DGS GESA 2017-1 FIN.1 GESA
Department of General Services
Capitol Complex

Energy Financing Providers

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF GENERAL SERVICES
HARRISBURG

Tom Wolf
Governor

Curt Topper
Secretary

GESA 2017-1 FIN.1

DGS – Capitol Complex Project

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DATE OF ISSUE: May 18, 2018

NOTICE TO FINANCIAL BIDDERS

Department of General Services, Office of Energy and Resource Management, 401 North Street, Harrisburg, Pennsylvania 17120

It is the responsibility of each bidder to ensure that its bid is received by the Department of General Services prior to the date and time set for the bid opening. No bid shall be considered if it arrives after the Bid Opening Date and Time, regardless of reason for the late arrival.

Financing.....Energy Financial Provider for
Guaranteed Energy Savings Act Project

Project Location.....DGS – Capitol Complex Project
Harrisburg, Pennsylvania

Professional.....Department of General Services
Energy and Resource Management Office

Agency .....Department of General Services

Brief Description.....This solicitation seeks financing for the GESA Contract described in the Bidding Documents including the Investment Grade Audit (IGA). The Bidder / Energy Financial Provider ("Financer") will be required to execute the Installment Purchase Agreement and Payment Schedule included in the Bidding Documents. The GESA Contract Documents are included with the Bidding Documents.

Bid Opening Date and Time .....**Friday, June 8, 2018 at 2:00 PM**

Contract Numbers.....DGS GESA 2017-1 FIN.1
....DGS – Capitol Complex Project GESA FINANCING
Collective No.: CN00038814

Proposed Term of Financing.....20 years including 12 months construction

Proposal Period .....60 Days allowed from Bid Opening until Award of
Installment Purchase Agreement

Bidder / Financer is expected to hold interest rates for 90 days from the date and time of Bid Opening.

MANDATORY Vendor Registration:.....All Bidders must be registered to and must have a current & active PA Vendor Number. Register at www.pasupplierportal.state.pa.us

Contact Office……	Energy and Resource Management Office Department of General Services
Mailing Address and Telephone Number to receive contract documents.	Room 403 North Office Building 401 North Street Harrisburg, Pennsylvania 17120 Telephone No: (717) 705-5946 Contact: Bidder Services

For information on the project please contact:
Rebecca Tomlinson (717) 705-5946, email retomlinso@pa.gov

THE INSTRUCTIONS TO FINANCIAL BIDDERS FOR GESA PROJECTS, INSTALLMENT PURCHASE AGREEMENT, AND THE GESA CONTRACT DOCUMENTS, ARE INCORPORATED INTO AND APPLY TO THIS PROJECT.

PRE-BID CONFERENCE

NO PRE-BID CONFERENCE WILL BE SCHEDULED

FREQUENTLY ASKED QUESTIONS

Question: How long does the Commonwealth expect the lender / contractor to hold the financing rate?
Answer: 90 days.

Question: When does the Commonwealth expect to complete / close the financing?
Answer: Upon full execution of both the 1) Installment Purchase Agreement by the Financer and Funding Agency and 2) GESA contract by the GESA Contractor and Funding Agency. This will occur within 90 days from the date of the Notice of Selection (i.e. award of contract to a Financer).

Question: Is the Commonwealth open to a rate index?
Answer: No, a fixed rate is required. Please refer to the bid proposal.

Question: Please clarify the proposal period – is it 60 days until selection of the finance company and an additional 60 days until closing? Or is it 60 days between the selection of finance company & closing?
Answer: DGS has up to 60 days from the Proposal Submission Deadline to issue a Notice of Selection. Closing may take up to 90 days after Notice of Selection.

INSTRUCTIONS
TO
FINANCIAL BIDDERS
FOR GESA PROJECT

GESA 2017-1 FIN.1

pennsylvania

DEPARTMENT OF GENERAL SERVICES

DEPARTMENT OF GENERAL SERVICES
CAPITOL COMPLEX GESA PROJECT

HARRISBURG, PENNSYLVANIA

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FAILURE TO COMPLY WITH THESE INSTRUCTIONS MAY RESULT IN THE REJECTION OF THE BID AS NOT RESPONSIVE.

SECTION 1. FINANCING TO BE PROVIDED. The financing to be provided is for the GESA Contract described in the bidding documents and the Investment Grade Audit (IGA). The GESA Contract Documents may be inspected during regular business hours at the Energy and Resource Management Office of the Department of General Services, located at Room 403, 401 North Street, Harrisburg, Pennsylvania 17120. The successful Bidder / Energy Financial Provider ("Financer") will be required to execute the Installment Purchase Agreement and Payment Schedule included in the Bidding Documents.

SECTION 2. FAMILIARITY WITH PROPOSED GESA CONTRACT WORK. The Bidder is responsible for its due diligence regarding the Investment Grade Audit (IGA) and for examining the nature and location of the GESA Contract Work. The Bidder shall also examine the Installment Purchase Agreement and proposed GESA Contract Documents pertaining to the Project. After the award of the contract, the Financer may not submit any claim alleging insufficient data, incorrectly assumed conditions, or misunderstanding with regard to matters for which no such clarification was sought during the bidding phase of the Project.

SECTION 3. INTERPRETATION OF BIDDING DOCUMENTS.

A. Requests for Interpretation (RFI) during the bid stage **shall be submitted in writing/email** to the name and address found in the Notice to Bidders. A copy of the RFI must also be forwarded at the same time to the Director, Energy and Resource Management, Department of General Services, 401 North Street, Harrisburg, Pennsylvania 17120. All RFIs related to the proposed Work or proposed contract documents must be received, in writing, by the Department, **no later than close of business five (5) days prior to the Bid Opening Date**. Only written RFIs received no later than five (5) days prior to the date fixed for the opening of bids will be considered by the Department. If a request is received within 5 days of the bid opening date, the Department may, in its sole discretion, answer the request. Requests via emails shall be considered "written" requests.

B. NEITHER THE DEPARTMENT NOR ANY REPRESENTATIVE OF THE FUNDING AGENCY SHOULD BE ASKED TO PROVIDE ANY ORAL INTERPRETATION TO ANY BIDDER RFI OF THE GESA CONTRACT DOCUMENTS. ANY CONVERSATION BETWEEN A BIDDER AND EITHER THE DEPARTMENT, OR THE REPRESENTATIVE OF THE FUNDING AGENCY FOR WHOM THE PROJECT IS BEING CONSTRUCTED, SHOULD NOT BE RELIED UPON BY ANY BIDDER, IS NOT BINDING UPON THE DEPARTMENT, AND SHALL NOT BECOME PART OF THE INSTALLMENT PURCHASE AGREEMENT UNLESS THE INFORMATION SUBSEQUENTLY APPEARS IN A WRITTEN BULLETIN.

C. The Department's response to any RFI will be in the form of a written bulletin signed by the Department. The Department will forward all bulletins to all Bidders that obtained bidding documents for the Project. All bulletins become a part of the Installment Purchase Agreement, and all Bidders are bound by all bulletins issued on the project.

SECTION 4. SUBMISSION OF BIDS. All bids shall be submitted on the form prepared by the Department. Bidder should retain a copy for their own use. All entries on the bid must be in ink or typewritten, preferably in blue ink to indicate an original writing. In case of discrepancy between the words and numbers, the written words are the bid price. The GESA Financial Bid form must be completed and a preliminary Payment Schedule must be submitted with the Bid. If the Interest Rate, Market Index, Spread (basis points), Other Fees, and/or All-In Total Payment on the GESA Financial Bid form are not completed and/or the preliminary Payment Schedule is not submitted with the Bid, **the Bid will be rejected as non-responsive**.

SECTION 5. SIGNING THE BID. The Bidder must sign the bid correctly as described in the bid documents. The signature must be an ORIGINAL and HAND-SCRIPTED signature. If the bid is submitted

by a corporation, the bid should be signed by the President or Vice President and any one of the following officers of the Corporation: the Secretary, Assistant Secretary, Treasurer, or Assistant Treasurer. If not signed by the specified officers, the signing individual must be authorized to sign by the corporation's board of directors. If a person other than one of these officers executes the bid, a copy of the document authorizing that person to execute the bid must accompany the bid. **If the "Certification and Bid Signature Page" is left blank, the bid will be deemed void and the bid WILL BE REJECTED by the Department. The bidder will NOT be given any opportunity to sign the page after the time and date of the bid opening. A signature appearing any other place in the bid package shall not be sufficient to substitute for the lack of a signature on the Certification and Bid Signature page.**

SECTION 6. AWARD TO A FOREIGN BUSINESS. No contract will be awarded to a Bidder which is a foreign corporation, a foreign limited liability company, a foreign limited partnership, or which is operating under a fictitious or assumed name unless the Bidder has complied with, or agreed to comply with, the registration requirements under the Business Corporation Law of 1988 (15 Pa. C.S. §4121-§4131) and/or the Limited Liability Company Law of 1994 (15 Pa. C.S. §8981-§8982), and/or the Partnership Code (15 Pa. C.S. §8581-§8590), and/or the Fictitious Names Act (54 Pa. C.S. §301-§332).

SECTION 7. TIMELY DELIVERY OF BID PROPOSAL. The bidder must submit its bid to the Department prior to the time scheduled for bid opening, regardless of the method of delivery used. Any bid received after the time set for the bid opening will be returned to the bidder without being considered by the Department. The bid will not be returned if it is not possible to determine the identity and address of the bidder.

SECTION 8. DELIVERY OF BID IN CLEARLY MARKED ENVELOPE. Each bid should be submitted in a separate envelope. All bids shall be enclosed in a sealed envelope and marked plainly on the outside with the contract number, bid opening date and time. If the bid envelope is to be enclosed in another envelope for the purpose of express-type delivery, the exterior envelope shall be clearly marked as a bid and the contract number, bid opening date and time shall be shown on the exterior envelope.

A. **Submission of Bid by Mail.** If submitted by mail, the envelope shall be sent to the address for receiving bids noted in the "Notice to Bidders" for the particular Project, and should be sent Return Receipt Requested.

B. **Submission of Bid by other than Mail.** If submitted other than by mail, the bid must be delivered to the address noted in the particular "Notice to Bidders" prior to the time stated therein.

C. **Submission of Bid by Hand Delivery.** Photographic identification and proof of authorization will be required from individuals who are hand-delivering bids.

SECTION 9. WITHDRAWAL OR MODIFICATION OF A BID PRIOR TO BID OPENING

A. **Complete Withdrawal Before Bid Date or Time.** A Bid may be withdrawn by written notice or in person by a Bidder or its authorized representative (if their identity is established by photographic identification and proof of authorization, preferably on Bidder letterhead) and a receipt for the bid is signed prior to the exact hour and date set for the opening of bids.

B. **Modification Before Bid Date or Time of a Bid of Bid Already Submitted But Not Opened.** If, before the time of the bid opening, a Bidder wishes to modify a bid already delivered to the Department, the Bidder or its authorized representative (if their identity is made known through photographic identification and proof of authorization) may request that the Department return the bid, but only if the Bidder/representative signs a receipt for the bid **before** the exact hour and date set for the opening of bids. The Bidder or their authorized representative may then modify the bid and resubmit the bid so long as the modified bid complies with the requirements set forth in these Instructions to Financial Bidders for GESA Projects. The Department will not, under any circumstances, open a bid before the bid opening date and time.

SECTION 10. **BID OPENING PROCEDURE.** Bids will be opened and the All-In Total Payment will be read aloud publicly in the presence of one or more witnesses at the time and place designated in the Notice to Bidders. No inspection or photocopies of any Bid Proposal will be made at the bid opening. The amount of each bid, together with the name of each Bidder will be recorded. Such recorded information shall be considered unofficial and shall be open to public inspection after the bid opening. The bid tab, listing the Bidders and their bid amount, will formally be made available to interested parties typically within (3) three business days.

SECTION 11. **REJECTION OF BID.** The Department reserves the right to reject any or all bids or parts thereof. A bid may be rejected if it shows any omission, alterations of form, additions or deductions not called for, conditional language or uninvited alternate bids, or irregularities of any kind. The Department reserves the right, however, to waive technical defects or irregularities on bids. The Department may reject the bid of any Bidder failing to meet the requirements of these Instructions to Financial Bidders or any other requirements of Bidders set forth in the Bidding Documents.

SECTION 12. **WITHDRAWAL OF BIDS AFTER BID OPENING.** Within three (3) days after the opening of the bids, but before award, a Bidder may request permission to withdraw its entire bid if it submits a request, by email or mail, to the Department. The request must be addressed to the Director of the Energy and Resource Management Office. The request will not be considered received unless it is directed as set out in this section. With the request for withdrawal, the Bidder must submit evidence that the reason for withdrawal is a clerical mistake as opposed to a judgment mistake and was actually due to an unintentional arithmetical error.

SECTION 13. **EXPERIENCE QUESTIONNAIRE AND FINANCIAL STATEMENT PROVIDED ON REQUEST.** At the Department's request, or if specifically required by the bid, Bidders shall file an experience questionnaire and financial statement with the Department on the form provided by the Department. The questionnaire and statement shall be certified to be true and correct by an affidavit sworn to or affirmed before a Notary Public, or other officer empowered to administer oaths or affirmations. Falsification of any requested information shall result in a rejection of the bid as not responsible, forfeiture of the bid bond and/or cancellation of the Contract Award.

SECTION 14. **COLLUSIVE BIDS WILL BE REJECTED.** The bids of any Bidder or Bidders who engage in collusive bidding will be rejected. Any Bidder who submits more than one bid in such manner as to make it appear that the bids submitted are on a competitive basis from different parties will be considered a collusive Bidder. Submission of collusive bids will result in a Bidder being rejected as not responsible for subsequent projects. Nothing in this Section prevents a Bidder from superseding a bid by submitting a subsequent bid, delivered prior to bid opening, which expressly revokes the previous bid.

SECTION 15. **BID PROTEST PROCEDURE.** The Commonwealth Procurement Code (62 P.C. §1711.1, as amended) governs the protest procedure, which is summarized below. In the event this general description conflicts with the statute, the statutory language controls.

A. Who may File. Any Bidder or prospective Bidder who is aggrieved in connection with the bid or the award of a contract resulting from the bid may file a protest.

1. Prospective Bidder is an entity that has not submitted a bid in response to the Notice to Bidders.

2. Bidder is an entity that has submitted a bid in response to the Notice to Bidders.

B. Time Limits.

1. If a protest is filed by a prospective Bidder, a protest must be filed, in writing or by email, with the head of the Issuing Office **prior** to the bid opening date and time described in the Notice to Bidders.

2. If a protest is filed by a Bidder, the protest must be filed, in writing or email, with the Issuing Office within seven (7) days after the protesting Bidder knew or should have known of the facts giving rise to the protest **except** in no event may a protest be filed later than 7 days after the Notice of Award is posted on the DGS website.

3. Filed – shall be defined as the date upon which the Issuing Office receives the written protest.

4. If the Bidder fails to file a bid protest or files an untimely protest, then they shall be deemed to have waived the right to protest the solicitation or award of the contract in any forum. Untimely protests will be disregarded by the Department.

C. The Department may cancel an invitation for bids or may reject all bids at any time prior to the time a contract is executed by all parties when it is in the best interests of the Commonwealth. The Bidder may not submit a protest relating to cancellation of the bid or rejection of all bids.

D. A protest shall state all grounds upon which the protestant asserts the solicitation or award of the contract was improper. The protestant may submit with the protest any documents or information it deems relevant to the protest.

E. The full text of the Bid Protest Procedure can be found at 62 Pa.C.S §1711.1 *et seq.*

SECTION 16. BIDDER CERTIFIED NOT UNDER DEBARMENT. The Bidder must certify that it is not currently under suspension or debarment by the Commonwealth, any other state, or the federal government, and if the Bidder cannot so certify, then the Bidder agrees to submit along with the bid a written explanation of why such certification cannot be made.

SECTION 17. REIMBURSEMENT OF COSTS OF INSPECTOR GENERAL INVESTIGATION. The Financer shall reimburse the Commonwealth for the reasonable costs of investigation incurred by the Office of Inspector General for investigations of the Contractor's compliance with the terms of this or any other agreement between the Financer and the Commonwealth which result in the suspension or debarment of the Financer. Such costs shall include, but not be limited to, salaries of investigators, including overtime; travel and lodging expenses; and expert witness and documentary fees. The Contractor shall not be responsible for investigative costs for investigations which do not result in the Financer's suspension or debarment.

SECTION 18. CURRENT LIST OF SUSPENDED AND DEBARRED ENTITIES. The Financier/Contractor may obtain the current list of suspended and debarred Entities by referring to the Department of General Services' Construction and Public Works website or by contacting the:

Department of General Services
Office of Chief Counsel
603 North Office Building
Harrisburg, Pennsylvania 17125
Telephone No. (717) 783-6472
FAX No. (717) 787-9138

SECTION 19. ASSIGNMENT OF ANTITRUST CLAIMS. The Financer/Contractor and the Commonwealth recognize that, in actual economic practice, overcharges by the Financer's/Contractor's consultants, resulting from the violations of State or Federal antitrust laws, are, in fact, borne by the Commonwealth. As part of the consideration for the award of this contract, and, intending to be legally bound, the Financer/Contractor assigns to the Commonwealth all right, title and interest in, and to, any claims contractor now has, or may hereafter acquire, under State or Federal antitrust laws relating to the goods or services, which are the subject of this contract.

SECTION 20. CONTRACTOR INTEGRITY PROVISIONS

A. It is essential that those who seek to contract with the Commonwealth of Pennsylvania ("Commonwealth") observe high standards of honesty and integrity. They must conduct themselves in a manner that fosters public confidence in the integrity of the Commonwealth procurement process.

B. In furtherance of this policy, the Energy Financing Provider/Financer (referred to as "Contractor" in this Section) agrees to the following:

a. Contractor shall maintain the highest standards of honesty and integrity during the performance of this contract and shall take no action in violation of state or federal laws or regulations or any other applicable laws or regulations, or other requirements applicable to Contractor or that govern contracting with the Commonwealth.

b. Contractor shall establish and implement a written business integrity policy, which includes, at a minimum, the requirements of these provisions as they relate to Contractor employee activity with the Commonwealth and Commonwealth employees, and which is distributed and made known to all Contractor employees.

c. Contractor, its affiliates, agents and employees shall not influence, or attempt to influence, any Commonwealth employee to breach the standards of ethical conduct for Commonwealth employees set forth in the *Public Official and Employees Ethics Act, 65 Pa.C.S. §§1101 et seq*.; the *State Adverse Interest Act, 71 P.S. §776.1 et seq*.; and the *Governor's Code of Conduct, Executive Order 1980-18, 4 Pa. Code §7.151 et seq*., or to breach any other state or federal law or regulation.

d. Contractor, its affiliates, agents and employees shall not offer, give, or agree or promise to give any gratuity to a Commonwealth official or employee or to any other person at the direction or request of any Commonwealth official or employee.

e. Contractor, its affiliates, agents and employees shall not offer, give, or agree or promise to give any gratuity to a Commonwealth official or employee or to any other person, the acceptance of which would violate the *Governor's Code of Conduct, Executive Order 1980-18, 4 Pa. Code §7.151 et seq.* or any statute, regulation, statement of policy, management directive or any other published standard of the Commonwealth.

f. Contractor, its affiliates, agents and employees shall not, directly or indirectly, offer, confer, or agree to confer any pecuniary benefit on anyone as consideration for the decision, opinion, recommendation, vote, other exercise of discretion, or violation of a known legal duty by any Commonwealth official or employee.

g. Contractor, its affiliates, agents, employees, or anyone in privity with him or her shall not accept or agree to accept from any person, any gratuity in connection with the performance of work under the contract, except as provided in the contract.

h. Contractor shall not have a financial interest in any other contractor, subcontractor, or supplier providing services, labor, or material on this project, unless the financial interest is disclosed to the Commonwealth in writing and the Commonwealth consents to Contractor's financial interest prior to Commonwealth execution of the contract. Contractor shall disclose the financial interest to the Commonwealth at the time of bid or proposal submission, or if no bids or proposals are solicited, no later than Contractor's submission of the contract signed by Contractor.

i. Contractor, its affiliates, agents and employees shall not disclose to others any information, documents, reports, data, or records provided to, or prepared by, Contractor under this contract without the prior written approval of the Commonwealth, except as required by the *Pennsylvania Right-to-Know Law, 65 P.S. §§ 67.101-3104*, or other applicable law or as otherwise provided in this contract. Any information, documents, reports, data, or records secured by Contractor from the Commonwealth or a third party in connection with the performance of this contract shall be kept confidential unless disclosure of such information is:

    i. Approved in writing by the Commonwealth prior to its disclosure; or

    ii. Directed by a court or other tribunal of competent jurisdiction unless the contract requires prior Commonwealth approval; or

iii. Required for compliance with federal or state securities laws or the requirements of national securities exchanges; or

iv. Necessary for purposes of Contractor's internal assessment and review; or

v. Deemed necessary by Contractor in any action to enforce the provisions of this contract or to defend or prosecute claims by or against parties other than the Commonwealth; or

vi. Permitted by the valid authorization of a third party to whom the information, documents, reports, data, or records pertain: or

vii. Otherwise required by law.

j. Contractor certifies that neither it nor any of its officers, directors, associates, partners, limited partners or individual owners has not been officially notified of, charged with, or convicted of any of the following and agrees to immediately notify the Commonwealth agency contracting officer in writing if and when it or any officer, director, associate, partner, limited partner or individual owner has been officially notified of, charged with, convicted of, or officially notified of a governmental determination of any of the following:

i. Commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements or receiving stolen property.

ii. Commission of fraud or a criminal offense or other improper conduct or knowledge of, approval of or acquiescence in such activities by Contractor or any affiliate, officer, director, associate, partner, limited partner, individual owner, or employee or other individual or entity associated with:

1. Obtaining;

2. Attempting to obtain; or

3. Performing a public contract or subcontract

Contractor's acceptance of the benefits derived from the conduct shall be deemed evidence of such knowledge, approval or acquiescence.

iii. Violation of federal or state antitrust statutes.

iv. Violation of any federal or state law regulating campaign contributions.

v. Violation of any federal or state environmental law.

vi. Violation of any federal or state law regulating hours of labor, minimum wage standards or prevailing wage standards; discrimination in wages; or child labor violations.

vii. Violation of the *Act of June 2, 1915 (P.L.736, No. 338)*, known as the *Workers' Compensation Act,* 77 P.S. 1 *et seq*.

viii. Violation of any federal or state law prohibiting discrimination in employment.

ix. Debarment by any agency or department of the federal government or by any other state.

x. Any other crime involving moral turpitude or business honesty or integrity.

Contractor acknowledges that the Commonwealth may, in its sole discretion, terminate the contract for cause upon such notification or when the Commonwealth otherwise learns that Contractor has been officially notified, charged, or convicted.

k. If this contract was awarded to Contractor on a non-bid basis, Contractor must, (as required by *Section 1641* of the *Pennsylvania Election Code*) file a report of political contributions with the Secretary of the Commonwealth on or before February 15 of the next calendar year. The report must include an itemized list of all political contributions known to Contractor by virtue of the knowledge possessed by every officer, director, associate, partner, limited partner, or individual owner that has been made by:

    i. Any officer, director, associate, partner, limited partner, individual owner or members of the immediate family when the contributions exceed an aggregate of one thousand dollars ($1,000) by any individual during the preceding year; or

    ii. Any employee or members of his immediate family whose political contribution exceeded one thousand dollars ($1,000) during the preceding year.

To obtain a copy of the reporting form, Contractor shall contact the Bureau of Commissions, Elections and Legislation, Division of Campaign Finance and Lobbying Disclosure, Room 210, North Office Building, Harrisburg, PA 17120.

l. Contractor shall comply with requirements of the *Lobbying Disclosure Act, 65 Pa.C.S. § 13A01 et seq*., and the regulations promulgated pursuant to that law. Contractor employee activities prior to or outside of formal Commonwealth procurement communication protocol are considered lobbying and subjects the Contractor employees to the registration and reporting requirements of the law. Actions by outside lobbyists on Contractor's behalf, no matter the procurement stage, are not exempt and must be reported.

m. When Contractor has reason to believe that any breach of ethical standards as set forth in law, the Governor's Code of Conduct, or in these provisions has occurred or may occur, including but not limited to contact by a Commonwealth officer or employee which, if acted upon, would violate such ethical standards, Contractor shall immediately notify the Commonwealth contracting officer or Commonwealth Inspector General in writing.

n. Contractor, by submission of its bid or proposal and/or execution of this contract and by the submission of any bills, invoices or requests for payment pursuant to the contract, certifies and represents that it has not violated any of these contractor integrity provisions in connection with the submission of the bid or proposal, during any contract negotiations or during the term of the contract.

o. Contractor shall cooperate with the Office of Inspector General in its investigation of any alleged Commonwealth employee breach of ethical standards and any alleged Contractor non-compliance with these provisions. Contractor agrees to make identified Contractor employees available for interviews at reasonable times and places. Contractor, upon the inquiry or request of the Office of Inspector General, shall provide, or if appropriate, make promptly available for inspection or copying, any information of any type or form deemed relevant by the Inspector General to Contractor's integrity and compliance with these provisions. Such information may include, but shall not be limited to, Contractor's business or financial records, documents or files of any type or form that refers to or concern this contract.

p. For violation of any of these Contractor Integrity Provisions, the Commonwealth may terminate this and any other contract with Contractor, claim liquidated damages in an amount equal to the value of anything received in breach of these provisions, claim damages for all additional costs and expenses incurred in obtaining another contractor to complete performance under this contract, and debar and suspend Contractor from doing business with the Commonwealth. These rights and remedies are cumulative, and the use or non-use of any one shall not preclude the use of all or any other. These rights and

remedies are in addition to those the Commonwealth may have under law, statute, regulation, or otherwise.

q. For purposes of these Contractor Integrity Provisions, the following terms shall have the meanings found in this Paragraph q.

i. "Confidential information" means information that a) is not already in the public domain; b) is not available to the public upon request; c) is not or does not become generally known to Contractor from a third party without an obligation to maintain its confidentiality; d) has not become generally known to the public through a act or omission of Contractor; or e) has not been independently developed by Contractor without the use of confidential information of the Commonwealth.

ii. "Consent" means written permission signed by a duly authorized officer or employee of the Commonwealth, provided that where the material facts have been disclosed, in writing, by pre-qualification, bid, proposal, or contractual terms, the Commonwealth shall be deemed to have consented by virtue of execution of this contract.

iii. "Contractor" means the individual or entity that has entered into this contract with the Commonwealth, including those directors, officers, partners, managers, and owners having more than a five percent interest in Contractor.

iv. "Financial interest" means:

1. Ownership of more than a five percent interest in any business; or

2. Holding a position as an officer, director, trustee, partner, employee, or holding any position of management.

v. "Gratuity" means tendering, giving or providing anything of more than nominal monetary value including, but not limited to, cash, travel, entertainment, gifts, meals, lodging, loans, subscriptions, advances, deposits of money, services, employment, or contracts of any kind. The exceptions set forth in the *Governor's Code of Conduct, Executive Order 1980-18*, the *4 Pa. Code §7.153(b)*, shall apply.

vi. "Immediate family" means a spouse and any unemancipated child.

vii. "Non-bid basis" means a contract awarded or executed by the Commonwealth with Contractor without seeking bids or proposals from any other potential bidder or offeror.

viii. "Political contribution" means any payment, gift, subscription, assessment, contract, payment for services, dues, loan, forbearance, advance or deposit of money or any valuable thing, to a candidate for public office or to a political committee, including but not limited to a political action committee, made for the purpose of influencing any election in the Commonwealth of Pennsylvania or for paying debts incurred by or for a candidate or committee before or after any election.

SECTION 21. AWARD OF INSTALLMENT PURCHASE AGREEMENT (i.e., CONTRACT). If DGS awards an Installment Purchase Agreement, it will be made to the responsible Bidder with the lowest "All-In Total Payment," whose "All-In Total Payment" coincides with their submitted preliminary Payment Schedule (monthly, commencing 1 month after final completion) and the project's Investment Grade Audit , within sixty (60) days from the Bid Opening Date. The 60-day period may be extended by written consent of the lowest responsible Bidder(s). Notice of Award of Contract will be made by letter mailed to the Financer and will be effective upon the date DGS mailed the Notice of Award. If the lowest Bidder withdraws its bid, declines to extend the bid or refuses the Award of Contract, the Department may award the Installment Purchase Agreement to the next lowest responsible Bidder or reject all bids and re-bid the

Financing. **There will be no Contract with the Commonwealth until all parties have fully executed the Installment Purchase Agreement**

SECTION 22. EXECUTION OF INSTALLMENT PURCHASE AGREEMENT. Within ten (10) days after receipt of the Installment Purchase Agreement, the successful Bidder, must:

A. Sign and return the Installment Purchase Agreement and Payment Schedule (monthly, commencing 12 months after final completion) to the Department of General Services, Room 403, 401 North Street, Harrisburg, Pennsylvania 17120; in care of the Energy and Resource Office, or emailed to the GESA administrator and

B. The payment schedule shall include payment number, payment date, payment amount, principle payment, interest payment and total balance.

C. The Commonwealth will review the Payment Schedule for accuracy;

a. If it is inaccurate, discuss the discrepancies with the Bidder; or
b. If accurate, process for Commonwealth signatures.

D. After all Commonwealth signatures (handwritten or electronic) are obtained and the Installment Purchase Agreement is fully executed, the Department will forward a written notification to you.

E. Understand and agree that a stamped "APPROVED ELECTRONICALLY" or similar wording by the Commonwealth on the Installment Purchase Agreement signature page constitutes a valid, binding contract with the Commonwealth and represents that all approvals required by Commonwealth contracting procedures have been obtained. The fully executed Contract may not contain "ink" signatures by the Commonwealth.

F. The monthly payments will be made automatically to the Bidder with no payment book or invoices.

SECTION 23. FAILURE TO EXECUTE INSTALLMENT PURCHASE AGREEMENT. Failure or refusal of the Financer to properly execute the Installment Purchase Agreement within the 10-day time will be viewed as a refusal to accept the Award. If the successful Bidder refuses to accept the award or properly execute the Installment Purchase Agreement within the 10-day time, the Department may award the Installment Purchase Agreement to the next lowest responsible Bidder, or reject all bids and re-bid the Financing

SECTION 24. VETERAN'S PREFERENCE. The Department strongly encourages that, all things being equal, contractors give preference in employment on projects of the Department to veterans of the Armed Services of the United States of America.

SECTION 25. PROVISIONS CONCERNING THE AMERICANS WITH DISABILITIES ACT. During the term of this contract, the Energy Financing Provider/Financer (referred to as "Contractor" in this Section) agrees as follows:

A. Pursuant to federal regulations promulgated under the authority of The Americans with Disabilities Act, 28 C.F.R. 35.202 et seq., the contractor understands and agrees that no individual with a disability shall, on the basis of the disability, be excluded from participation in this contract or from such activities provided for under this contract. As a condition of accepting and executing this contract, the Contractor agrees to comply with the "General Prohibitions Against Discrimination," 28 C.F.R. 35.130, and all other regulations promulgated under Title II of The Americans with Disabilities Act which are applicable to the benefits, services, programs, and activities provided by the Commonwealth of Pennsylvania through contracts with outside contractors.

B. The Contractor shall be responsible for and agrees to indemnify and hold harmless the Commonwealth of Pennsylvania from all losses, damages, expenses, claims, demands, suits, and actions brought by any party against the Commonwealth of Pennsylvania as a result of the Contractor's failure to comply with the provisions of paragraph A above.

SECTION 26. **Energy Finance Providers Bid Package Contents.** The bid package for solicitation of an Energy Financial Provider for the GESA includes:

- **A.** Notice to Financial Bidders
- **B.** Instructions to Financial Bidders for GESA Project
- **C.** Financial Bid Proposal for GESA Project which includes:
    1. Responsiveness Checklist
    2. General Information
    3. Certification and Bid Signature Page
- **D.** Installment Purchase Agreement and Payment Schedule with Exhibits containing:
    1. GESA Contract
        a. Contract Bonds
        b. Scope of Work
        c. Assured Performance Guarantee for GESA Contract
    2. Form of Acceptance Certificate
    3. Payment Schedule
- **E.** Other GESA Contract Documents Including:
    1. Request for Quote (RFQ) for GESA Contractor
    2. General Conditions
    3. Administrative Procedures
    4. Bulletins
    5. Selected GESA Contractor's Quote Submission
- **F.** Energy Audit Report

Financial Bid Proposal
for
Guaranteed Energy Savings Project
Contract No.
DGS GESA 2017-1 Capitol Complex

Bid Index

Responsiveness Checklist

General Information

Certification and Bid Signature

Note: Please read all pages of this Bid Proposal. The Responsiveness Checklist is provided for your convenience and should not be returned to the Department. All other pages shall be completed and properly signed and/or sealed by Bidder in the appropriate place before being returned to the Department on or before the bid due date and time established in the Notice to Bidders. If the Bidder wishes to have a copy of their Bid Proposal, make the copy before submitting to the Department. The Department will not provide Bidder with a copy.

Responsiveness Checklist

This checklist is only provided as a courtesy to assist bidders in submitting a responsive bid. Compliance with the checklist does not guarantee a responsive bid. The checklist should not be returned to the Department since it will not be used to review the bid package.

	YES	NO
Bidder has acknowledged receipt of any Bulletins under "BULLETIN INFORMATION"		
Bidder has ensured the GESA Financial Bid form is fully complete		
Bidder has ensured the words match numbers in the All-In Total Payment, if not, words control		
Bidder has submitted the preliminary Payment Schedule		
Bidder has completed the Bid Signature Page		
Bidder has ensured that the Bid Signature Page is signed by authorized person		

pennsylvania
DEPARTMENT OF GENERAL SERVICES

GESA FINANCE BID PROPOSAL

Department of General Services
401 North Street
Harrisburg, PA 17125

Do not write in space below

Date: _____

Bid Opening Witness: _____

Legal Review: _____

CONTRACT NO. DGS GESA 2017-1 CAPITOL COMPLEX FIN.1
COLLECTIVE NO.: CN00038814
GUARANTEED ENERGY SAVINGS PROJECT
FINANCING BID PROPOSAL FOR
GESA 2017-1 DGS, CAPITOL COMPLEX, HARRISBURG, PENNSYLVANIA

Bidder Name and Address:

_____

_____

_____

_____

_____

Bidder Phone #:
_____

Bidder Email:
_____

Bidder Federal ID #:
_____

Vendor ID #:
_____

BULLETIN INFORMATION: Bidder acknowledges receipt of the following Bulletin(s) and agrees they are part of this Bid Proposal.

Bulletin #___ Issue Date:_____ Bulletin #___ Issue Date:_____

Bulletin #___ Issue Date:_____ Bulletin #___ Issue Date:_____

Bulletin #___ Issue Date:_____ Bulletin #___ Issue Date:_____

GESA Financial Bid

Funding Placement	Private
Construction Duration	12 months
Repayment Period (commencing 1 month after final completion)	19 years
Payment Structure (commencing 1 month after final completion)	Monthly
*Interest Rate	
*Market Index	
*Spread (basis points)	
*Other fees (if applicable and include explanation)	
*°All-In Total Payment $	$_____ (figures) _____ _____ (written)

*These items are required to be completed. If they are not completed, the Bid will be rejected as non-responsive.

° All-In Total Payment is the total amount to be paid to the Financer over the Repayment Period.

BIDDER ORGANIZATIONAL INFORMATION

BIDDER ORGANIZATION (Check applicable box)

☐ The Bidder is a corporation, limited liability company, or partnership organized and existing under the laws of Pennsylvania and has been granted a certificate of authority to do business in Pennsylvania as required by the Business Corporation Law of 1988, as amended.

OR

☐ The Bidder is a corporation organized and existing under the laws of _____ and **has or has not** (circle one) been granted a certificate of authority to do business in Pennsylvania as required by the Business Corporation Law of 1988 (15 Pa. C.S. §4121-§4131), as amended.

OR

☐ The Bidder is a limited liability company organized and existing under the laws of _____ and **has or has not** (circle one) registered to do business in Pennsylvania as required by the Limited Liability Company Law of 1994 (15 Pa. C.S. §8981-§8982), as amended.

OR

☐ The Bidder is a limited partnership organized and existing under the laws of _____ and **has or has not** (circle one) registered to do business in Pennsylvania as required by the Partnership Code (15 Pa. C.S. §8581-§8590), as amended.

OR

☐ The Bidder is an individual or partnership trading under a fictitious or assumed name and **has or has not** (circle one) registered under the Fictitious Names Act (54 Pa. C.S. §301-§332), as amended.

BIDDER RESIDENCE INFORMATION

Bidder has a bona fide establishment in Pennsylvania at which it was transacting business when the Notice to Bidders for this Project was issued?

If "**Yes**", insert address below if different than address on page 1:

_____
_____
_____
_____

If "**No**", insert Bidder's office address if different than address on page 1.

_____
_____
_____
_____

Certification and Bid Signature

In conformity with the Investment Grade Audit prepared for this Project and after examination of the contract documents including the Installment Purchase Agreement and Payment Schedule and issued Bulletins, which are made a part hereof as if fully set forth, the undersigned (hereinafter "Bidder"), submits this Bid Proposal and certifies by signing that:

1. Bidder is the only person(s) interested in this Bid as principal and this Bid Proposal is submitted without collusion with any person, firm or corporation; and

2. Bidder will execute the Installment Purchase Agreement within ten (10) days after receipt of the documents; and

3. Bidder agrees to provide the funding to complete the work set forth in the GESA Contract documents and the Investment Grade Audit. It is understood that the first payment of the Payment Schedule is not due until twelve (12) months after the GESA Project is completed; and

4. Bidder agrees that DGS reserves the right to reject this and any or all Bid Proposals, or any part thereof or to waive technicalities required for the best interests of the Commonwealth; and

5. Bidder understands and acknowledges that all information provided by, and representations made by, the Bidder in the Bid Proposal are material and important and will be relied upon by the Issuing Office in awarding the contract(s). Any misstatement shall be treated as fraudulent concealment from the Issuing Office of the true facts relating to the submission of this bid. A misrepresentation shall be punishable under 18 Pa. C.S. § 4904; and

6. Bidder agrees that the Commonwealth of Pennsylvania may offset all or a portion of any and all payments that may become due and owing under the contract for this project against any and all debts owed to any other Commonwealth of Pennsylvania agency; and

7. The bid is made in good faith and not pursuant to any agreement or discussion with, or inducement from, any firm or person to submit a complementary or other noncompetitive bid; and

8. To the best knowledge of the person signing the bid, Bidder, its affiliates, subsidiaries, officers, directors, and employees are not currently under investigation by any governmental agency and have not in the last three (3) years been convicted or found liable for any act prohibited by State or Federal law in any jurisdiction, involving conspiracy or collusion with respect to bidding or proposing on any public contract, except as disclosed by the Bidder in its bid; and.

9. To the best of the knowledge of the person signing the Bid Proposal for the Bidder and except as otherwise disclosed by the Bidder in its bid, the Bidder has no outstanding, delinquent obligations to the Commonwealth including, but not limited to, any state tax liability not being contested on appeal or other obligation of the Bidder that is owed to the Commonwealth; and.

10. The Bidder is not currently under suspension or debarment by the Commonwealth, or any other state, or the federal government; and

11. The Bidder has not, under separate contract with the Issuing Office, made any recommendations to the Issuing Office concerning the need for the services described in the bid or the specifications for the services described in the bid; and

12. Bidder, by submitting its bid, authorizes all Commonwealth agencies to release to the Commonwealth information related to liabilities to the Commonwealth including, but not limited to, taxes, unemployment compensation, and workers' compensation liabilities; and

13. Until the awarded Bidder receives a fully executed and approved written Installment Purchase Agreement from the Issuing Office there is no legal and valid contract, in law or in equity, and the Bidder should not begin to perform Work; and

14. Bidder agrees to comply with the Non-Discrimination Sexual Harassment Clause in the Installment Purchase Agreement and is aware that implementation of nondiscrimination and equal opportunity is the policy of the Commonwealth of Pennsylvania. DGS has established a method of administration to assure that all contracting agencies and contractors are accorded equal employment opportunity without regard to race, color, national origin, ancestry, religious creed, age or sex; and

15. The person(s) signing this bid certifies that the information in this Bid Proposal is true and correct to the best of their knowledge and that the person(s) is authorized to represent the Bidder in connection with this certification

I state that _____ (Name of Bidder) submits this Bid Proposal and understands and acknowledges that the above representations (1 through 15) are material and important, and will be relied upon by the Department of General Services in awarding the Installment Purchase Agreement for which this bid is submitted. I understand and my firm understands that any misstatement in this affidavit is and shall be treated as fraudulent concealment from the Department of General Services of the true facts relating to the submission of this bid.

BIDDER IS AN INDIVIDUAL:

Witness: By:

_____ _____ _____

General Partner Date

BIDDER IS A PARTNERSHIP:

Witness: By:

_____ _____ _____

General Partner Date

BIDDER IS A LIMITED LIABILITY COMPANY:

Attest: By:

_____ _____ _____

Secretary President Date

OR

BIDDER IS A CORPORATION:

Attest: By:

_____ _____ _____

Secretary President Date

Installment Purchase Agreement and Payment Schedule
GESA 2017-1 Capitol Complex Project

This **Installment Purchase Agreement and Payment Schedule** ("Agreement") is entered into this ____ day of _____, 20___ between the Energy Financial Provider, **[Financial Provider]**, a **[State]** corporation ("FINANCER") and the Commonwealth of Pennsylvania ("Commonwealth"), acting through the Department of General Services ("Funding Agency").

WITNESSETH:

WHEREAS, GESA Contractor and Commonwealth will enter into a Guaranteed Energy Savings Contract ("GESA Contract" --**Exhibit A**) for the implementation of the Energy Conservation Measures ("ECM") at the Funding Agency's facilities located in Harrisburg, Pennsylvania, GESA 2017-1 Capitol Complex Project;

WHEREAS, the FINANCER will provide financing for the GESA Contract and receive payments from the Funding Agency in accordance with the terms of this Agreement;

WHEREAS, the GESA Contractor will implement/construct the ECMs and adhere to all terms of the GESA Contract; and

WHEREAS, the Funding Agency will approve payments to be made to the GESA Contractor for work satisfactorily completed by the GESA Contractor during the implementation/construction of the ECMs and make payments to the FINANCER in accordance with the terms of this Agreement.

NOW THEREFORE, the parties intending to be legally bound agree as follows:

1. FUNDING AND PAYMENT FOR GESA CONTRACT

   A. To assure the availability of moneys to pay the GESA Contractor, the cost of the GESA Contract for, inter alia, the implementation/construction of the ECMs, the FINANCER has, at the request of the Commonwealth, deposited $ .00 (the "Acquisition Amount") into a segregated escrow account (the "Escrow Account") at _____, (the "Escrow Agent") to be held, invested, and disbursed by the Escrow Agent in accordance with the terms of that certain Escrow and Account Control Agreement dated as of _____ by and among the Financer, the Funding Agency, and the Escrow Agent (the "Escrow Agreement").

   B. The ECMs will be implemented/constructed by the GESA Contractor at the location specified in the GESA Contract. The GESA Contractor will submit Applications for Payment in accordance with the GESA Contract, and once the Applications for Payment are reviewed/approved by the Funding Agency, the Funding Agency will request disbursement from the Escrow Account for the payment of the cost of the ECMs.

   C. The FINANCER shall then make payments to the GESA Contractor for the amount specified by the Funding Agency.

   D. In the event that the amounts in the Escrow Account are insufficient to pay the costs of the ECMs, the Funding Agency shall deposit additional funds into the Escrow Account to eliminate such insufficiency.

E. In the event that the amount in the Escrow Account exceeds the cost of the ECMs (the "Excess Funds"), the Funding Agency shall pay such Excess Funds to FINANCER and such Excess Funds shall be applied as a principal prepayment to the first payment on the Payment Schedule and to each succeeding payment on the Payment Schedule until all of the Excess Funds have been applied. Upon acceptance of all the ECMs, the Funding Agency shall deliver to FINANCER an Acceptance Certificate in the form attached to this Agreement as **Exhibit B**.

2. TERM

A. This Agreement will become effective upon receipt of a fully executed Agreement by all parties. This Agreement, unless earlier terminated as expressly provided for in this Agreement, will continue until all payments set in the Payment Schedule (**Exhibit C**) have been made in full ("Agreement Term").

3. PAYMENT

A. The Funding Agency agrees to pay to FINANCER, or any assignee of the FINANCER, the payments including the interest portion, as specified in the Payment Schedule at the office of FINANCER (or such other place as FINANCER or its assignee may from time to time designate in writing).

B. Such payments will be made commencing on (and thereafter) the dates set in the Payment Schedule.

C. Unless specifically provided otherwise in this Agreement, the Funding Agency's obligation to make the payments to the Financer shall commence approximately one (1) month after the Final Payment has been paid to the GESA Contractor by the Escrow Agent and shall be absolute and unconditional in all events except as expressly provided in Section 4 and Section 19.

D. The Funding Agency believes that sufficient funds can be obtained to make all payments during the Agreement Term and hereby covenants that it will do all things lawfully within its power to obtain, maintain, and properly request and pursue funds from which the payments may be made, including making provisions for such payments to the extent necessary in each budget submitted for the purpose of obtaining funding, using its best efforts to have such portion of the budget approved, and exhausting all available administrative reviews and appeals in the event that such portion of the budget is not approved.

E. It is the Funding Agency's intent to make payment for the full Agreement Term if funds are legally available, and in that regard, the Funding Agency represents that the use of the ECMs is essential to its proper, efficient, and economic operation.

F. During the Agreement Term, the Funding Agency will, upon the request of FINANCER, annually make available to FINANCER or its assignee current financial statements, budgets, proof of appropriation for the ensuing fiscal period, and such other financial information as may be requested by FINANCER or any assignee relating to the ability of the Funding Agency to continue to make installment payments and other sums due under this Agreement.

G. If payment or other sums owed by the Funding Agency is not paid when due, interest may accrue in accordance with State law.

4. NONAPPROPRIATION OF FUNDS

A. In the event that no funds or insufficient funds are appropriated and budgeted in any Commonwealth Fiscal Period for payments due under this Agreement, then the Funding Agency will immediately notify FINANCER or its assignee of such occurrence and this Agreement shall terminate on the last day of Commonwealth's Fiscal Period for which appropriations were received without penalty or expense to the Funding Agency of any kind whatsoever. In the event of such termination, the Funding Agency agrees to peaceable surrender possession of all ECMs requested by FINANCER in good operating condition, subject to normal wear and tear to FINANCER or its assignee on the date of such termination, packed for shipment in accordance with manufacturer's published specifications and with freight and insurance prepaid to FINANCER's or its assignee's nearest warehouse location in the United States, such location to be specified by FINANCER or its assignee. FINANCER or its assignee will have all legal and equitable rights and remedies to take possession of the ECMs. Upon such termination, title to the ECMs will revert to FINANCER or its assignee.

B. If on the thirtieth (30th) day after the commencement of any Fiscal Period, sufficient funds have not been appropriated for the purpose of making all of the payments scheduled to be paid in such Fiscal Period, the Funding Agency shall cause to be delivered written notice (a "notice of non-appropriation") to FINANCER or its assignee within ten (10) calendar days after such thirtieth (30th) day. Upon FINANCER's receipt of a notice of non-appropriation this Agreement shall terminate as of the end of the Fiscal Period just ended; provided, however, that such termination shall not become effective as of the end of such Fiscal Period just ended if, within ten (10) calendar days of the thirtieth (30th) day after the end of such Fiscal Period just completed, the Funding Agency shall cause to be delivered to FINANCER a written statement to the effect that it reasonably expects sufficient funds for the then-current Fiscal Period to be appropriated for this Agreement, and in such event that the term shall continue into the then-current Fiscal Period so long, but only so long, as an appropriation becomes available from which to make the payments. Notwithstanding the foregoing, the Funding Agency agrees that it will not cancel this Agreement under the provisions of this paragraph if any funds are appropriated to it, or by it, for this Guaranteed Energy Saving Act project for the Fiscal Period following the Fiscal Period in which funds were appropriated.

5. AUTHORITY AND AUTHORIZATION

A. Commonwealth represents, covenants, and warrants that:

I. The execution, delivery, and performance by Commonwealth of this Agreement have been duly authorized by necessary action on the part of Commonwealth;

II. This Agreement has been duly executed and delivered on behalf of Commonwealth and constitutes a legal, valid, and binding obligation of Commonwealth enforceable in accordance with its terms; and

III. The Commonwealth has complied with all bidding requirements, where necessary, and by due notification presented this Agreement for approval as a valid obligation on its part. The Commonwealth agrees that:

a. The Commonwealth will do or cause to be done all things necessary to preserve and keep the Agreement in full force and effect;

b. The Funding Agency has sufficient appropriations or other funds available to pay all amounts due for the current Fiscal Period;

c. The Funding Agency's obligations are not guaranteed by the United States of America or any agency or instrumentality;

d. The Funding Agency has not established and will not establish any sinking fund, redemption fund, debt service fund, reserve fund, replacement fund, or similar fund to be used to pay principal or interest composing the payments due;

e. The Funding Agency will take no action that would cause the interest portion of the payments due to become included in gross income of the recipient for federal income tax purposes under the Internal Revenue Code of 1986, as amended (the "Code"), and Treasury Regulations promulgated (the "Regulations"), and the Funding Agency will take and will cause its officers, employees, and agents to take all affirmative actions legally within its power necessary to ensure that the interest portion of the payments due does not become included in gross income of the recipient for federal income tax purposes under the Code and Regulations, all as amended from time to time (including, without limitation, the calculation and payment of any rebate required to preserve such exclusion); and

f. The Funding Agency will sign and submit to FINANCER for filing with the Secretary of the Treasury information reporting statements and other information relating to this Agreement at the times and in the forms required by the Code and the Regulations.

6. TITLE

A. Upon final acceptance of the implemented/constructed ECMs by Commonwealth, title to the ECMs will vest in Commonwealth, provided however, that

I. In the event of termination of this Agreement by the Funding Agency pursuant to NONAPPROPRIATION OF FUNDS paragraph and delivery of the ECMs to FINANCER; or

II. Upon repossession of the ECMs in the event of a default, title will immediately vest in FINANCER or its assignee.

7. SECURITY INTEREST

A. In order to secure all of its obligation, the Funding Agency hereby:

I. Grants to FINANCER a first priority security interest in any and all right, title, and interest of the Funding Agency in the ECMs and in all additions, attachments, accessions, and substitutions, and on any proceeds therefrom;

II. Agrees that this Agreement may be filed as a financing statement evidencing such security interest; and

III. Agrees to execute and deliver all financing statements, certificates of title, and other instruments necessary or appropriate to evidence such security interest.

B. Once all payments set in Payment Schedule have been made, then the Funding Agency will own the ECMs free and clear of all liens or other encumbrances.

8. PERSONAL PROPERTY

A. The ECMs are, and will remain, personal property, and will not be deemed to be affixed to, or be a part of, the real estate on which it may be situated.

9. MAINTENANCE

A. The Funding Agency, at its own cost and expense, will maintain the ECMs in good operating condition for the duration of this Agreement and will not use or deal with the ECMs in any manner which is inconsistent with any laws or regulations. The ECMs will not be misused, abused, wasted, or be allowed to deteriorate except for ordinary wear and tear resulting from its intended use. The Funding Agency agrees to cause the ECMs to be maintained pursuant to manufacturer's standard maintenance specifications and will provide proof of proper maintenance at FINANCER's request.

10. ALTERATIONS

A. The Funding Agency will not make any alterations, additions, or improvement to the ECMs without FINANCER's prior written consent unless such alterations, additions, or improvement may be readily removed without damage to the ECMs.

11. LIENS AND ENCUMBRANCES

A. Commonwealth shall keep the ECMs free and clear of all levies, liens, and encumbrances, except those created under this Agreement. The Funding Agency shall pay, when due, all charges which may be imposed upon the ownership, leasing, rental, sale, purchase, possession, or use of the ECMs, excluding, however, all taxes on or measured by FINANCER's income. If the Funding Agency fails to pay said charges when due, FINANCER shall have a right, but shall not be obligated, to pay said charges. If FINANCER pays any charges for which the Funding Agency is responsible or liable under this Agreement, the Funding Agency shall reimburse FINANCER.

12. RISK OF LOSS; DAMAGE; DESTRUCTION

A. Upon acceptance of the ECMs, Commonwealth and/or GESA Contractor, as per the terms of the GESA Contract, assumes all risks of loss or damage to the ECMs from any cause whatsoever, and no such loss of or damage to the ECMs or defect, or unfitness or obsolescence, shall relieve the Funding Agency of its obligation to make payments or to perform any other obligation under this Agreement.

B. In the event of damage to any item or ECM, the Funding Agency will immediately notify GESA Contractor and place the same in good repair. If the Funding Agency determines that any item of ECMs is lost, stolen, destroyed, or damaged beyond repair, the Funding Agency will either:

I. Replace the same with like ECMs in good repair; or

II. On the next payment date following occurrence of loss, pay FINANCER or its assignee

a. All amounts for said lost, stolen, destroyed, or damaged beyond repair ECM then owed by the Funding Agency to FINANCER under this Agreement, including the payment for such item(s) due on such date; and

b. The proportionate amount of applicable payment set in the PAYMENT SCHEDULE.

13. INSURANCE

A. GESA Contractor will insure against any or all risks in accordance with the GESA Contract. GESA Contractor shall demonstrate to the satisfaction of FINANCER or assignee that adequate insurance is provided. In the event of any loss, damage, injury, or accident involving the ECMs, Commonwealth will promptly provide GESA Contractor with written notice within ten (10) days and make available to GESA Contractor all relative information and documentation.

B. Upon final acceptance of ECMs, and in accordance with Section 6 of this Agreement, title of the ECMs will vest with the Commonwealth. Commonwealth will then self-insure against any or all risks assumed in this Agreement. Commonwealth shall demonstrate to the satisfaction of FINANCER or assignee that adequate self-insurance is provided. In the event of any loss, damage, injury, or accident involving the ECM(s), Commonwealth will promptly provide GESA Contractor with written notice within ten (10) days and make available to GESA Contractor all relative information and documentation.

C. Upon Commonwealth self-insuring the ECMs, Commonwealth will assume all risks and liabilities for injury to or death of any person or damage to any property, in any manner arising out of possession, use, operation, custody, control, condition, or storage of the ECMs by Commonwealth, whether such injury or death be with respect to Commonwealth's property or the property of other; provided, however, that said damage or injury results from the negligence of Commonwealth, it agents or employees, and that either Commonwealth agrees to settle such claim or judgment has been obtained against Commonwealth. This Section shall not be construed to limit or waive in any way the sovereign immunity of Commonwealth, liability of which under the Section is limited to amounts in which Commonwealth is otherwise permitted or required to respond in accordance with applicable law.

14. PREPAYMENT OPTION

A. Upon thirty (30) days' prior written notice from the Funding Agency to FINANCER, and provided that there is no Event of Default, or an event with which notice or lapse of time, or both, could become an Event of Default, then existing, the Funding Agency will have the right to terminate the Funding Agency's continued obligation to make payments, as specified in the PAYMENT paragraph and Payment Schedule to FINANCER on the purchase of the ECMs.

B. Under this paragraph, payments up to date of prepayment and the Purchase Price, along with any interest accrued from the date of the last payment, will be due to FINANCER on the date of prepayment. Upon satisfaction by the Funding Agency of such purchase conditions, FINANCER shall then have no rights, title, and interest in the ECMs. No voluntary prepayment is permitted prior to the date of the first scheduled payment under the Payment Schedule.

15. ASSIGNMENTS

A. Without FINANCER's prior written consent, Commonwealth will not assign, transfer, pledge, or grant any security interest in, or otherwise dispose, of this Agreement, the ECMs, or any interest in this Agreement or the ECMs. FINANCER may assign its rights, title, and interest to this Agreement, the ECMs, and any other documents executed with respect to this Agreement and/or grant or assign a security interest in this Agreement and the ECMs, in whole or in part. Any such assignee shall have all of the rights of FINANCER under this Agreement. Subject to the foregoing, this Agreement inures to the benefit of, and is binding upon, the heirs, executors, administrators, successors, and assigns of the parties.

B. Upon assignment of FINANCER's interests, FINANCER will cause written notice of such assignment to be sent to the Funding Agency, which will be sufficient if it discloses the name of the assignee and address to which further payments should be made. No further action will be required by FINANCER or by the Funding Agency to evidence the assignment, but the Funding Agency will acknowledge such assignments in writing if so requested.

C. Notwithstanding, the foregoing, no such assignments of FINANCER's interests shall be effective against the Funding Agency unless the Funding Agency receives notification in writing of said Agreement designating the name and address of any such assign. In compliance with Section 149(a) of the Internal Revenue Code, Commonwealth agrees to affix a copy of each notification of assignment to Commonwealth's counterpart of the Agreement.

D. NOT BEING THE MANUFACTURER OR VENDOR OF THE ECMs, ANY ASSIGNEE OF FINANCER SHALL BE DEEMED TO HAVE MADE NO WARRANTY OR REPRESENTATION, EITHER EXPRESS OR IMPLIED, AS TO THE VALUE, DESIGN, CONDITIONS, MERCHANTABILITY, OR FITNESS FOR A PARTICULAR PURPOSE OR FITNESS FOR USE OF THE ECMs. In no event shall any assignee be liable for any incidental, indirect, special, or consequential damage in connection with, or arising out of, this Agreement or the existence, furnishing, functioning, or the Funding Agency's use of any item of ECMs or products or services provided for in this Agreement.

16. EVENTS OF DEFAULT BY the Funding Agency

A. The term "Event of Default," as used in paragraphs 17 and 18, means the occurrence of any one of the following events:

I. The Funding Agency, in accordance with the GESA Contract, fails to make any payment as it becomes due in accordance with the terms of this Agreement, and any such failure continues for sixty (60) days after receipt of written notice of Default; or

II. The Funding Agency fails to perform or observe any other covenant, condition, or agreement to be performed or observed by it, and such failure is not cured within sixty (60) days after written notice by FINANCER.

17. REMEDIES BY FINANCER

A. Upon the occurrence of an Event of Default, and as long as such Event of Default is continuing, FINANCER may at its option, exercise any one or more of the following remedies:

I. By written notice to the Funding Agency, with or without terminating this Agreement, declare an amount equal to all amounts then due under this Agreement, and all remaining payments due for which funds have been appropriated, to be immediately due and payable, whereupon the same shall become immediately due and payable;

II. By written notice to the Funding Agency, request the Funding Agency to, at the Funding Agency's expense, promptly return the ECMs to FINANCER in the manner specified in NONAPPROPRIATION OF FUNDS paragraph, or FINANCER, at its option, may enter upon the premises where the ECM is located and take immediate possession of and remove the same, and the Funding Agency hereby expressly waives any damages occasioned by such actions not caused by FINANCER's willful misconduct or negligence;

III. Sell the ECMs and apply any proceeds of such disposition in the following order: (i) all costs incurred in securing possession of the ECMs; (ii) all expenses incurred in completing the disposition; (iii) any sales or transfer taxes; (iv) the applicable payment; and (v) the balance of any payments owed by the Funding Agency for which funds have been appropriated. Any disposition proceeds remaining after the requirements of clauses (i), (ii), (iii), (iv), and (v) have been met shall be paid to the Funding Agency; and

IV. Exercise any other right, remedy, or privilege which may be available to it under applicable laws of the Commonwealth of Pennsylvania, or any other applicable law, or proceed by appropriate court action to enforce the terms of this Agreement, or to recover damages for the breach of this Agreement, or to terminate this Agreement as to any or all of the ECMs. In addition, the Funding Agency will remain liable to the extent not prohibited by law for all covenants under this Agreement and for all fees, other costs, and expenses incurred by FINANCER with respect to the enforcement of any of the remedies listed above or any other remedy available to the FINANCER.

18. EVENTS OF DEFAULT BY FINANCER AND REMEDIES BY COMMONWEALTH

A. If FINANCER fails to make any payment as it becomes due in accordance with the terms of this Agreement, and any such failure continues for sixty (60) days after receipt of written notice of Default, then Commonwealth may pursue any right, remedy, or privilege which may be available to it under applicable laws of the Commonwealth of Pennsylvania, or any other applicable law, or proceed by appropriate court action to enforce the terms of this Agreement or to recover damages for the breach of this Agreement.

19. NOTICES

A. All notices to be given under this Agreement shall be made in writing and mailed by certified mail, return receipt requested, to the other party at its address or at such address as the party may provide in writing from time to time. Any such notice shall be deemed to have been received five (5) days after mailing.

20. NONDISCRIMINATION/SEXUAL HARASSMENT CLAUSE

A. During the term of this Agreement, the Contractor (i.e., FINANCER) agrees as follows:

I. In the hiring of any employee(s) for the manufacture of supplies, performance of work, or any other activity required under the contract or any subcontract, the Contractor, each

subcontractor, or any person acting on behalf of the Contractor or subcontractor shall not discriminate in violation of the Pennsylvania Human Relations Act (PHRA) and applicable federal laws against any citizen of this Commonwealth who is qualified and available to perform the work to which the employment relates.

II. Neither the Contractor nor any subcontractor nor any person on their behalf shall in any manner discriminate in violation of the PHRA and applicable federal laws against or intimidate any employee involved in the manufacture of supplies, the performance of work, or any other activity required under the contract.

III. The Contractor and each subcontractor shall establish and maintain a written nondiscrimination and sexual harassment policy and shall inform their employees of the policy. The policy must contain a provision that sexual harassment will not be tolerated and employees who practice it will be disciplined. Posting this Nondiscrimination/Sexual Harassment clause conspicuously in easily-accessible and well-lighted places customarily frequented by employees and at or near where the contract services are performed shall satisfy this requirement.

IV. The Contractor and each subcontractor shall not discriminate in violation of PHRA and applicable federal laws against any subcontractor or supplier who is qualified to perform the work to which the contract relates.

V. The Contractor and each subcontractor represents that it is presently in compliance with and will maintain compliance with all applicable federal, state, and local laws and regulations relating to nondiscrimination and sexual harassment. The Contractor and each subcontractor further represents that it has filed a Standard Form 100 Employer Information Report ("EEO-1") with the U.S. Equal Employment Opportunity Commission ("EEOC") and shall file an annual EEO-1 report with the EEOC as required for employers subject to Title VII of the Civil Rights Act of 1964, as amended, that have 100 or more employees and employers that have federal government contracts or first-tier subcontracts and have 50 or more employees. The Contractor and each subcontractor shall, upon request and within the time periods requested by the Commonwealth, furnish all necessary employment documents and records, including EEO-1 reports, and permit access to their books, records, and accounts by the contracting agency and the Bureau of Diversity, Inclusion and Small Business Opportunities, for purpose of ascertaining compliance with provisions of this Nondiscrimination/Sexual Harassment Clause.

VI. The contractor shall include the provisions of this Nondiscrimination/Sexual Harassment Clause in every subcontract so that those provisions applicable to subcontractors will be binding upon each subcontractor.

VII. The Contractor's and each subcontractor's obligations pursuant to these provisions are ongoing from and after the effective date of the contract through the termination date thereof. Accordingly, the Contractor and each subcontractor shall have an obligation to inform the Commonwealth if, at any time during the term of the contract, it becomes aware of any actions or occurrences that would result in violation of the provisions.

VIII. The Commonwealth may cancel or terminate the contract and all money due or to become due under the contract may be forfeited for the violation of the terms and conditions of this Nondiscrimination/Sexual Harassment Clause. In addition, the agency may proceed with debarment or suspension and may place the Contractor in the Contractor Responsibility File.

21. CONTRACTOR INTEGRITY PROVISIONS

It is essential that those who seek to contract with the Commonwealth of Pennsylvania ("Commonwealth") observe high standards of honesty and integrity. They must conduct themselves in a manner that fosters public confidence in the integrity of the Commonwealth procurement process.

(a). DEFINITIONS. For purposes of these Contractor Integrity Provisions, the following terms shall have the meanings found in this Section:

1. "Affiliate" means two or more entities where (a) a parent entity owns more than fifty percent of the voting stock of each of the entities; or (b) a common shareholder or group of shareholders owns more than fifty percent of the voting stock of each of the entities; or (c) the entities have a common proprietor or general partner.

2. "Consent" means written permission signed by a duly authorized officer or employee of the Commonwealth, provided that where the material facts have been disclosed, in writing, by prequalification, bid, proposal, or contractual terms, the Commonwealth shall be deemed to have consented by virtue of the execution of this contract.

3. "Contractor" means the individual or entity, that has entered into this contract with the Commonwealth.

4. "Contractor Related Parties" means any affiliates of the Contractor and the Contractor's executive officers, Pennsylvania officers and directors, or owners of 5 percent or more interest in the Contractor.

5. "Financial Interest" means either:

(1) Ownership of more than a five percent interest in any business; or

(2) Holding a position as an officer, director, trustee, partner, employee, or holding any position of management.

6. "Gratuity" means tendering, giving, or providing anything of more than nominal monetary value including, but not limited to, cash, travel, entertainment, gifts, meals, lodging, loans, subscriptions, advances, deposits of money, services, employment, or contracts of any kind. The exceptions set forth in the Governor's Code of Conduct, Executive Order 1980-18, the 4 Pa. Code §7.153(b), shall apply.

7. "Non-bid Basis" means a contract awarded or executed by the Commonwealth with Contractor without seeking bids or proposals from any other potential bidder or offeror.

(b) In furtherance of this policy, Contractor (i.e., FINANCER) agrees to the following:

1. Contractor shall maintain the highest standards of honesty and integrity during the performance of this contract and shall take no action in violation of state of federal laws or regulations or any other applicable laws or regulations or other requirements applicable to Contractor or that govern contracting or procurement with the Commonwealth.

2. Contractor shall establish and implement a written business integrity policy, which includes, at a minimum, the requirements or these provisions as they relate to Contractor activity with the Commonwealth and Commonwealth employees and which is made known to all Contractor employees. Posting these Contractor Integrity Provisions conspicuously in easily-accessible and well-lighted places customarily frequented by employees and at or near where the contract services are performed shall satisfy this requirement.

3. Contractor, its affiliates, agents and employees and anyone in privity with Contractor shall not accept, agree to give, offer, confer, or agree to confer or promise to confer, directly or indirectly, any gratuity or pecuniary benefit to any person, or to influence or attempt to influence any person in violation of any federal or state law, regulation, executive order of the Governor of Pennsylvania, statement of policy, management directive, or any other published standard of the Commonwealth in connection with performance of work under this contract, except as provided in this contract.

4. Contractor shall not have a financial interest in any other contractor, subcontractor, or supplier providing services, labor, or material under this contract, unless the financial interest is disclosed to the Commonwealth in writing and the Commonwealth consents to Contractor's financial interest prior to Commonwealth execution of the contract. Contractor shall disclose the financial interest to the Commonwealth at the time of bid or proposal submission, or if no bids or proposals are solicited, no later than Contractor's submission of the contract signed by Contractor.

5. Contractor certifies to the best of its knowledge and belief that within the last five (5) years Contractor or Contractor Related Parties have not:

i. been indicted or convicted of a crime involving moral turpitude or business honesty or integrity in any jurisdiction;
ii. been suspended, debarred, or otherwise disqualified from entering into any contract with any governmental agency;
iii. had any business license or professional license suspended or revoked;
iv. had any sanction or finding of fact imposed as a result of a judicial or administrative proceeding related to fraud, extortion, bribery, bid rigging, embezzlement, misrepresentation, or anti-trust; and
v. been, and is not currently, the subject of a criminal investigation by any federal, state, or local prosecuting or investigative agency and/or civil anti-trust investigation by any federal, state, or local prosecuting or investigative agency.

If Contractor cannot certify to the above, then it must submit, along with its bid proposal, a written explanation (Exhibit D) of why such certification cannot be made and the Commonwealth will determine whether a contract may be entered into with the Contractor. The Contractor's obligation pursuant to this certification is ongoing from and after the effective date of the contract through the termination date thereof. Accordingly, the Contractor shall have an obligation to immediately notify the Commonwealth in writing if at any time during the term of the contract if becomes aware of any event which would cause the Contractor's certification or explanation to change. Contractor acknowledges that the Commonwealth may, in its sole discretion, terminate the contract for cause if it learns that any of the certifications made herein are currently false due to intervening factual circumstances or were false or should have been known to be false when entering into the contract.

6. Contractor shall comply with the requirements of the Lobbying Disclosure Act (65 Pa.C.S. §13A01 et seq.) regardless of the method of award. If this contract was awarded on a Non-bid Basis, Contractor must also comply with the requirements of the Section 1641 of the Pennsylvania Election Code (25 P.S. §3260a).

7. When Contractor has reason to believe that any breach of ethical standards as set forth in law, the Governor's Code of Conduct, or these Contractor Integrity Provisions has occurred or may occur, including but not limited to contact by a Commonwealth officer or employee which, if acted upon, would violate such ethical standards, Contractor shall immediately notify the Commonwealth contracting officer or the Office of the State Inspector General in writing.

8. Contractor, by submission of its bid or proposal and/or execution of this contract and by the submission of any bills, invoices or requests for payment pursuant to the contract, certifies and represents that it has not violated any of these Contractor Integrity Provisions in connection with the submission of the bid or proposal, during any contract negotiations or during the term of the contract, to include any extensions thereof. Contractor shall immediately notify the Commonwealth in writing of any actions for occurrences that would result in a violation of these Contractor Integrity Provisions. Contractor agrees to reimburse the Commonwealth for the reasonable costs of investigation incurred by the Office of the State Inspector General for investigations of the Contractor's compliance with the terms of this or any other agreement between the Contractor and the Commonwealth that results in the suspension or debarment of the Contractor. Contractor shall not be responsible for investigative costs for investigations that do not result in the Contractor's suspension or debarment.

9. Contractor shall cooperate with the Office of the State Inspector General in its investigation of any alleged Commonwealth agency or employee breach of ethical standards and any alleged Contractor non-compliance with these Contractor Integrity Provisions. Contractor agrees to make identified Contractor employees available for interviews at reasonable times and places. Contractor, upon the inquiry or request of an Inspector General, shall provide, or if appropriate, make promptly available for inspection or copying, any information of any type or form deemed relevant by the Office of the State Inspector General to Contractor's integrity and compliance with these provisions. Such information may include, but shall not be limited to, Contractor's business or financial records, documents or files of any type or form that refer to or concern this contract. Contractor shall incorporate this paragraph in any agreement, contract or subcontract it enters into in the course of the performance of this contract/agreement solely for the purpose of obtaining subcontractor compliance with this provision. The incorporation of this provision in a subcontract shall not create privity of contract between the Commonwealth and any such subcontractor, and no third party beneficiaries shall be created thereby.

10. For violation of any of these Contractor Integrity Provisions, the Commonwealth may terminate this and any other contract with Contractor, claim liquidated damages in an amount equal to the value of anything received in breach of these Provisions, claim damages for all additional costs and expenses incurred in obtaining another contractor to complete performance under this contract, and debar and suspend Contractor from doing business with the Commonwealth. These rights and remedies are cumulative, and the use or non-use of any one shall not preclude the use of all or any other. These rights and remedies are in addition to those the Commonwealth may have under law, statute, regulation, or otherwise.

22. CONTRACTOR RESPONSIBILITY PROVISIONS

For the purpose of these provisions, the term contractor is defined as any person, including, but not limited to, a bidder, offeror, loan recipient, grantee or lessor, who has furnished or performed or seeks to furnish or perform, goods, supplies, services, leased space, construction or other activity, under a contract, grant, lease, purchase order or reimbursement agreement with the Commonwealth of Pennsylvania (Commonwealth). The term contractor includes a permittee, licensee, or any agency, political subdivision, instrumentality, public authority, or other public entity in the Commonwealth.

(a) The Contractor certifies, in writing, for itself and its subcontractors required to be disclosed or approved by the Commonwealth, that as of the date of its execution of this Bid/Contract, that neither the Contractor, nor any such subcontractors, are under suspension or debarment by the Commonwealth or any governmental entity, instrumentality, or authority and, if the Contractor cannot so certify, then it agrees to submit, along with its Bid/Contract, a written explanation of why such certification cannot be made.

(b) The Contractor also certifies, in writing, that as of the date of its execution of this Bid/Contract it has no tax liabilities or other Commonwealth obligations, or has filed a timely administrative or judicial appeal if such liabilities of obligations exist, or is subject to a duly approved deferred payment plan if such liabilities exist.

(c) The Contractor's obligations pursuant to these provisions are ongoing from and after the effective date of the Contract through the termination date thereof. Accordingly, the Contractor shall have an obligation to inform the Commonwealth if, at any time during the term of the Contract, it becomes delinquent in the payment of taxes, or other Commonwealth obligations, or if it or, to the best knowledge of the Contractor, any of its subcontractors are suspended or debarred by the Commonwealth, the federal government, or any other state or governmental entity. Such notification shall be made within 15 days of the date of suspension or debarment.

(d) The failure of the Contractor to notify the Commonwealth of its suspension or debarment by the Commonwealth, any other state, or the federal government shall constitute an event of default of the Contract with the Commonwealth.

(e) The Contractor agrees to reimburse the Commonwealth for the reasonable costs of investigation incurred by the Office of State Inspector General for investigations of the Contractor's compliance with the terms of this or any other agreement between the Contractor and the Commonwealth that results in the suspension or debarment of the contractor. Such costs shall include, but shall not be limited to, salaries of investigators, including overtime; travel and lodging expenses; and expert witness and documentary fees. The Contractor shall not be responsible for investigative costs for investigations that do not result in the Contractor's suspension or debarment.

(f) The Contractor may obtain a current list of suspended and debarred Commonwealth contractors by either searching the Internet at http://www.dgs.pa.gov or contacting:

Department of General Services
Office of Chief Counsel
603 North Office Building
Harrisburg, PA 17125

Telephone No: (717) 787-5599
FAX No. (717) 787-9138

23. AMERICANS WITH DISABILITIES ACT

Pursuant to federal regulations promulgated under the authority of The Americans With Disabilities Act, 28 C.F.R. §35.101 et seq., FINANCER understands and agrees that it shall not cause any individual with a disability to be excluded from participation in this Agreement or from activities provided for under this Agreement on the basis of the disability. As a condition of accepting this Agreement, FINANCER agrees to comply with the "General Prohibitions Against Discrimination", 28 C.F.R. §35.130, and all other regulations promulgated under Title II of The Americans With Disabilities Act which are applicable to all benefits, services programs, and activities provided by the Commonwealth of Pennsylvania through the contracts with outside contractors.

FINANCER shall be responsible for and agrees to indemnify and hold harmless the Commonwealth of Pennsylvania from all losses, damages, expenses, claims, demands, suits, and actions brought by any party against the Commonwealth of Pennsylvania as a result of FINANCER's failure to comply with the provisions of subparagraph above.

24. PARAGRAPH HEADINGS

A. All section headings contained in this Agreement are for the convenience of reference only and are not intended to define or limit the scope of any provision of this Agreement.

25. GOVERNING LAW

A. This Agreement shall be construed in accordance with, and governed by the laws of, the Commonwealth of Pennsylvania.

26. COUNTERPARTS

A. This Agreement may be executed in one or more counterparts, each of which is an original, and all of which together are a single Agreement.

27. DELIVERY OF RELATED DOCUMENTS

A. Commonwealth will execute or provide, as requested by FINANCER, such other documents and information as are reasonable necessary with respect to the transaction contemplated by this Agreement.

B. Commonwealth agrees that, pursuant to Section 149(a) of the Internal "Revenue Code of 1986, as amended (the "Code"), and any temporary and final income tax regulations promulgated thereunder, it shall file the applicable Internal Revenue Service Form 8039G or 8038GC (Information Return for Tax Exempt Governmental Bond Issues). Additionally, Commonwealth, pursuant to Section 149 (a) of the Code, appoints the FINANCER, or any assignee, as "Agent" of the Lessee to keep a record of the assignees who maintain an interest in this Lease. Commonwealth agrees that it shall remit to the Internal Revenue Service any rebates due as provided by the Code.

28. ENTIRE AGREEMENT; WAIVER

A. This Agreement, together with the Request for Bid Proposals for Financing, the FINANCER's Bid Proposal, the GESA Contract, the Payment Schedule, and the documents delivered pursuant to the requirements of paragraph 27 of this Agreement, constitute the entire Agreement between the parties with respect to the financing of the GESA Contract, and this Agreement shall not be modified amended, altered, or changed except with the written consent of the FINANCER and the Commonwealth (the Funding Agency). Any provision of this Agreement found to be prohibited by law shall be ineffective to the extent of such prohibition without invalidating the remainder of this Agreement. The waiver by the FINANCER and the Commonwealth (the Funding Agency) of any breach by the other party of any term, covenant, or condition shall not operate as a waiver of any subsequent breach.

[SIGNATURE PAGE IMMEDIATELY FOLLOWS.]

The parties have caused this contract to be executed on the dates written above.

ATTEST:

_____
Printed Name

_____
Title

_____
Signature *Date*

[FINANCIAL PROVIDER]

_____
Printed Name

_____
Title

_____
Signature *Date*

Federal Identification No. _____
Vender No._____

COMMONWEALTH OF PENNSYLVANIA
Acting through the DEPARTMENT OF GENERAL SERVICES

ATTEST:

_____
Signature *Date*

_____
Secretary *Date*

APPROVED AS TO FORM AND LEGALITY:

_____
Office of Chief Counsel *Date*

_____
Office of General Counsel *Date*

_____
Office of Attorney General *Date*

_____
Comptroller Operations *Date*

Exhibit A

Guaranteed Energy Savings Contract

Guaranteed Energy Savings Act Contract
GESA 2017-1 Capitol Complex Project

This Guaranteed Energy Savings Act Contract ("GESA Contract") for a GESA Project is executed this _____ day of _____, 20____, by and between the Department of General Services ("Funding Agency"), an executive agency of the Commonwealth of Pennsylvania authorized to enter into GESA Contracts pursuant to 62 Pa C. S. §§3751-3758, and The Efficiency Network ("GESA Contractor" or "Contractor"), a company organized under the Laws of the State of Delaware, with its principal offices located at 1501 Reedsdale Street, Suite 401, Pittsburgh, PA 15233.

ARTICLE 1 – CONTRACT DOCUMENTS

1.1 The Contract Documents shall consist of this GESA Contract, the Request for Quote ("the RFQ"), the Contractor's Quote submitted in response to the RFQ, the Contract Bonds, the Conditions of the Contract (General, Special, Supplementary, and other Conditions), all drawings created by or for the Contractor and/or its Retained Professional, the specifications created by or for the Contractor and/or its Retained Professional, the Scope of Work by ECM (**Exhibit 1**), all bulletins and addenda issued prior to execution of this Contract, all change orders, the Administrative Procedures for the GESA Contract, the Installment Purchase Agreement and Payment Schedule, and the Investment Grade Audit Contract Documents, and the Investment Grade Audit. These documents form the Contract and are as fully part of the Contract as if attached to this Contract.

ARTICLE 2 – SCOPE OF WORK

2.1 The Contractor shall perform all the Work required by the Contract Documents as stated in the RFQ for the design and implementation/construction of the GESA 2017-1 Capitol Complex ("Project").

ARTICLE 3 – TERM

3.1 The term of this Contract shall commence upon the Effective Date of this Contract and shall run for 365 calendar days. The Effective Date of this Contract shall be the date of the last required Commonwealth signature.

3.2 The format and scope of the Work shall be as stated in the RFQ and the Investment Grade Audit.

3.3 Time is of the essence and if the Contractor fails to complete the Work within the time specified above, the Contractor shall pay the Funding Agency, as Liquidated Damages and not as a penalty for such failure, the sum of Four Thousand, Seven Hundred Fifty Dollars and Zero Cents ($4,750.00) per day for each and every calendar day after the completion date until the Work is completed and accepted. The Funding Agency may extend the completion date of the GESA Contract for causes stated in the General Conditions of the GESA Contract ("General Conditions") that, in fact, delay the completion of the Work. In such case, the Contractor is liable for said Liquidated Damages only after the expiration of the extended period.

ARTICLE 4 – CONTRACT SUM

4.1 The Funding Agency will authorize a financing provider, procured separately, to pay the Contractor for the performance of the Work subject to additions and deductions by change order, as provided in the General Conditions, the Contract Sum of $18,044,436.00 (Eighteen Million, Forty-Four Thousand, Four Hundred Thirty-Six Dollars and Zero Cents). Payment will be made as stated in the General Conditions. Deductions from, or additions to, this sum will be made as stated in the General Conditions. The Funding Agency is not liable for any debt due to the GESA Contract.

ARTICLE 5 – PROGRESS PAYMENTS AND RETAINAGE

5.1 Based upon Applications for Release of Payment submitted to the Funding Agency by the Contractor, the Funding Agency will authorize the financing provider to release progress payments to the Contractor, in accordance with the provisions of the Prompt Payment Schedules found in the Commonwealth Procurement Code, 62 Pa. C.S. §3931-§3939, and the Administrative Procedures, which are both incorporated by reference and made a part hereof as if those provisions were fully and at length recited, except that, where those provisions refer to the government agency, it is deemed to refer to the Funding Agency. The Funding Agency will retain a portion of the amount due to the Contractor to insure the proper performance of the Contractor in each Application for Release of Payment in accordance with the provisions of Retainage found in the Commonwealth Procurement Code, 62 Pa. C.S. §3921, and the General Conditions, which are both incorporated by reference and made a part hereof as if those provisions were fully and at length recited, except that, where those provisions refer to the government agency, it is deemed to refer to the Funding Agency.

ARTICLE 6 – FINAL PAYMENT

6.1 Final Payment, constituting the entire unpaid balance of the Contract Sum, will be approved by the Funding Agency for release by the financing provider to the Contractor within thirty (30) days after Closeout Inspection of the Work if the Contract has been fully performed and a Final Application for Release of Payment has been submitted, as provided in the General Conditions.

ARTICLE 7 – SMALL DIVERSE BUSINESS PARTICIPATION

7.1 The Contractor provided its Small Business (“Small Business”) and Small Diverse Business (i.e., minority owned small business, woman owned small business, veteran owned small business, service disable veteran owned small business, LGBT owned small business, or disability owned small business) (“Small Diverse Business”) percentages for Small Business & Small Diverse Business Subcontracts, suppliers, and manufacturers for this Project in its Quote. The GESA Contractor’s Small Business & Small Diverse Business percentage is included in **Exhibit 1**.

ARTICLE 8 – MISCELLANEOUS PROVISIONS

8.1 Terms used in this Contract defined in the General Conditions have the meanings designated in those General Conditions.

8.2 In addition to any other guarantees or warrantees, the Contractor covenants and agrees after acceptance of the Work performed under this Contract, to remedy without cost to the Funding Agency, any such defect in the Work, provided said defects in the reasonable judgment of the Funding Agency, or its successors having jurisdiction over the premises, are caused by defective or inferior materials, equipment, or workmanship. If the corrective Work is not completed within thirty (30) days after the

notification by the Funding Agency to the GESA Contractor, the Funding Agency may do the Work and submit those costs to the Surety Company for reimbursement.

8.3 The Contract Bonds given by the Contractor conditioned upon the faithful performance of the Contract and for the payment of labor, material, equipment, and public utility service claims are attached to this Contract and are made a part of it. No third party shall acquire any rights against the Funding Agency under the Contract Documents. The Performance Bond does not cover the Assured Performance Guarantee or guaranteed savings under the Contract Documents. However, failure to meet Assured Performance Guarantee or guaranteed savings may be the result of defective or inferior materials, equipment, or workmanship due to the Contractor's failure of faithful performance. Where and when such cases of defective and/or nonconforming work occurs, such defective and/or nonconforming work is covered by the Performance Bond.

8.4 The Contractor agrees to abide by and be bound by the Laws of Pennsylvania, including those relating to and regulating the hours and conditions of employment.

8.5 Nothing in this Contract shall be deemed to waive or otherwise affect the sovereign immunity of the Commonwealth and its agencies, officers, and employees, or to subject any Commonwealth party to any liability not expressly authorized by law.

8.6 Any person, co-partnership, association, or corporation furnishing labor, material, equipment or renting equipment, or rendering public utility services in connection with the performance of this GESA Contract, has a right of action to recover the cost from the Contractor and the Surety on the Bond given to secure the payment of such labor, material, equipment, or equipment rental and services rendered by public utility as though such person or corporation had been named as Obligee in the Bond. For those who do not have a Contract directly with the Contractor, this right of action may not be exercised unless the Contractor is notified of the claim within ninety (90) days from the last performance of labor or provision of materials. The Contractor shall include in all of its Subcontracts or supply Contracts a provision requiring that its Subcontractors and Suppliers notify, in writing, their Subcontractors and Suppliers of this requirement. It is agreed that no third-party rights arise against the Funding Agency for any reason under this Article, and the Contractor agrees to inform all Subcontractors and Suppliers in writing.

8.7 This Contract may be executed in one or counterparts, each of which is an original, and all of which together are a single Contract.

ARTICLE 9 – CONTRACT COMPLIANCE REGULATIONS

9.1 Refer to the appropriate paragraph of the General Conditions (which are made a part of this Contract by incorporation by reference), which prohibits discrimination in hiring or employment opportunities. Also made a part of this Contract by incorporation by reference are all State and Federal Laws prohibiting discrimination in hiring or employment opportunities. The Contract Documents also list applicable statutory provisions, which are incorporated by reference into this GESA Contract.

ARTICLE 10 – ASSURED PERFORMANCE GUARANTEE

10.1 The Contractor is required to guarantee energy and cost savings stipulated in this Contract on an annual basis. The savings must be guaranteed to equal or exceed the Project financing payment, plus the

service fees during that year for the Contract duration. No credit for savings above the annual guarantee will be credited toward the performance guarantees for future years of this Contract. The recovery of Contract costs from energy savings over the term of this Contract shall not exceed nineteen (19) years. Refer to the Assured Performance Guarantee (which is made a part of this Contract by incorporation) for the Contractor's requirements regarding documenting and verifying the annual energy and/or cost savings that are attributed to this Project **(Exhibit 2)**.

[SIGNATURE PAGE IMMEDIATELY FOLLOWS.]

The parties have caused this contract to be executed on the dates written above.

ATTEST:

_____
Secretary/Treasurer *Date*

THE EFFICIENCY NETWORK

_____
President *Date*

COMMONWEALTH OF PENNSYLVANIA
ACTING THROUGH THE DEPARTMENT OF GENERAL SERVICES

ATTEST:

_____
Date

_____
Secretary *Date*

I hereby certify that funds in the amount of
$_____
Are available under Appropriation Symbol
_____
Comptroller Operations *Date*
(Comptroller Operations execution may be by electronic signature and does not imply verification of funds)

APPROVED AS FORM AND LEGALITY

_____
Office of Chief Counsel *Date*
Department of General Services

_____
Office of General Counsel *Date*

_____
Office of Attorney General *Date*

CONTRACT BOND

KNOW ALL PERSONS BY THESE PRESENTS, That we the undersigned

_____

_____

_____

as Principal and

_____

_____

_____

as the Surety Company, a Corporation organized and existing under the Laws of the State of _____ and authorized to transact business in Pennsylvania, as surety, are held and firmly bound unto the Department of General Services ("Funding Agency"), as hereinafter set forth, in the full and just several sums of:

(A)_____Dollars

($_____) for faithful performance of the GESA Contract as designated in Paragraph "A" below; and

(B)_____Dollars

($_____) for payment for labor, material equipment rental and public utility services as designated in Paragraph "B" below; and

Sealed with our respective seals and dates this _____ day of _____.

WHEREAS, the above Principal has entered into a GESA Contract with the Department of General Services dated the _____ day of _____, 20__ for _____upon certain terms and conditions in said GESA Contract more particularly mentioned; and

WHEREAS, it is one of the conditions of the Award pursuant to which said GESA Contract is about to be entered into, that these presents be executed;

NOW, THEREFORE, the joint and several conditions of this obligation are such:

A. That, if the above Principal as GESA Contractor shall well and faithfully do and perform the things agreed by it to be done and performed according to the terms of said Contract Documents, including the plans and specifications therein referred to and made part thereof, and such alterations as may be made in said plans and specifications as therein provided and which are hereby made part of this Bond the same as though they were fully set forth herein, and shall indemnify and save harmless the Department of General Services and all of their officers, agent and employees from any expense incurred through the failure of said GESA Contractor to complete the Work as specified and for any damages growing out of the manner of performance of said GESA Contract by said GESA Contractor or its Subcontractors, or their agents or servants, including, but not limited to, patent trademark and copyright infringements, then this part of this obligation shall be void; otherwise, it shall be and remain in full force and effect.

B. That, if the above Principal shall and will promptly pay or cause to be paid all sums of money which may be due by the Principal or any of its Subcontractors to any person, co-partnership, association or corporation for all material furnished and labor supplied or performed in the prosecution of the work, whether or not the said material or labor entered into and become component parts of the Work or improvements contemplated, and for rental of equipment used, and services rendered by public utilities in, or in connection with, the prosecution of such Work, then this part of this obligation shall be void; otherwise, it shall be and remain in full force and effect.

C. It is further agreed that any alterations which may be made in the terms of the GESA Contract or in the Work to be done or materials to be furnished or labor to be supplied or performed, or equipment to be rented, or public utility services to be rendered, or the giving by the Funding Agency of any extension of time for the performance of the GESA Contract, or the reduction of the retained percentage as permitted by the GESA

Contract, or any other forbearance on the part of either the Funding Agency or the Principal to the other, shall not in any way release the Principal and the surety or sureties or either or any of them, their heirs, executors, administrators, successors or assigns, from their liability hereunder; notice to the surety or sureties of any such alterations, extension or forbearance being hereby waived.

D. The Principal and Surety hereby jointly and severally agree with the Funding Agency herein that every person, co-partnership, association or corporation which, whether as subcontractor as a person otherwise entitled to the benefits of this Bond, has furnished material or supplied or performed labor or rented equipment used in the prosecution of the Work as above provided and any public utility, which has rendered services, in, or in connection with, the prosecution of such Work, and, which has not been paid in full therefore, may sue in assumpsit on this Bond in his, their, or its name and prosecute the same to final judgment for such sum or sums as may be justly due him, them, or its, and have execution thereon; provided, however, that the Funding Agency shall not be liable for the payment of any cost or expenses of such suit to a third party under any theory of law or equity.

E. Recovery by any persons, co-partnership, association or corporation hereunder is subject to the provisions of the Pennsylvania Procurement Code, 62 Pa. C.S §§101-4509, as amended, which Act is incorporated herein and made a part hereof, as fully and completely as though its provisions were fully and at length herein recited, except that, where said Act refers to the Commonwealth of Pennsylvania or a Department thereof, it is deemed to refer to the Funding Agency.

IN WITNESS WHEREOF, the said Principal and Surety have duly executed this Bond under seal the day and year above written.

Witness:

_____ (Date)

_____
Principal (Date)
The Efficiency Network

(Corporate Seal)

_____
Surety

By:_____
Attorney-in-Fact (Date)

APPROVED AS TO FORM AND LEGALITY

_____
Office of Chief Counsel
Department of General Services

_____
Office of Attorney General

_____
Office of General Counsel, DGS

EXHIBIT 1

Scope of Work by ECM
Including
Small Diverse Business Participation

Project Scope

Listed in the table below are the Base Project Energy Conservation Measures (ECMs) as well as additional ECMs which DGS can fund from additional capital contributions or from owner controlled contingency funds. The Efficiency Network (TEN) will engineer and install the ECMs. There will be a 3 year measurement and verification period from the end of the project to confirm the projected savings.

ECM 1 – LED Lighting: This ECM will retrofit or install new luminaires with LED lamps in over 20,000 fixtures on the campus, including exterior lighting.

ECM 2 – Central Plant Upgrades: This ECM will remove two aging chillers in the central chilled water plant and replace with three (3) new 1,200-ton magnetic bearing chillers. The chilled water equipment instrumentation will be upgraded to allow an optimization control software to make the plant operate at peak efficiency. The central heating hot water heat exchanger and circulation pumps will be removed from the central plant. The buildings fed by this heating hot water loop will be served by their existing individual heat exchangers, some of which will be replaced.

ECM 3 – Central Plant Pumping Upgrades: This ECM will convert the condenser water system to variable volume by adding VFDs to all three pumps, retrofitting pump motor #1 and replacing pump motors #2 and #3. Chilled water motor #2 will be replaced and converted to 460V with a new VFD. The bearings on chilled water pumps #1 and #3 will be replaced.

ECM 4 – Utility Distribution: A significant retro commissioning effort will analyze and retrofit air handling units across the campus to reduce chilled water and steam consumption. Bare or under-insulated steam and chilled water piping will be insulated. The central plant will receive a significant controls upgrade. An optional ECM (not currently in the project scope) would install a satellite chiller in the Labor & Industry building to satisfy a cooling capacity shortfall during peak summer conditions.

ECM 5 – Window Film: This ECM will install window film on the south face of the Labor & Industry building and the east face of the L&I west wing.

ECM 6 – Building Sealing: This ECM will replace the sealant in horizontal crack below the sills on each floor of the North and South faces of the Labor and Industry Building.

ECM 7 – H&W Chilled Water Coil Replacement: This ECM will replace the chilled water coils in the 4 main air handling units in the Health & Welfare building.[Remainder of this page left intentionally blank]

Commitment for Small Diverse Businesses for each ECM:

Commitment for Small Diverse Businesses for each ECM:

ECM #	Energy Conservation Measure Description	Dollar Value of ECM	RFP % SDB Commitment	Contract % SDB Commitment	Contract Dollar Value SDB Commitment ($ Value of ECM x % Commitment)	ECM in RFP? (yes or no)
1	Base Lighting	$ 2,233,065	70%	70%	$ 1,563,146	yes
1A (ADD)	New Luminaires	$ 1,280,302	0%	70%	$ 896,211	no
2A	~~Central Plant Free Cooling~~	$ -	70%	N/A	$ -	yes
2B	Chiller Replacement and Plant Optimization	$ 9,123,946	0%	55%	$ 5,000,000	no
2C	Heating Loop Decentralization	$ 1,308,620	0%	38%	$ 500,000	no
2C (ADD)	~~Replace both Heat Exchangers in North + South Offi~~	$ -	0%	N/A	$ -	no
3A	Condenser Water Variable Flow	$ 671,638	70%	70%	$ 470,146	yes
3B	Chilled Water Pump Motor and VFD Replacement	$ 339,815	0%	60%	$ 205,000	no
3C	Replace Motor Bearings on CHW Pumps 1 and 3	$ 72,087	0%	55%	$ 40,000	no
4A.1	Retro Commissioning	$ 1,339,503	30%	30%	$ 401,851	yes
4A.2	Steam/Chilled Water Piping Insulation	$ 531,549	0%	N/A	$ -	no
4B	Central Plant Controls Upgrade	$ 376,023	0%	0%	$ -	yes
4C	~~L&I Chilled Water Capacity Shortfall - Satellite Chil~~	$ -	0%	N/A	$ -	no
5A	Window Film - L&I	$ 172,889	70%	70%	$ 121,022	yes
5B	~~Window Film - H&W~~	$ -	70%	N/A	$ -	yes
6	~~L&I Building Window Sealing~~	$ -	70%	N/A	$ -	yes
7A	H&W Chilled Water Coil Replacement - AHU1&2	$ 297,500	0%	N/A	$ -	no
7B	H&W Chilled Water Coil Replacement - AHU3&4	$ 297,500	0%	N/A	$ -	no

Note: ECMs in blue are not for the base project. ECM 2A - Central Plant free cooling was removed from the project scope at the IGA stage.
1. Certain ECMs will deliver SDB participation even though they were not a commitment at the RFP stage. Additional participation may be demonstrated during installation reporting.

Base Project Total	**$ 18,044,436**		**$ 9,197,377**

Commitment
Total Dollar Value of ECMs

51.0 % (Figure) — Fifty-one (Written) — Percent

TEN's proposal at the time of the RFP included an SDB commitment of $3,747,095. While some ECMs were dropped from the project, others were added for which TEN will provide an SDB commitment (as described above). The total SDB commitment in this contract is $9,197,377, an increase of $5,450,282 over the proposal.

ECM # Comparison between the RFP and GESA Contract:

ECM # RFP Stage	RFP ECM Description	In Final GESA Project (yes or no)	GESA Contract ECM	% RFP SDB Commitment
1	Lighting	yes	1	70%
2	Central Plant Winter Free Cooling	no	N/A	N/A
3	Condenser Water Upgrade to Variable Volume	yes	3A	70%
4	Retro-Commissioning (CHW loop flow control & delta T mgmt)	yes	4A.1	30%
4(ADD)	Metasys BMS Upgrade (Chilled Water Plant)	yes	4B	0%
5a	Window Film - L&I	yes	5A	70%
5b	Window Film - H&W	no	5B	70%
6	Building Sealing (L&I)	no	6	70%

EXHIBIT 2

ASSURED PERFORMANCE GUARANTEE
For
GESA CONTRACT

PART 1

1-1. DEFINITIONS
For purposes of this Agreement, the following terms have the meanings set forth below:

Annual Project Benefits are the portion of the projected Total Project Benefits to be achieved in any one year of the Guarantee Term.

Annual Project Benefits Realized are the Project Benefits actually realized for any one year of the Guarantee Term.

Annual Project Benefits Shortfall is the amount by which the Annual Project Benefits exceed the Annual Project Benefits Realized in any one year of the Guarantee Term.

Annual Project Benefits Surplus is the amount by which the Annual Project Benefits Realized exceed the Annual Project Benefits in any one year of the Guarantee Term.

Baseline is the mutually agreed upon data and/or usage amounts that reflect conditions prior to the installation of the Energy Conservation Measures.

Guarantee Term will commence on the first day of the month following the Final Payment date and will continue through the duration of the M&V Services.

Installation Period is the period beginning on the effective date of the GESA Contract and ending on the commencement of the Guarantee Term.

Measured Project Benefits are the utility savings and cost avoidance calculated in accordance with the methodologies set forth in Part 2 of this Agreement.

Project Benefits are the Measured Project Benefits to be achieved for a particular period during the term of this Agreement.

O&M Benefits are the operations and maintenance cost avoidance savings as stipulated in Part 2 of this Agreement.

Rebate Project Benefits are the energy rebate or incentive non-recurring savings as stipulated in Part 2 of this Agreement.

Total Project Benefits are the projected Project Benefits to be achieved during the entire term of this Agreement.

1-2. SCOPE

A. The Funding Agency is contracting for a full range of energy services and energy-related capital improvements at no initial capital cost for the Project. The ECMs may include but are not limited to: the design, acquisition, installation, modification, maintenance and training of funding agency personnel in the operation of existing and new equipment. The ECMs will reduce energy consumption and related costs associated with the heating, ventilation and air conditioning system, lighting systems, control systems, building envelope, the hot water systems, water consumption, sewage costs and other energy using devices. Additionally, savings which will not reduce consumption but are aimed at cost savings, such as fuel switching, demand side management, on-site generation, utility bill auditing, utility rate changes, and distribution upgrades etc. have been considered. ECMs may also include the training of facility staff with respect to routine maintenance and operation of all improvements. ECMs must result in a guaranteed minimum energy savings with payments linked to actual documented energy and cost reductions.

B. Any stipulated energy and/or operational cost savings that are attributed to this project have been rigorously reviewed and the GESA Contractor is required by this contract to thoroughly document and verify the savings, which have been approved by DGS and the Funding Agency. The Annual Project Benefits Realized by the ECMs in any year must be guaranteed to equal or exceed the Annual Project Benefits during that year for the duration of the contract. The GESA Contractor is required to guarantee energy and cost savings on an annual basis. No credit for the achievement of savings above and beyond the annual guarantee will be credited to satisfy performance guarantees in future years of the contract. Annual reconciliation of the achieved savings will be required.

1-3. MEASUREMENT & VERIFICATION

A. Measurement & Verification (M&V) services shall commence on the first day of the month following the month in which the Funding Agency releases the Final Payment to the GESA Contractor and shall continue throughout the Assured Performance Guarantee Term, subject to earlier termination of the Assured Performance Guarantee as provided herein. The GESA Contractor shall ensure that an approved representative from the Funding Agency is physically present for all pre-retrofit and post-retrofit measurements for each ECM as applicable to the Energy Savings Guarantee unless the Funding Agency waives their right to be present. The final completion date shall be the date when all Work is completed, including all punch list items, as evidenced by the release of the Final Payment by the Funding Agency. In the event the Funding Agency (i) cancels or terminates receipt of M&V Services, (ii) fails to fulfill any of Funding Agency responsibilities necessary to enable GESA Contractor to complete the Work and provide the M&V Services, or (iii) otherwise cancels, terminates or materially breaches this Agreement, GESA Contractor shall issue a written notice to the Funding Agency stating the nature of the alleged breach, the date upon which it arose, and the remedy sought. GESA Contractor shall provide the Funding Agency with a thirty (30) day period to cure such breach. In the event of a dispute, all parties shall act in good faith to mitigate damages with a reservation of rights as to damages.

B. If the GESA Contractor is delayed in the commencement, performance, or completion of the M&V Services by causes beyond its control and without its fault, including but not limited to inability to access property; concealed or unknown conditions encountered at the project, differing from the conditions represented by Funding Agency in the quote documents or otherwise disclosed by Funding Agency to the GESA Contractor; a Force Majeure condition; failure by Funding Agency to perform its obligations under this GESA Contract; or failure by Funding Agency to reasonably

cooperate with GESA Contractor in the timely completion of the M&V Work where such failure is material, substantial and inconsistent with the terms of this GESA Contract, GESA Contractor shall provide written notice to Funding Agency of the existence, extent of, and reason for such delays and impacts. Under such circumstances, an equitable adjustment in the time for performance and the Assured Performance Guarantee shall be made, subject to the mutual written agreement of the parties.

C. Funding Agency shall provide GESA Contractor, its subcontractors, and its agents reasonable and safe access to all facilities and properties in Funding Agency's control that are subject to the M&V Services. Work to be performed by GESA Contractor in accordance with this GESA Contract shall be performed during normally scheduled staff shifts and as agreed to by both parties. Funding Agency further agrees to assist GESA Contractor, its subcontractors, and its agents to gain access to facilities and properties that are not controlled by Funding Agency but are necessary for GESA Contractor to provide the M&V Services. An equitable adjustment in the time for performance and Assured Performance Guarantee shall be made as a result of any failure to grant such access, subject to the mutual written agreement of the parties.

D. In order for GESA Contractor to perform its obligations under this Agreement with respect to the Work, the Assured Performance Guarantee, and the M&V Services, Funding Agency shall be responsible for:

1. Providing GESA Contractor, its subcontractors, and its agents reasonable and safe access to all facilities and properties that are subject to the Work and/or M&V Services;

2. Properly maintaining, and performing appropriate preventative maintenance on, all equipment and building systems affecting the Assured Performance Guarantee in accordance with manufacturers' standards and specifications;

3. Providing the utility bills, reports, and similar information reasonably necessary for administering GESA Contractor's obligations under the Assured Performance Guarantee within thirty (30) days of Funding Agency receipt and/or generation or GESA Contractor's request therefore;

4. Providing all records relating to energy and/or water usage and related maintenance of the premises and relevant equipment requested by GESA Contractor; and

5. Promptly notifying GESA Contractor of any change in use or condition or any other matter that may impact the Assured Performance Guarantee.

[Remainder of this page left intentionally blank]

PART 2
PROJECT BENEFITS

2-1. PROJECT BENEFITS SUMMARY

A. Subject to the terms and conditions of this GESA Contract, GESA Contractor and Funding Agency agree that, upon Final Completion, Funding Agency will be deemed to achieve a total of **$2,584,566** in material savings and capital cost avoidance in annual increments as shown in the Total Project Benefits table below. GESA Contractor guarantees that Funding Agency will achieve a total of **$24,649,513** in Total Annual Energy Savings during the term of this Assured Performance Guarantee, for Total Project Benefits of **$27,234,079** as set forth in the Total Project Benefits table below.

Table A. Total Project Benefits

Year	Guaranteed Energy Cost Savings[1]	Material Cost Savings	Capital Cost Avoidance[2]	Total Guaranteed Savings[3]
0	$ 174,746	$ -	$ 1,006,901	$ 1,181,647
1	$ 1,176,056	$ 75,810	$ -	$ 1,251,865
2	$ 1,187,816	$ 76,568	$ -	$ 1,264,384
3	$ 1,199,694	$ 77,333	$ -	$ 1,277,028
4	$ 1,211,691	$ 78,107	$ -	$ 1,289,798
5	$ 1,223,808	$ 78,888	$ -	$ 1,302,696
6	$ 1,236,046	$ 79,677	$ -	$ 1,315,723
7	$ 1,248,407	$ 80,473	$ -	$ 1,328,880
8	$ 1,260,891	$ 81,278	$ -	$ 1,342,169
9	$ 1,273,500	$ 82,091	$ -	$ 1,355,590
10	$ 1,286,235	$ 82,912	$ -	$ 1,369,146
11	$ 1,299,097	$ 83,741	$ -	$ 1,382,838
12	$ 1,312,088	$ 84,578	$ -	$ 1,396,666
13	$ 1,325,209	$ 85,424	$ -	$ 1,410,633
14	$ 1,338,461	$ 86,278	$ -	$ 1,424,739
15	$ 1,351,845	$ 87,141	$ -	$ 1,438,987
16	$ 1,365,364	$ 88,013	$ -	$ 1,453,376
17	$ 1,379,018	$ 88,893	$ -	$ 1,467,910
18	$ 1,392,808	$ 89,782	$ -	$ 1,482,589
19	$ 1,406,736	$ 90,679	$ -	$ 1,497,415
Total	$ 24,649,513	$ 1,577,665	$ 1,006,901	$ 27,234,079

Table Notes:

[1] Energy cost savings in year zero of $174,746 are construction period energy savings from ECM 1 – lighting and ECM 2C – Heating Hot Water Loop Decentralization. It is assumed that these savings will be applied as a financing repayment concurrent with the first monthly lease payment.

[2] The capital cost avoidance of $1,006,901 represents a payment from DGS to TEN to cover the cost of ECMs 3B, 3C, 7A, and 7B.

[3] TEN guarantees savings not greater than the amount necessary to cover the Project financing payment, plus the service fees during that year for the Contract duration. This guarantee may vary from the annual amounts described in the table above depending on the final financing amortization.

Any future PPL Act-129 incentives will be paid directly to TEN and held as additional DGS controlled contingency funds for use under this Contract. If the funds ultimately are not used by DGS, they can be applied to financing repayment.

The energy cost savings provided in **Table A** above are based on the annual escalation stated in **Table A-1** below and will be applied to the unit utility rates listed in **Table B** beginning on the first month of the Installation Period, escalating annually throughout the Guarantee Period.

Table A-1 – Annual Escalation Rates

Energy Cost Esc./yr	**1.0%**
Labor/M&V/Service Cost Esc./yr	**3.0%**
Maintenance Cost Esc	**1.0%**

The actual escalation of calculated savings that will be applied in the M&V Report will be the highest of:

(1) **Table A-1** above
(2) CPI (Consumer Price Index) for the geographical region, or
(3) Actual fuel rate

B. Within ninety (90) days of the commencement of the Guarantee Term, GESA Contractor will calculate the Measured Project Benefits achieved during the Installation Period and provide the Funding Agency of written confirmation of the calculations.

C. Within ninety (90) days of each anniversary of the commencement of the Guarantee Term, GESA Contractor will calculate the Measured Project Benefits achieved for the applicable year applicable to such period and provide both DGS and the Funding Agency with an annual report containing:

1. an executive overview of the project's performance and Project Benefits achieved to date; and
2. a summary analysis of the Measured Project Benefits accounting; and
3. a detailed analysis of the Measured Project Benefits calculations.

D. Funding Agency acknowledges and agrees that if, for any reason, it (i) cancels or terminates receipt of M&V Services, (ii) fails to pay for M&V Services, (iii) fails to fulfill any of its responsibilities necessary to enable GESA Contractor to complete the Work and provide the M&V Services, or (iv) otherwise cancels, terminates or materially breaches this GESA Contract, the Assured Performance Guarantee shall automatically terminate and GESA Contractor shall have no liability hereunder.

2-2. PROJECT SAVINGS SHORTFALLS OR SURPLUSES

A. Guaranteed Savings Shortfalls: If an Annual Project Benefit Shortfall occurs for any year of the Assured Performance Guarantee Term, GESA Contractor shall, at the sole discretion of the Funding

Agency, perform one or more of the following:

1. pay to Funding Agency the amount of such shortfall, or
2. subject to Funding Agency's written approval, provide to Funding Agency additional products or services, in the value of such shortfall, at no additional cost to Funding Agency.

B. Guaranteed Savings Surpluses: If an Annual Project Benefit Surplus occurs for any year of the Guarantee Term, GESA Contractor may not apply the amount of such surplus to set off any subsequent Annual Project Benefit Shortfall during the Guarantee Term.

C. Additional Energy Conservations. Where an Annual Project Benefits Shortfall has occurred, GESA Contractor may, subject to Funding Agency approval, implement additional Energy Conservation Measures, at no cost to Funding Agency, which may generate additional Project Benefits in future years of the Guarantee Term. Such improvements do not relieve the GESA Contractor from liability set forth in Paragraph 2-2(A).

D. Event of Default by GESA Contractor: If an Annual Project Benefits Shortfall has occurred and the GESA Contractor does not comply with Paragraph 2-2(A), the Funding Agency may deem this to be an Event of Default. If default occurs, the Funding Agency may place the GESA Contractor in the Contractor Responsibility Program and also pursue debarment or suspension in accordance with the Commonwealth Procurement Code.

PART 3

MEASUREMENT AND VERIFICATION METHODOLOGY

3-1. MEASUREMENT & VERIFICATION PROTOCOL

A. GESA Contractor shall apply either Option A or Option B or Option C or Option D verification methodologies, as more fully detailed in the guidelines and standards of the International Measurement and Verification Protocol (IPMVP) and/or the Federal Energy Management Program (FEMP), or modified variations as outlined below, in connection with the provision of M&V Services hereunder. The applicable option shall be as set forth in the Project-Specific Request for Quote submitted to and accepted by DGS and the Funding Agency. Option A shall not be accepted without DGS and the Funding Agency's prior written approval.

B. Option A: Partially Measured Retrofit Isolation

Measured Project Benefits are determined by partial field measurement of the energy use of the system(s) to which an ECM was applied separate from the energy use of the rest of the facility. Measurements will be short-term with only one-time measurements before and after the Installation Period.

Partial measurement means that some but not all parameters will be measured. Careful review of the design and installation of ECMs is intended to demonstrate that the stipulated values fairly represent the probable actual values. Agreed-upon values will be shown in the measurement and verification plan, along with analysis of the significance of the error they may introduce. Engineering calculations using short-term pre and post-retrofit measurements and stipulations are used to calculate Measured Project Benefits for the duration of the Guarantee Term.

C. Option B: Retrofit Isolation

Savings are determined by field measurement of the energy use of the systems to which the ECM was applied, separate from the energy use of the rest of the facility. Short-term or continuous measurements are taken throughout the post-retrofit period.

D. Option C: Whole Facility

Savings are determined by measuring energy use at the whole facility level. Short-term or continuous measurements are taken throughout the post-retrofit period.

E. Option D: Calibrated Simulation

Savings are determined through simulation of the energy use of components or the whole facility. Simulation routines must be demonstrated to adequately model actual energy performance measured in the facility.

The table below shows the projected energy savings for each ECM and the measurement and verification protocol to be used to verify savings.

ECM #	Energy Conservation Measure Description	Annual kWh Savings	Annual Steam Savings (Mlbs)	Annual Water (kGal) Savings	Annual Sewer (kGal) Savings	IPMVP Option
1	Base Lighting	2,460,496	-1,027	0	0	A
1A (ADD)	New Luminaires	215,337	-127	0	0	A
2B	Chiller Replacement and Plant Optimization	2,296,023	0	830	138	D/B/C
2C	Heating Loop Decentralization	1,319,850	3,088	32	5	A/D
3A	Condenser Water Variable Flow	1,290,672	0	819	136	D/B/C
3B	Chilled Water Pump Motor and VFD Replacement	13,197	0	0	0	D/B/C
3C	Replace Motor Bearings on CHW Pumps 1 and 3	0	0	0	0	N/A
4A.1	Retro Commissioning	677,198	12,711	245	41	D/B/A
4A.2	Steam/Chilled Water Piping Insulation	370,325	4,921	134	22	D/B/A
4B	Central Plant Controls Upgrade	0	0	0	0	N/A
5A	Window Film - L&I	55,631	48	20	3	D
7A	H&W Chilled Water Coil Replacement - AHU1&2	12,575	0	0	0	D
7B	H&W Chilled Water Coil Replacement - AHU3&4	12,575	0	0	0	D

3-2. CHANGES IN USE OR CONDITION

A. Funding Agency agrees to notify GESA Contractor within thirty (30) days of (i) any actual or intended change, whether before or during the Guarantee Term, in the use of any facility, equipment, or Energy Conservation Measure to which this schedule applies; (ii) any proposed or actual expansions or additions to the premises or any building or facility at the premises; (iii) a change to utility services to all or any portion of the premises; or (iv) any other change or condition arising before or during the Guarantee Term that reasonably could be expected to change the amount of Project Savings realized under this Agreement.

1. Such a change, expansion, addition, or condition would include, but is not limited to: (a) changes in the primary use of any facility, Energy Conservation Measure, or portion of the premises; (b) changes to the hours of operation of any facility or portion of the premises; (c) changes or modifications to the Energy Conservation Measures or any related equipment; (d) changes to the M&V Services provided under this GESA Contract; (e) insufficient or improper maintenance or unsound usage of the Energy Conservation Measures or any related equipment at any facility or portion of the premises (other than by GESA Contractor); or (f) additions or deletions of Energy Conservation Measures or any related equipment at any facility or portion of the premises.

B. If GESA Contractor independently learns of any such change or condition, GESA Contractor shall calculate and send to Funding Agency a Notice of adjustment to the Annual Project Benefits to reflect the impact of such change or condition, and the adjustment shall become effective as of the date the change or condition first arose. If the Funding Agency fails to promptly provide GESA Contractor with notice of any such change or condition, GESA Contractor may make reasonable estimates as to the impact of such change or condition and as to the date on which such change or condition first arose in calculating the impact of such change or condition, and such estimates shall be conclusive.

PART 4

BASELINE CALCULATIONS AND UTILITY RATES

4-1. UTILITY COSTS FOR BASELINE

A. The unit utility costs for the Baseline period are set forth below as "Base Utility Cost" and shall be used for all calculations. The Base Utility Cost shall be escalated annually by escalation rate of one percent (1%). The Base Utility Cost for electric represents the 12- month average utility costs from January 1, 2017 through December 31, 2017 for electricity and steam. Water and sewer costs are the published tariff rates for 2018.

B. The baseline energy rates used to calculate savings are $0.075546 / kWh for electricity, $24.64 / Mlb for steam, $9.46/kGal for water, and $6.99/kGal for sewer.

Baseline utility rates used for the energy savings calculations were determined according to the following methods:

Electric Rates: Average annual consumption rate for 2017
Steam Rates: Average annual consumption rate for 2017
Water Rates: Published tariff rate for 2018
Sewer Rates: Published tariff rate for 2018

Current Baseline[1] (3-year Average)			
Utility	**Usage**	**Unit**	**Cost**
Electricity	66,552,132	kWh/yr	$5,027,747
Steam	126,187	Mlb/yr	$3,109,248
Water[2]	18,162	kGal/yr	$171,815
Sewer[2]	14,707	kGal/yr	$102,803
TOTAL			**$8,411,612**

[1] Buildings include: L&I, H&W, North and South Office, Ryan, Main Capitol, East Wing, Central Plant, Keystone, Judicial, and Finance

[2] Water and Sewer consumption for central plant only

The utility baseline was adjusted for the improvements made during the 2015 Small GESA at the Judicial and Keystone buildings, which were only partially reflected in 2017 billing data. The following table shows the modified baseline on which the savings calculations are based. The adjusted electric consumption due to chilled water load reductions will be reflected in the savings calculated for ECM 2 – Chiller Replacement. The electricity reduction from lighting upgrades and steam reduction from mechanical improvements are reflected in the table below but do not affect the savings calculations for any ECMs. The adjustment to the electricity baseline from the 2015 lighting upgrades is half the full annual lighting savings because the 2017 electricity bills already reflect partial implementation of that project.

Adjusted Baseline			
Utility	**Usage**	**Unit**	**Cost**
Electricity	65,544,896	kWh/yr	$4,951,655
Steam	118,666	Mlb/yr	$2,923,930
Water[2]	18,162	kGal/yr	$171,815
Sewer[2]	14,707	kGal/yr	$102,803
TOTAL			**$8,150,202**

Replacing the flow-restricted chilled water coils in the Health & Welfare building may increase energy use by delivering more cooling energy to the building during peak periods. TEN will take flow measurements before coil replacement to assess the level of restriction in the existing coils. A baseline adjustment will be calculated based on those measurements if it is found that the coils were capacity constrained.

Should DGS choose to install a chiller in the basement of the Labor and Industry (L&I) building (ECM 4C), a baseline adjustment would be made to reflect the peak cooling load that is currently unmet by the central plant.

Even in the absence of the new L&I chiller, certain improvements are being considered under the retro commissioning scope that could improve cooling capacity at L&I and would therefore warrant an increase to the baseline energy use (e.g., plate-frame heat exchanger expansion). The full baseline adjustment required to address the entire cooling capacity expansion of the chiller is approximately 440,000 kWh. The contemplated improvements under the retro commissioning scope will not address the full capacity shortfall, so the chiller baseline adjustment can be viewed as an upper bound on the needed baseline adjustment. The required baseline adjustment will be determined during measurement and verification efforts when the amount of cooling capacity expansion can be quantified.

Another baseline adjustment will be required if DGS decides to lower the chilled water supply temperature in peak months to satisfy the cooling load in L&I. The size of the adjustment will be calculated after the operational parameters of the temperature reset are known (e.g., under what conditions DGS lowers the supply temperature).

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PART 5

PRIMARY OPERATIONS SCHEDULE PRE & POST RETROFIT

5-1. PRE/POST RETROFIT

The following table details the stipulated lighting burn hours pre and post retrofit.

Hour Groups	Hour Group Description	Hours
Not in Use	Areas That Are Not In Use (Assumed Based On Space Type)	0
Low Use Storage	Areas with Minimal Occupancy	200
IT Room	Telephone / Data Rooms	260
Electrical Mechanical	Electrical-High Voltage / Mechanical-Boiler Room	520
High Use Storage	24 Hour / 7 Days A Week	520
Janitor Closet	Custodial / Housekeeping	1040
Staff Restroom	Unisex Restroom / Single Occupant	1040
Conference Room	Meeting / Hearing Rooms	1560
Office	Office Areas / Administration	2080
Common Area	Corridor / Lobby Areas / Stairwells	3120
Cafeteria	Cafeteria / Staff Dining	3120
Locker Room	Locker Room Areas	3640
Gym	Staff Athletic / Fitness	3640
Exterior	Exterior Building Façade / Campus Walkway	4380
Stairwell	24 Hour / 7 Days A Week	8760
Exit Signs	24 Hour / 7 Days A Week	8760
Public Restroom	Open 24 Hour Access Public Restroom	8760
Garage	Parking Garage / P1-P2 Elevator Lobby Areas	8760

Assumptions concerning operating schedules for other non-lighting measures are detailed in the Investment Grade Audit.

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PART 6

6.1 MEASUREMENT & VERIFICATION SERVICES

COMMONWEALTH REPRESENTATIVE

A. **GESA Contractor shall ensure that an approved representative from Funding Agency is physically present for all pre-retrofit and post retrofit measurements, for each ECM as applicable to the Energy Savings Guarantee. Funding Agency and GESA Contractor shall mutually witness and record said measurements and sign GESA Contractor's measurement logbook, if deemed mutually acceptable. GESA Contractor shall include all logged measurements in the annual report to be provided.**

6-2. M&V SERVICES

A. GESA Contractor will, for a period of 3 Guarantee Years (the "Reporting Period") unless earlier terminated by Funding Agency, provide the "M&V Services" set forth below in connection with the Assured Performance Guarantee. Funding Agency shall pay GESA Contractor an annual fee during the Reporting Period for such M&V Services as identified in the table below. Notwithstanding anything to the contrary, Funding Agency may choose to continue the M&V services in Guarantee Year Four (4) and beyond by notifying GESA Contractor within thirty (30) days of the end of the third Guarantee Year. If Funding Agency, after GESA Contractor's completion of the third year of M&V Services, does not continue with the M&V Services, it irrevocably acknowledges GESA Contractor's full satisfaction of, and release from, this Assured Performance Guaranty.

1. During the Installation Period, the GESA Contractor's Performance Assurance Engineer will track Measured Project Benefits. The GESA Contractor will report the Measured Project Benefits achieved during the Installation Period to the Funding Agency within 90 days of the commencement of the Guarantee Term.

2. Within 90 days of each anniversary of the commencement of the Guarantee Term, for a period of 3 years, GESA Contractor will provide the Funding Agency with an annual report containing:

    A. an executive overview of the project's performance and Project Benefits achieved to date;
    B. a summary analysis of the Measured Project Benefits accounting; and
    C. depending on the M&V Option, a detailed analysis of the Measured Project Benefits calculations.

3. During the Guarantee Term, for a period of 3 years, the GESA Contractor's Performance Assurance Engineer will monitor the on-going performance of the ECMs, as specified in this GESA Contract, to determine whether anticipated Measured Project Benefits are being achieved. In this regard, the Performance Assurance Engineer will periodically assist the Funding Agency, on-site or remotely, with respect to the following activities:

    A. Conduct one annual on-site visit to verify proper operation of the equipment installed under the project.
    B. review information furnished by the Funding Agency from the facility

management system to confirm that control strategies are in place and functioning;

C. advise Funding Agency's designated personnel of any performance deficiencies based on such information;
D. coordinate with Funding Agency's designated personnel to address any performance deficiencies that affect the realization of Measured Project Benefits; and
E. inform Funding Agency of opportunities to further enhance project performance and of opportunities for the implementation of additional ECMs.

4. For specified ECMs utilizing "Option A" and "Modified Option A" M&V protocols, the GESA Contractor will:

A. conduct pre and post installation measurements required under this GESA Contract;
B. confirm the building management system employs the control strategies and set points specified in this GESA Contract; and
C. analyze actual as-built information and adjust the Baseline and/or Measured Project Benefits to conform to actual installation conditions (e.g., final lighting and water benefits calculations will be determined from the as-built information to reflect the actual mix of retrofits encountered during installation).

6-3. COST OF M&V SERVICES

Based on direction from the Commonwealth, the fees for the first three (3) years of annual M&V service have been included in the Project; refer to the project cash flow in the Investment Grade Audit. The amount to be paid annually by Funding Agency for the M&V services provided is listed in the table below. If the Funding Agency chooses to continue the M&V services in Guarantee Year Four (4) and beyond, it must notify GESA Contractor within thirty (30) days of the end of the third Guarantee Year. If the Customer wishes to continue the M&V Services past the third Guarantee Year, the pricing for each additional Guarantee Year for M&V services will be the Year 3 M&V Cost annually escalated at 3% in each additional Guarantee Year. The billing for the 1st three Guarantee Years will begin with Final Acceptance of this project.

The M&V payments in year 2 and 3 are larger than year 1 to reflect on-going M&V activities by Optimum Energy. Optimum's year 1 M&V costs are included in the ECM installation cost.

Year	**M&V Cost**
1	$64,549
2	$104,736
3	$106,731
Total	**$276,016**

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PART 7

FUNDING AGENCY RESPONSIBILITIES

7-1. In order for GESA Contractor to perform its obligations under this GESA Contract with respect to the Work, the Assured Performance Guarantee, and the M&V Services, Funding Agency shall be responsible for:

1. Providing GESA Contractor, its subcontractors, and its agents reasonable and safe access to all facilities and properties that are subject to the Work and/or M&V Services;

2. Properly maintaining, and performing appropriate preventative maintenance on, all equipment and building systems affecting the Assured Performance Guarantee in accordance with manufacturers' standards and specifications;

3. Providing the utility bills, reports, and similar information reasonably necessary for administering GESA Contractor's obligations under the Assured Performance Guarantee within thirty (30) days of Funding Agency receipt and/or generation or GESA Contractor's request therefore;

4. Providing all records relating to energy and/or water usage and related maintenance of the premises and relevant equipment requested by GESA Contractor;

5. Providing and maintaining a dedicated telephone line and/or TCP/IP remote connection to facilitate remote monitoring of relevant equipment;

6. Promptly notifying GESA Contractor of any change in use or condition or any other matter that may impact the Assured Performance Guarantee.

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ENERGY EFFICIENT MEASURES

The table(s) below summarizes ECM savings and cost and simple payback

ECM #	Energy Conservation Measure Description	Install Cost	Annual Energy Savings ($)	Annual O&M Savings ($)	Simple Payback	Annual kWh Savings	Annual Steam Savings (Mlbs)	Annual Water (kGal) Savings	Annual Sewer (kGal) Savings
1	Base Lighting	$ 2,233,065	$ 160,564	$ 59,965	10.1	2,460,496	-1,027	0	0
1A (ADD)	New Luminaires	$ 1,280,302	$ 13,142	$ 545	-	215,337	-127	0	0
2A	Central Plant Free Cooling	$ -	$ -	$ -	-	0	0	0	0
2B	Chiller Replacement and Plant Optimization	$ 9,123,946	$ 182,271	$ 5,808	48.5	2,296,023	0	830	138
2C	Heating Loop Decentralization	$ 1,308,620	$ 176,120	$ 221	7.4	1,319,850	3,088	32	5
2C (ADD)	Replace both Heat Exchangers in North + South Office	$ -	$ -	$ -	-	0	0	0	0
3A	Condenser Water Variable Flow	$ 671,638	$ 106,202	$ 5,730	6.0	1,290,672	0	819	136
3B	Chilled Water Pump Motor and VFD Replacement	$ 339,815	$ 997	$ -	-	13,197	0	0	0
3C	Replace Motor Bearings on CHW Pumps 1 and 3	$ 72,087	$ -	$ -	-	0	0	0	0
4A.1	Retro Commissioning	$ 1,339,503	$ 366,959	$ 1,713	3.6	677,198	12,711	245	41
4A.2	Steam/Chilled Water Piping Insulation	$ 531,549	$ 150,652	$ 937	3.5	370,325	4,921	134	22
4B	Central Plant Controls Upgrade	$ 376,023	$ -	$ -	-	0	0	0	0
4C	L&I Chilled Water Capacity Shortfall - Satellite Chiller	$ -	$ -	$ -	-	0	0	0	0
5A	Window Film - L&I	$ 172,889	$ 5,605	$ 141	30.1	55,631	48	20	3
5B	Window Film - H&W	$ -	$ -	$ -	-	0	0	0	0
6	L&I Building Window Sealing	$ -	$ -	$ -	-	0	0	0	0
7A	H&W Chilled Water Coil Replacement - AHU1&2	$ 297,500	$ 950	$ -	-	12,575	0	0	0
7B	H&W Chilled Water Coil Replacement - AHU3&4	$ 297,500	$ 950	$ -	-	12,575	0	0	0
	Installation Total	**$ 18,044,436**	**$ 1,164,411**	**$ 75,059**	**14.6**	**8,723,879**	**19,613**	**2,078**	**346**

Owner Controlled Contingency	$ 175,000
LESS Capital Avoidance (CHWP Retrofits, H&W Coils - ECMs 3B, 3C, 7A, and 7B)	$ (1,006,901)
Net Financed Amount	**$ 17,212,535**

Possible PPL Act-129 Incentives (Add to Owner Controlled Contingency)	$ 418,851
Lighting	*$ 112,356*
Non-Lighting	*$ 306,495*

Exhibit B

Form of Acceptance Certificate

FORM OF ACCEPTANCE CERTIFICATE

FINANCER ADDRESS
Attn: Contract Administration

Re: Installment Purchase Agreement and Payment Schedule (the "Agreement") dated as of _____ between _____ ("FINANCER") and the Commonwealth of Pennsylvania, Acting through the Department of General Services ("DGS")

Ladies and Gentlemen:

In accordance with the Agreement, the undersigned DGS hereby certifies and represents to, and agrees with Lessor as follows:

1. The implementation/construction of the ECMs (as defined in the Agreement) has been completed by the GESA Contractor (as defined in the Agreement) and such ECMs have been delivered, installed and accepted on the date hereof.

2. DGS has conducted such inspection and/or testing of the ECMs as it deems necessary and appropriate and hereby acknowledges that it accepts the ECMs for all purposes.

3. DGS is self-insured in accordance with Section 13 of the Agreement.

4. DGS hereby reaffirms that the representations, warranties and covenants contained in the Agreement are true and correct as of the date hereof.

5. No event or condition that constitutes, or with notice or lapse of time, or both, would constitute, an Event of Default (as defined in the Agreement) exists at the date hereof under the Agreement.

Date: _____

Commonwealth of Pennsylvania, Acting through
Department of General Services ("DGS")

By: _____

Name: _____

Title: _____

(Seal)

Exhibit C

Payment Schedule

Request for Quotes

For A Guaranteed Energy Savings Project At:

Pennsylvania Capitol Complex

Dauphin County, PA

Project No. GESA 2017-1

Contract No. GESA 2017-1.1

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF GENERAL SERVICES
HARRISBURG

Tom Wolf
Governor

Curt Topper
Secretary

DATE OF ISSUE:
April 12, 2017

GUARANTEED ENERGY SAVINGS PROJECT

NOTICE TO OFFERORS

It is the responsibility of each Offeror to ensure that its quote is received at the delivery location listed below prior to the date and time set for the opening of quotes ("Quote Opening Time"), regardless of method of delivery used. **No quote shall be considered if it arrives after the Quote Opening Time, regardless of the reason for the late arrival.** All envelopes containing quotes must be clearly marked "QUOTE" and must include the address of the Quote Opening location, the assigned contract, project number and the Quote Opening Date and Time.

Project…….	GESA – 2017-1
Project Location……	Capitol Complex Harrisburg, Dauphin County, Pennsylvania
Funding Agency……	Department of General Services
Brief Description……	The Department of General Services is soliciting quotes for a project to assist the Department of General Services facility in the Capitol Complex to become as energy efficient as possible through installation of energy or water conservation measures, upgrades, and implementation of optimal operation and maintenance procedures. The Department wishes to implement the proposed energy project on an energy performance contract basis. Only quotes that have a return on investment of less than 20 years and reduce real energy consumption and are funded under a guaranteed performance basis will be considered. Savings guarantees provided by the successful offeror will fully offset the project costs involved for the Commonwealth.
Pre-Quote Conference……..	**April 26, 2017 at 1:00 p.m.** in Hearing Room 2, Keystone Office Building, Harrisburg, Pennsylvania 17120

Quote Submission Deadline... June 1, 2017 at 2:00 p.m.

Deliver quotes To……	Becky Tomlinson 403 North Office Building 401 North Street Harrisburg, PA 17120 Telephone: (717) 705-5946 Fax: (717) 705-2887 Email: retomlinso@pa.gov
Contract Numbers.....	D.G.S. GESA- 2017-1.1
Vendor Registration……...	**Offerors must be approved through the ITQ process at date of issue. Register at www.pasupplierportal.state.pa.us**
Quote Results At……..	www.dgs.pa.gov Menu Path: State Government > Facilities & Space Management > Energy Savings Programs
Proposed Date of Completion…..	To Be Determined
Quote Period……..	60 days allowed from Quote Submission Deadline until Notice of Selection
Issuing Office……	Becky Tomlinson 403 North Office Building 401 North Street Harrisburg, PA 17120 Telephone: (717) 705-5946 Fax: (717) 705-2887 Email: retomlinso@pa.gov
Public Works Verification Act:	**The Bidder must comply with the Public Works Employment Verification Act 127 of 2012 by submitting to the Department a Commonwealth Public Works Verification Form ("Form") prior to the award of the Contract.**

The Department's directory of small and diverse businesses, including Minority Business Enterprises, Women Business Enterprises, Veteran Business Enterprises, Service-Disabled Veteran Business Enterprises, Disability-Owned Business Enterprises, and LGBT Business Enterprises businesses can be accessed from:

http://www.dgs.pa.gov/Businesses/Small%20Diverse%20Business%20Program/Pages/default.aspx#.WNz7Qp3D-Ag

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Appendix C Quote Security (Bid Bond)

Appendix D Small Diverse Business Submission Form

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PART 1

General Information for GESA Firms

1.1 Purpose.

A. This Request for Quotes (RFQ) provides interested and previously ITQ qualified Offerors with sufficient information to enable them to prepare and submit a Quote for the Service Category of:

GESA Contracting

As listed in the Commonwealth's Guaranteed Energy Savings Act Project (GESA) Invitation to Qualify (ITQ) in accordance with the Guaranteed Energy Savings Act requirements of the Commonwealth Procurement Code, 62 Pa. C.S. Sec. 3751 – 3758, as amended.

B. All Offerors must qualify through the ITQ process before the RFQ issue date. Each Quote shall consist of three separately submissions: 1) Technical; 2) ECM/Cost; and 3) Small Diverse Business, for consideration by the Department of General Services (DGS) to satisfy a need for construction of a GESA project for the Department of General Services (aka "DGS", referred hereinafter as the "**Funding Agency**") located in Harrisburg, DGS No. GESA 2017-1, Dauphin County, Pa. ("the Project"). The Quote evaluation process, and if the Commonwealth decides to proceed, the construction process, are further described in this RFQ.

C. **This is an RFQ for a "DGS" GESA project. However, the format of this RFQ is templated for projects whereby DGS is the coordination agency for another agency (i.e., the "Funding Agency"). As such, any and all references of the Funding Agency or to DGS and the Funding Agency as though they are two separate entities in this RFQ and Appendices shall mean only "DGS".**

1.2 Definitions.

A These definitions shall apply to terms used in the RFQ, without conflicting with any definitions in the General Conditions of the GESA Contract:

1. **Energy and Resource Management Office** – The DGS Office responsible to oversee development of the design by the GESA Contractor and Energy Consultant. The DGS Office responsible to advertise, bid, and awards the contract for this Project.

2. **DGS** – In addition to the definition stated in the ITQ, DGS helps to oversee adherence to design and construction contractual obligations.

3. **GESA Contractor's Professional (Professional)** – The GESA Contractor's licensed PA Registered Professional.

4. **Offeror** – A GESA firm submitting and signing the Quote in response to this RFQ for consideration by the Commonwealth for the award of a GESA Contract. The successful Offeror will, if a contract is awarded and fully executed, become the GESA Contractor.

5. **Project** – The site and associated building(s) and infrastructure improvements.

6. **Project Superintendent** – GESA Contractor's person responsible for oversight and management of the construction process.

7. **RFQ** – Request for Quote, the document issued by DGS to obtain Quotes from firms for award of a GESA contract.

1.3 Issuing Office:

A This RFQ is issued by DGS on behalf of the Funding Agency. The Issuing Office is the sole point of contact in the Commonwealth for this RFQ. Offerors should not contact any DGS employees, any consultant or any Funding Agency employees about this RFQ.

1.4 Requests for Information (RFI):

A All questions or inquiries regarding this RFQ are to be submitted by use of an RFI. RFI's are to submitted to the RFQ Coordinator in writing and should include the Project Name and Project Number. RFI's must be submitted NO LATER THAN the date indicated in the Calendar of Events herein.

B **Questions will NOT be answered via telephone**. All relevant questions and written answers will be issued as a bulletin and become part of this RFQ. DGS shall not be bound by any verbal information or by any written information allegedly supplied by the consultant, the Funding Agency or by DGS that is not either contained within the solicitation documents or issued by DGS through a bulletin. Questions shall not constitute a formal protest of the specifications or of the solicitation. The formal protest process is described below and available in the Procurement Code (62 Pa.C.S. § 1711.1).

RFQ Coordinator: Becky Tomlinson
403 North Office Building
401 North Street
Harrisburg, PA 17120
Telephone: (717) 705-5946
Fax: (717) 772-5317
Email: retomlinso@pa.gov

C The RFQ Coordinator will ensure that questions are answered promptly and that all bulletins will be issued to Offerors who have requested project documents. Plan holders who requested the RFQ will get the complete bulletin, including any attachments. Any entity that is not on DGS' list of plan holders will not receive complete bulletins and will be deemed non-responsive on the Quote Submission Deadline.

1.5 Scope.

A DGS is interested in contracting for a full range of energy services and energy-related capital improvements ("energy conservation measures" or "ECMs") at no initial capital cost for the Project. The ECMs may include but are not limited to: the design, acquisition, installation, modification, maintenance and training of Funding Agency personnel in the operation of existing and new equipment. The ECMs will reduce energy consumption and related costs associated with the heating, ventilation and air conditioning system, lighting systems, control systems, building envelope, the hot water systems, water consumption, sewage costs and other energy using devices. Additionally, savings which would not reduce consumption per se but are aimed at cost savings, such as fuel switching, demand side management, on-site generation, utility bill auditing, utility rate changes, and distribution upgrades etc. may also be considered. ECMs may also include the training of facility staff with respect to routine maintenance and operation of all improvements. ECMs must result in a guaranteed minimum energy savings with payments linked to actual documented energy and cost reductions.

B **Any stipulated energy and/or operational cost savings that may be attributed to this project will be rigorously reviewed, and the GESA Contractor will be required by the contract to thoroughly document and verify the savings, which must be approved by DGS. The savings achieved by the ECMs in any year must be guaranteed to satisfy the project financing payment plus the service fees during that year for the duration of the contract. The GESA Contractor will be required to guarantee energy and cost savings on an annual basis. No credit for the achievement of savings above and beyond the annual guarantee will be credited to satisfy performance guarantees in future years of the contract. Annual reconciliation of the achieved savings will be required. In accordance with the provisions of the Commonwealth Procurement Code (62 Pa. C.S. § 3754(c)), the recovery of contract costs from energy savings over the term of the energy performance contract shall not exceed 20 years**

1.6 Type and Award of Contract.

A If a contract is entered into as a result of this RFQ process, DGS will award a single GESA Contract to the successful Offeror. The only language of the GESA Contract that is negotiable is the ECMs to be installed in the project. The remainder of the GESA Contract is non-negotiable. The Effective Date of the contract shall be the date on which all signatures required by law are affixed to the contract. No contract exists until all such signatures are fixed and the final date becomes the Effective Date of the contract. See the Calendar of Events at the end of this Part 1 for anticipated dates and durations for the procurement process on this Project. This single GESA Contract will encompass the costs for any and all design and construction services necessary to provide the complete Project described in the GESA Contract documents. The successful Offeror will become the GESA Contractor. Liquidated damages will be applied to the contract.

1.7 Commonwealth's Rights Reserved.

A DGS reserves the right to cancel or withdraw this RFQ, in whole or in part, any time prior to award of the contract. DGS reserves the right to reject any and all Quotes received as a result of this request. DGS may, in its discretion, waive any informality or technical deficiency in a Quote. In addition, DGS reserves the right to interview all qualified Offerors and to negotiate the final ECMs with the successful Offeror.

1.8 Incurring Costs.

A The Commonwealth is not liable for any costs incurred by Offerors prior to Offerors entering contract with the Commonwealth.

1.9 Pre-Quote Conference.

A A Pre-Quote Conference will be held as indicated in the Calendar of Events included at the end of Part 1 of this RFQ. Although attendance at the Pre-Quote Conference is not mandatory, all prospective Offerors, subcontractors and suppliers are encouraged to attend. The Conference will not be videotaped and recordings are strictly prohibited. Representatives from DGS and the Funding Agency will present an overview of the RFQ, including but not limited to: square footage, floor plans, conditions, infrastructure, drawings if available, fuel type, actual fuel and electric consumption, and utility bills, if not already part of this RFQ. The Commonwealth will also provide information about any changes in occupancy. The Commonwealth will also review this RFQ's submission requirements and answer questions. If possible, Offerors should forward questions to the RFQ Coordinator prior to the date of the Pre-Quote Conference to ensure sufficient analysis prior to an answer being supplied at the Conference. Questions may also be asked at the Conference.

B **Answers furnished during the Pre-Quote Conference will not be official or binding until verified, in writing, by the Issuing Office via bulletin. Questions and answers from the Pre-Quote Conference issued as a bulletin become part of this RFQ.**

1.10 Site Visit by Offerors.

A Each Offeror will be allowed to visit the site immediately following the Pre-Quote Conference for no more than 4 hours. All personnel must be approved by the Funding Agency to access the facility. Each Offeror will have the same 4-hour limit. Offerors must recognize and accept that site visits constitute an imposition on the Funding Agency, who must continue to maintain a safe and secure facility. No request will be granted that may in any way be perceived as a risk to the safety and security of the facility. During the visit, Offerors shall become fully acquainted and familiar with existing conditions; the character of the operations to be carried on under the proposed contract; and the facility operations, difficulties and restrictions affecting the execution of the work on this Project.

1.11 Site Visits

A Background checks will not be required for the site visit, but the successful GESA Contractor will be required to have background checks performed by the Funding

Agency on all employees entering the facility. Photographs will be limited during the site visit in accordance with Funding Agency policies. Each contractor will be allowed three (3) additional, 3-hour site visits. All visits will be scheduled by the RFQ Coordinator.

1.12 Amendments to the RFQ.

A If the RFQ needs to be amended, the RFQ Coordinator will administer the issuance of bulletin(s) setting forth all modifications to the RFQ and questions and answers about the RFQ. Notice of each bulletin will be emailed to all entities that have requested the RFQ and provided the required contact (email) information. Entities that do not provide complete contact information including firm name, prime contact, address, phone, fax and email might not receive all bulletins. The Offeror shall acknowledge receipt of the bulletin(s) as required by the language of the bulletin. Any Quote that does not acknowledge all bulletins may be considered non-responsive. The bulletin(s) will become part of the RFQ. DGS will not issue any bulletin later than indicated in the RFQ Calendar of Events, unless DGS extends the Quote Submission Deadline. By submitting a Quote, the Offeror acknowledges and affirms that the provisions of all bulletins have been included in the Quote, and the Offeror understands its responsibility for all provisions of all Bulletins. DGS reserves the option to issue bulletin(s) shipped in hardcopy format.

B **A written bulletin issued by DGS is the only binding revision to this RFQ. No other information or form of amendment, written or oral, shall be considered binding upon DGS, nor should a Offeror rely upon them. Offerors shall not contact DGS, the Funding Agency, or the consultant with any questions. Offerors may only submit written questions as described in this RFQ**.

1.13 Familiarity with Conditions and Operations of an Occupied Facility.

A By submitting a Quote, Offeror shall warrant and represent that it has become familiar with the conditions and operations related to the Project, including but not limited to: the location, condition, layout, and nature of the work required to be performed; the site; generally prevailing climactic conditions in the area; anticipated labor supply and cost; availability and cost of materials, tools and equipment; the character, quality and quantity of surface and sub-surface materials likely to be encountered; the character of equipment and other facilities needed for the performance of the work; the specific conditions under which the work is to be performed; and all matters which may in any way affect the work or its performance. The Offeror also warrants and represents that it has examined the RFQ and all information contained herein. The Offeror further represents that as a result of such examinations and investigations: it thoroughly understands the Project and its intent and purpose; is familiar with all applicable codes, ordinances, laws, regulations, and rules as they apply to the work; and that the Offeror will abide by same. The failure or omission of the Offeror to receive or examine the specifications, or to visit the site and become acquainted with the conditions there existing, shall in no way relieve the Offeror from any obligations relating to the performance of the Project work. No subsequent claims will be recognized for additional costs of labor, materials, appliance, equipment, etc., or

for difficulties encountered that could have been foreseen had such an examination been made.

B If a contract is awarded for the Project, the GESA Contractor shall be required to perform its work with no interruption to the Funding Agency's operation of an occupied facility, including its administrative and business operations. Any work which will interfere with the Funding Agency's operations shall be performed only after obtaining the Funding Agency's prior written approval. The Funding Agency reserves the right to determine what work will interfere with its operations and such determination shall be final.

1.14 Quote Submission Deadline.

A To be considered responsive, a Quote must be delivered to the RFQ Coordinator **In Harrisburg, Pennsylvania**, on or before the Quote Submission Deadline set forth in the Calendar of Events paragraph. Offerors who mail Quotes should allow sufficient mail delivery time to ensure timely receipt of their Quotes. If, due to inclement weather, natural disaster, or any other cause, the DGS office to which quotes are to be submitted is closed on the Quote Submission Deadline, the Quote Submission Deadline shall be automatically extended until the next Commonwealth business day on which the office is open, unless the Offerors are notified otherwise by DGS. The time of day for the extended Quote Submission Deadline shall remain the same.

B **The Offeror shall be solely responsible for assuring that the Quote arrives prior to the Quote Submission Deadline. Quotes delivered after the Quote Submission Deadline, regardless of the reason for lateness, will automatically be rejected and returned unopened to the Offeror.**

1.15 If the Offeror is a Joint Venture.

A If the entity that will be signing the Quote is a joint venture, then there are additional requirements that apply.

1. The bid bond submitted with the ECM/Cost submission must be issued in the name of the Joint Venture, not in the name of the individual entities comprising the Joint Venture

2. The Joint Venture must submit a copy of the Joint Venture Agreement with the Technical Quote. This Agreement shall not count against the page limits.

3. Each entity comprising the Joint Venture must submit with the Quote the corporate resolution or other legal document evidencing the entity's authorization to participate or form the Joint Venture.

4. The Qualification form for the Joint Venture GESA shall address the scoring requirements for each entity of the Joint Venture. Each entity of the Joint Venture may have three (3) sheets for that entity's qualifications. Any Joint Venture that exceeds this page limit will forfeit all points for the GESA Qualification.

5. The Joint Venture should specifically identify and discuss in the Work Plan Section the responsibilities and scope of work on the Project for each entity in the Joint Venture.

1.16 Withdrawal of Quote.

A Each Offeror specifically waives any right to withdraw or modify a submission, except as hereinafter provided. A Quote may be withdrawn by written, emailed or faxed notice received at the Issuing Office's address for Quote delivery prior to the exact hour and date specified for receipt of the Quote. If, however, the Offeror chooses to attempt to provide such written notice by fax transmission, DGS shall not be responsible or liable for errors or failures in fax transmission. A Quote may also be withdrawn in person by an Offeror or its authorized representative, provided its identity is made known and it signs a receipt for the Quote, but only if the withdrawal is made prior to the exact hour and date set forth for receipt of the Quote. A Quote may only be modified by the submission of a new, sealed submission or a sealed modification that complies with the requirements of this RFQ and is received by the Issuing Office prior to the Quote Submission Deadline.

1.17 Small Diverse Business Information.

A DGS encourages participation by Small Diverse Businesses as prime contractors, and encourages all prime contractors to make significant commitments to use Small Diverse Businesses as subcontractors and suppliers. To be considered a Small Diverse Business, a business must meet the requirements of both a "Small Business" and "Small Diverse Business" set forth below:

A Small Business must meet each of the following requirements:

- The business must be a for-profit, United States business;
- The business must be independently owned;
- The business may not be dominant in its field of operation;
- The business may not employ more than 100 full-time or full-time equivalent employees;
- The business, by type, may not exceed the following three-year average gross sales:
  - Procurement Goods and Services: $20 million
  - Construction: $20 million
  - Building Design Services: $7 million
  - Information Technology Goods and Services: $25 million

For credit in the RFQ scoring process, a Small Business must complete the DGS/BDISBO self-certification process. Additional information on this process can be found at: http://www.dgs.pa.gov/Businesses/Small%20Business%20Contracting%20Program/Pages/default.aspx.

A Small Diverse Business is a DGS-verified minority-owned small business, woman-owned small business, veteran-owned small business, service-disabled

veteran-owned small business, LGBT-owned small business, Disability-owned small business, or other small businesses as approved by DGS, that are owned and controlled by a majority of persons, not limited to members of minority groups, who have been deprived of the opportunity to develop and maintain a competitive position in the economy because of social disadvantages.

For credit in the RFQ scoring process, a Small Diverse Business must complete the DGS verification process. Additional information on this process can be found at:
http://www.dgs.pa.gov/Businesses/Minority,%20Women%20and%20Veteran%20Businesses/Pages/default.aspx.

The Department's directory of self-certified Small Businesses and DGS/BDISBO-verified Small Diverse Businesses can be accessed from:
http://www.dgs.pa.gov/Businesses/Minority,%20Women%20and%20Veteran%20Businesses/Small-Diverse-Business-Verification/Pages/Finding-Small-Diverse-Businesses.aspx.

Questions regarding the Small Diverse Business and Small Business Programs, including questions about the self-certification and verification processes can be directed to:

Department of General Services
Bureau of Diversity, Inclusion and Small Business Opportunities (BDISBO)
Room 601, North Office Building
Harrisburg, PA 17125
Phone: (717) 783-3119
Fax: (717) 787-7052
Email: RA-BDISBOVerification@pa.gov
Website: www.dgs.pa.gov

B Small Diverse Businesses that submit a Quote as a Prime Quote will not receive credit for their own status as a Small Diverse Businesses.

Payments to Small Diverse Businesses that are subcontractors of any level to the GESA Contractor will count toward the Small Diverse Business participation total based upon the dollar value of their work.

C BDISBO shall provide the awarded Offeror a Small Diverse Business Participation Plan (Plan) Form at the Initial Job Conference. The Plan, which will be completed by the awarded Offeror, shall include a list of proposed DGS-verified SDB subcontractors, manufacturers and suppliers the awarded Offeror will use on the project, along with the scope of work and/or supplies to be provided by each individual SDB. The awarded Offeror shall provide the completed Small Diverse Business Participation Plan to BDISBO within (30) days of the Initial Job Conference.

1.18 Alternate Quotes.

A DGS has identified the basic approach to meeting its requirements and will not accept alternate Quotes or uninvited Quotes. Offerors may submit Energy

Conservation Measures beyond the ECMs described in the appendix to this RFQ. Additional ECMs are not considered alternate Quotes.

1.19 Contact for Clarification.

A Offerors that submit Quotes may be required to make an oral or written clarification of their Quotes to the Issuing Office to ensure thorough mutual understanding and Offeror responsiveness to the solicitation requirements. The Issuing Office will handle any requests for clarification.

1.20 Disclosure of Quote Contents.

A Confidential Information. The Commonwealth is not requesting, and does not require, confidential proprietary information or trade secrets to be included as part of Offerors' submissions in order to evaluate Quotes submitted in response to this RFQ. Accordingly, except as provided herein, Offerors should not label Quote submissions as confidential or proprietary or trade secret protected. Any Offeror who determines that it must divulge such information as part of its Quote must submit the signed written statement described below and must additionally provide a redacted version of its Quote, which removes only the confidential proprietary information and trade secrets, for required public disclosure purposes.

B Commonwealth Use of Quote Contents. All material submitted with the Quote shall be considered the property of the Commonwealth of Pennsylvania and may be returned only at the Issuing Office's option. The Commonwealth has the right to use any or all ideas not protected by intellectual property rights that are presented in any Quote regardless of whether the Quote becomes part of the contract. Notwithstanding any Offeror copyright designations contained on Quotes, the Commonwealth shall have the right to make copies and distribute Quotes internally and to comply with public record or other disclosure requirements under the provisions of any Commonwealth or United States statute or regulation, or rule or order of any court of competent jurisdiction.

C Public Disclosure. Public records requests for Quotes are governed by and shall be handled in the following manner:

1. After the award of a contract pursuant to this RFQ, or all Quotes are opened and rejected, all Quote submissions are subject to disclosure in response to a request for public records made under the Pennsylvania Right-to-Know-Law, 65 P.S. §67.101, et seq. If a Quote submission contains confidential proprietary information or trade secrets, a signed written statement to this effect must be provided with the submission in accordance with 65 P.S. §67.707(b) for the information to be considered exempt under 65 P.S. §67.708(b)(11) from public records requests. Financial capability information submitted with this RFQ is exempt from public records disclosure under 65 P.S. § 67.708(b) (26).

1.21 Interviews.

A The Quotes will be evaluated and scored as described in detail in this RFQ. Those Offerors who accumulate sufficient Technical Submission points as described in Part 3 will be advised of a date and time to interview with the Evaluation Committee members.

1.22 News Releases.

A All news releases and media contacts regarding this project will be made only by DGS, unless DGS directs otherwise in specific instances. Offeror(s) shall not initiate news releases or media contact without prior written permission of DGS. This paragraph does not apply to any advertisement soliciting interested subcontractors made by the Offeror during the preparation of the Quote.

1.23 Restriction of Contact.

A From the issue date of this RFQ until the issuance of a Notice of Selection, there shall be no contact between the Offerors and DGS and/or Funding Agency personnel concerning this RFQ, Quotes and the evaluation process except as discussed in Part 1 of this RFQ. The only person who may be contacted directly is the RFQ Coordinator. This restriction ensures that all Offerors obtain the same accurate and binding information, with no advantage or undue influence on any potential Quote scores. Any violation of this condition is cause for DGS to reject the Offeror's Quote. If DGS discovers that any violations have occurred, DGS may reject any Quote or rescind any contract awarded pursuant to this RFQ.

1.24 Successful Quote Events.

A Upon the Evaluation Committee's completion of the interview process, the following order of events will occur:

1. Each Evaluation Committee member will calculate their ECM/Cost score for each Quote using the scoring matrix included in this RFQ as an appendix.

2. The RFQ Coordinator will convene a meeting of the scoring members of the Evaluation Committee to discuss and finalize scoring (Legal counsel and Comptroller's Office may be represented.)

3. The RFQ Coordinator will compile the Technical Submission scores (which were finalized prior to the interview process), the ECM/Cost scores and the Small Diverse Business Submission scores.

4. The RFQ Coordinator will submit a recommendation memo to the Deputy Secretary for Public Works for DGS and the Secretary of DGS for review and approval.

5. DGS will issue a written Notice of Selection to the Offeror whose Quote is determined to be the most advantageous to the Commonwealth in accordance with the evaluation factors, procedures and criteria set forth in this RFQ.

6. DGS will post the following information on the DGS GESA website within 2 business days after the Notice of Selection is issued:

   a. The successful Quote's Technical submission

   b. The successful Quote's ECM/Cost submission

   c. The successful Quote's SDB commitment form

   d. All Offerors' Quote Score Summary with the successful Offerors' identity only (Technical Submission Score, ECM/Cost Submission Score, and Small Diverse Business Submission Score).

   e. The RFQ Coordinator's recommendation memo to the Deputy Secretary

1.25 Debriefing of Unsuccessful Offerors.

A DGS will provide notice to all unsuccessful Offerors (unsuccessful letter) on the same day DGS issues the Notice of Selection (if one is issued) to the successful Offeror. As part of this notice to unsuccessful Offerors, DGS will notify them of the opportunity for a debriefing and time frame for this optional debriefing. Any unsuccessful Offeror who wants to be debriefed must fax or email in a written request to the RFQ Coordinator within three (3) calendar days of the date of the unsuccessful letter. DGS will hold a debriefing conference for each unsuccessful Offeror who submitted a written request for such a conference within four (4) calendar days of receipt of notice of a request for a debriefing but no later than seven (7) calendar days from the date of the unsuccessful letter.

B The timeframe for debriefing of unsuccessful Offerors neither extends nor modifies in any way the deadlines for the RFQ Protest Procedure set forth herein.

C The RFQ Coordinator will hold the debriefing conference in Harrisburg or by telephone or video conference if possible. The unsuccessful Offeror may verify the accuracy of the submission scores prior to the debriefing conference based upon the overall scoring sheet posted to the DGS website.

1.26 Commonwealth Participation.

A Unless specifically noted in this Section, the GESA Contractor must provide all services to complete the identified work. DGS participation includes the following:

   1. DGS Office of Energy & Resource Management – Project Administration

   2. Funding Agency -- Final Design Review and Approval

1.27 Term of Contract.

A The term of the contract will commence on the Effective Date as defined in the GESA Contract. The Effective Date shall be fixed by the Issuing Office after the

contract has been fully executed by the GESA Contractor and the Commonwealth, and all approvals required by DGS contracting procedures have been obtained.

1.28 RFQ Protest Procedure.

A In addition to the summary provided herein, the Protest Procedure is available in the Procurement Code (62 Pa.C.S. § 1711.1).

1. Who may file – Any Offeror or Prospective Offeror who is aggrieved in connection with the RFQ or the award of a contract resulting from the RFQ may file a protest.

   a. Prospective Offeror – is an entity that has not submitted a Quote in response to the RFQ.

   b. Offeror – is an entity that has submitted a Quote in response to the RFQ.

2. Time limits

   a. If a protest is filed by a Prospective Offeror, it must be filed, in writing, with the Issuing Office prior to the Quote Submission Deadline.

   b. If a protest is filed by an Offeror, it must be filed, in writing, with the Issuing Office within seven (7) days after the protesting Offeror knew or should have known of the facts giving rise to the protest except in no event may a protest be filed later than 7 days after the Notice of Selection is posted on the DGS website.

   c. Filed – shall be defined as the date upon which the Issuing Office receives the written protest.

3. **Protests relating to cancellation of the RFQ and protests relating to rejection of all Quotes may not be filed**.

1.29 Interpretation.

A If any conflicts of the Contract Documents arise requiring interpretation, the terms of the General Conditions of the GESA Contract shall control. The RFQ may be referred to in an effort to assist in the interpretation but will not overrule the General Conditions of the GESA Contract.

1.30 Compliance with Coal Act (71 P.S. §650).

A The GESA Contractor must comply with the provisions of Act 28 of April 9, 1990 (71 P.S. §650) that requires heating systems or heating units installed in state-owned facilities to be fueled by coal unless exempted by the Secretary of the Department of General Services as provided for under the Act.

1.31 Lead Paint.

A All work is to be performed with the assumption that all painted surfaces are lead containing. The GESA Contractor is responsible for following all required OSHA 1926.62 'Lead in Construction' standards when disturbing or impacting these painted surfaces during the course of performing the work, including but not limited to activities such as: cutting and patching, core drilling, penetration, anchoring, fastening, etc. The area(s) shall be visually clean upon completion of any of these activities.

1. Action Plan: The GESA Contractor shall submit an Action Plan that conforms to A., 1. – 3. herein for approval at the Initial Project Meeting, which specifically outlines details of means and methods to be used for each dust-generating activity involving lead-painted surfaces, erection of critical barriers and plastic sheeting for dust control, subsequent exposure assessment, personal protective equipment, hygiene and clean-up.

2. GESA Contractor shall utilize means and methods that preclude dust generation to complete work that disturbs/impacts lead containing paint (i.e., paint stripper, HEPA-assisted drills, etc.).

3. GESA Contractor shall ensure areas beyond work area are not contaminated, and shall immediately stop work and erect plastic sheeting to prevent the spread of dust, anytime means and methods inadvertently create dust from lead painted surfaces.

1.32 Asbestos and Hazardous Material.

A If applicable, the GESA Contractor will be responsible for providing project-specific asbestos and hazardous material liability insurance as described below. The GESA Contractor has the obligation to determine if hazardous materials/wastes will be disturbed or handled/disposed of in performing the project. Hazardous materials/wastes include, but are not limited to, asbestos, mercury and PCBs. If hazardous materials/wastes must be disturbed, removed and/or remediated and/or disposed of, the GESA Contractor must advise the Commonwealth beforehand and the GESA Contractor shall perform such activities in accordance with industry standards and all federal, State and local regulations and pay for the cost of said activities out of the project savings. A copy of any project-specific Hazardous Material Management Plan/Survey, if one exists, will be made available upon request for use as a guide to the presence of ACM. If a management plan is not available, the GESA Contractor must test all suspect asbestos, etc. prior to disturbance.

1. **Note**: The replacement of equipment or disturbance of materials is the GESA Contractor's responsibility and must be performed in a manner that prevents uncontained releases of asbestos, lead, PCB's, mercury, and/or other hazardous materials and provide for their proper disposal. The Commonwealth requires a chain of custody of all materials from source removal to disposal.

B **Hazardous material liability insurance is as follows**: $1,000,000 occurrence/$2,000,000 aggregate, including products and completed operations. Such insurance shall include coverage for the GESA Contractor's operations

including, but not limited to, removal, replacement enclosure, encapsulation and/or disposal of asbestos, or any other hazardous material, along with any related pollution events, including coverage for third-party liability claims for bodily injury, property damage and clean-up costs. If a retroactive date is used, it shall pre-date the inception of the GESA Contract. If motor vehicles are used for transporting hazardous materials, the GESA Contractor or its subcontractor shall provide pollution liability broadened coverage (ISO endorsement CA 9948) as well as proof of MCS 90. Coverage shall fulfill all requirements set forth herein and shall extend for a period of three (3) years following acceptance by the Commonwealth of the Certificate of Completion.

1.33 Insurance Requirements.

A Although not required to be submitted with the Quote, the successful GESA Contractor shall purchase and maintain, at its expense, the following types of insurance, issued by companies licensed to do business in the Commonwealth of Pennsylvania:

1. Workers' Compensation:

a.	Coverage	Sufficient to cover statutory requirements for all employees involved in work under this agreement
b.	Extensions	Voluntary compensation All states coverage employers Employers' liability – unlimited

2. Commercial General and Umbrella Liability:

a.	Coverage	Occurrence using ISO occurrence Form CG 00 01 07 98 or later form
b.	Limits per Project	General Aggregate - $3,000,000.00 Products - Completed/Operations - $1,000,000.00 Personal & Advertising Injury - $1,000,000.00 Each Occurrence - $2,000,000.00 Fire Damage (any one fire) - $100,000.00 Medical Expenses (any one person) - $50,000.00 Property Damage - $2,000,000 Each Occurance

c. Umbrella - $5,000,000.00

d. Builder's Risk Coverage Amount sufficient to repair or replace the work,

e. such amount to be approved by the Commonwealth

f.	Vehicle Liability	$1,000,000 per occurrence/$3,000,000 aggregate (All vehicles hired or non hired)

g. The GESA Contractor shall require their Architect/Engineer to maintain professional liability insurance (errors and omissions) in an amount no

less than $2,000,000, worker's compensation in amounts required by law and general liability insurance (including owned, non-owned, and hired motor vehicles) in a single limit amount of no less than $1,000,000.

h. The GESA Contractor must, upon award of the GESA Contract by DGS, provide a Certificate of Insurance demonstrating to DGS' satisfaction the existence of the required insurance. The Commonwealth of Pennsylvania shall be named as an Additional Insured, on a primary non-contributory basis, on all certificates of insurance with the exception of Workers' Compensation and Professional Liability. Likewise, the Architect and/or Engineer's insurance coverage shall name the Commonwealth as an additional insured. The insurance coverages must be approved by DGS prior to the commencement of any work.

i. The insurance coverage to be provided by the GESA Contractor shall state that the GESA Contractor's coverage shall be the primary coverage for the GESA Contractor's work.

j. The required insurance coverages shall be maintained without interruption from the date of commencement of the Work until the date of final payment and/or termination of any coverage required to be maintained after final payment.

k. All insurance coverage to be provided by the GESA Contractor, its subcontractors and the Architect/Engineer shall include a cancellation notice to the Commonwealth of at least thirty days.

l. In the event that any of the insurance coverage to be provided by the GESA Contractor and/or Architect/Engineer to the Commonwealth contains a deductible, the GESA Contractor and/or Architect/Engineer shall indemnify and hold the Commonwealth harmless from the payment of such deductible, which deductible shall in all circumstances remain the sole obligation and expense of the GESA Contractor.

m. The GESA Contractor acknowledges that its failure to obtain or keep current the insurance coverage required and/or its failure to ensure that its subcontractors and/or Architect/Engineer maintain the required coverage, shall constitute a material breach of contract and subjects the GESA Contractor to liability for damages, including but not limited to direct, indirect, consequential, special and such other damages the Commonwealth sustains as a result of such breach. In addition, the GESA Contractor shall be responsible for the indemnification to the Commonwealth of any and all costs associated with the aforementioned lapse in coverage, including but not limited to reasonable attorneys fees.

n. The GESA Contractor shall require all subcontractors to carry similar insurance coverages and limits of liability as set forth herein and adjusted to the nature of subcontractors' operations and submit same to the Commonwealth for approval prior to start of any work. In the event the GESA Contractor fails to obtain the required certificates of insurance from its subcontractors and/or Architect/Engineer, and a claim is made or

suffered, the GESA Contractor shall indemnify, defend, and hold harmless the Commonwealth, its board, officers, agents or employees from any and all claims for which the required insurance would have provided coverage. This indemnity obligation is in addition to any other indemnity obligation that will be provided for in the Contract.

o. The GESA Contractor assumes responsibility for all injury or destruction of the GESA Contractor's materials, tools, machinery, equipment, appliances, shoring, scaffolding, false and form work, and personal property of GESA Contractor's employees from whatever cause arises. Any policy of insurance secured covering the GESA Contractor or subcontractors leased or hired by them and any policy of insurance covering the GESA Contractor or subcontractors against physical loss or damage to such property shall include an endorsement waiving the right of subrogation against the Commonwealth for any loss or damage to such property.

p. The Commonwealth in good faith may adjust and settle a loss with the GESA Contractor's insurance carrier. The GESA Contractor waives all rights against the Commonwealth, its board, officers, agents and employees for damages caused by fire or other perils to the extent of actual recovery of any insurance proceeds under any insurance policy procured or other property insurance applicable to the GESA Contractor's work.

q. Before commencement of its work, the GESA Contractor, its Architect/Engineer, and its subcontractors shall obtain and pay for such insurance as may be required to comply with the contract documents requirements.

r. In addition to the coverages required and under the same terms and requirements of such coverages, the GESA Contractor or its subcontractor shall provide hazardous material liability insurance as follows: $1,000,000 occurrence/$2,000,000 aggregate, including products and completed operations. Such insurance shall include coverage for the GESA Contractor's operations including, but not limited to, removal, replacement enclosure, encapsulation and/or disposal of asbestos, or any other hazardous material, along with any related pollution events, including coverage for third-party liability claims for bodily injury, property damage and clean-up costs. If a retroactive date is used, it shall pre-date the inception of the GESA Contract. If motor vehicles are used for transporting hazardous materials, the GESA Contractor or its subcontractor shall provide pollution liability broadened coverage (ISO endorsement CA 9948) as well as proof of MCS 90. Coverage shall fulfill all requirements set forth herein and shall extend for a period of three (3) years following acceptance by the Commonwealth of the Certificate of Completion.

s. In the event that the Project involves removal of asbestos or other hazardous materials, the GESA Contractor shall coordinate any asbestos/hazardous material testing and sampling with the

Commonwealth's Environmental Consultant. All costs associated with such testing/sampling shall be the responsibility of the GESA Contractor.

t. Under no circumstances shall the successful GESA Contractor limit its liability to the amount of its primary comprehensive general liability policy limits.

u. The GESA Contractor shall be required to obtain and maintain throughout the course of the Project any insurance coverage beyond that listed above that may be necessary due to the scope of work encompassed within this Project.

v. The Commonwealth does not warrant or represent that coverages and limits required here and in the General Conditions are appropriate or adequate to protect the GESA Contractor. Providing coverage in these stated minimum limits shall not be construed to relieve the GESA Contractor from liability in excess of such limits. All deductibles, co-insurance requirements, and self-insured retention amounts must be disclosed and are subject to acceptance by DGS. The cost of any claim payments falling within the deductible shall be the sole responsibility of the GESA Contractor.

1.34 Project Bonds.

A Although not required to be submitted with the Quote, the successful GESA Contractor shall provide performance and payment bonds in the amount of 100% of the awarded contract as fully described in the General Conditions of the GESA Contract. All bonds for this Project shall be issued by a qualified insurer licensed in Pennsylvania.

1.35 Investment Grade Audit (IGA) by Successful Offeror.

A Although not required to be submitted with the Quote, the successful GESA Contractor will gather and analyze information and data based upon the Energy Conservation Measures (ECMs) set forth in the Quote and submit a scope of work for the project to the Commonwealth in the form of a IGA that will reduce the Funding Agency's energy expenses. As part of the IGA, the GESA Contractor will conduct an on-site survey of the facilities and will interview appropriate personnel to learn the operating characteristics of the facility and the existing equipment and systems therein. The resulting Report will include an executive summary which lists all proposed ECMs with the total implementation cost of each ECM, energy savings, energy cost savings, useful life of the equipment, and the simple payback (individual and interactive).

B The IGA must be submitted to the Commonwealth within 60 calendar days of the date on the Commonwealth's Notice of Selection.

C The IGA must present a thorough analysis and discussion of the GESA Contractor's proposed ECMs and solutions for each facility that is part of the Project. The Report must detail the GESA Contractor's proposed methodology for the calculation of baseline energy use and, at a minimum, a description of

physical conditions, equipment counts, nameplate data, and control strategies prior to Project implementation. The energy use allocation must be based on generally accepted engineering practices and must be reconciled with historic usage. In addition to presenting how the proposed baseline is derived, the Report must define under what conditions the baseline will be adjusted; for example, changes in weather, occupancy, number of users, and equipment usage.

D For each ECM recommended, the IGA shall provide a detailed description to include:

1. Total implementation costs for each measure;

2. Equipment counts;

3. Performance characteristics and efficiency levels of the equipment comprising the proposed measure;

4. Installation and maintenance cost;

5. Useful life; and

6. Energy and cost savings.

    a. Projected energy savings calculations must specifically account for on and off-peak savings, demand savings, and the interaction between recommended measures.

7. All maintenance and monitoring costs must be stated separately in a clear and conspicuous manner.

8. A listing of the contractors and subcontractors to be used with respect to the ECMs as required by 62 Pa.C.S. §3753(e)(2).

E After submission of the IGA, and approval by the Commonwealth, the Commonwealth may, in its sole discretion, decides:

1. To proceed with the construction/ implementation/ financing of the Project, subject to the required approvals; or

2. Decline to proceed with the Project, in which case the Commonwealth shall not be responsible for any costs or expenses incurred by the GESA Contractor.

1.36 The GESA Contract.

A If, after review of the IGA, the Commonwealth decides to proceed with the Project, the Commonwealth will issue a GESA Contract, with a maximum twenty-year term, for signatures in accordance with the Commonwealth Attorneys' Act. There will be no contract until and unless all Commonwealth signatures are affixed to the contract. The Contract appears as an appendix to this RFQ.

B **Only the ECMs are negotiable; all other terms and conditions of the GESA Contract are non-negotiable. Submittal of a Quote in response to this RFQ constitutes acceptance of the terms of the GESA Contract.**

C This RFQ for facility wide implementation of ECMs on a performance basis, together with the respective GESA Contractor's Quote, shall be attached to and become part of the GESA Contract.

D Upon approval by all required Commonwealth entities, the GESA Contract will be executed to implement the Project in accordance with the IGA. **In the event approval by the required Commonwealth entities is not obtained, there is no contract, and the Commonwealth shall not be liable for any cost or expense incurred by the GESA Contractor.**

1.37 Post Construction Service.

A Upon completion of the Construction Phase, the GESA Contractor will perform ongoing services detailed in the GESA Contract to assure savings and guarantees are satisfied, together with the required staff training, maintenance services only as required by warranty, and measurement and verification (M&V) services. M&V services must adhere to all Federal M&V protocol standards and scalability for M&V of the energy baseline, adjustment factors, and energy cost savings. Final payment will not be made until all documentation, licenses, copies of software, maintenance manuals and as-built drawings are received, and the Commonwealth accepts the Project. The Commonwealth requires back-up copies of all software programs on non-magnetic media.

1.38 Job Posting.

A Pennsylvania, along with the rest of the nation, is experiencing high rates of unemployment. Recognizing that construction workers are among the hardest hit by the economic recession and their re-employment is essential, the GESA Contractor and all subcontractors and suppliers are encouraged to post jobs created by this Project or jobs they seek to fill, to the PaCareerLink system at www.cwds.state.pa.us. The GESA Contractor, subcontractors and suppliers, can locate their local PaCareerLink office through the same website. Staff at local PaCareerLink can assist employers to post positions and explain how to retrieve resumes or applications generated by their systems.

1.39 Calendar of Events:

Activity	**Date, Place and Time**
Notice to Offerors and RFQ Issued	**April 12, 2017**
Pre-Quote Conference/Site Visit	**April 26, 2017 at 1 P.M.** **Site Visit will immediately follow.**
Offerors' Deadline to Submit Questions	**COB May 19, 2017**
DGS Deadline to Issue Bulletins	**COB May 24, 2017**
Quote Submission Deadline	**By 2:00 PM. on June 1, 2017** **Delivered to:** **RFQ Coordinator** **4th Floor** **North Office Building** **Dept. of General Services** **401 North Street, Room 403** **Harrisburg, PA 17125**
Interviews with Successful Offerors (Tentative)	**Week of June 26, 2017**

End of Part 1

PART 2

Information Required from Offerors

2.1 General.

A The Quote Submission (Technical, ECM/Cost and Small Diverse Business) must be submitted in the format, including heading descriptions, outlined below. To be considered responsive, the Quote Submission must respond to all requirements in this part of the RFQ. Each Quote submission shall consist of the following 3 ***separate*** **parts**:

1. Technical Submission; and

2. ECM/Cost Submission; and

3. Small Diverse Business Submission

B Maintaining the confidentiality of the submittal information is critical, which is why each submission must be separately submitted. DGS will reject as non-responsive any submission that is not submitted in 3 separate parts. There will be no opportunity for an Offeror to resubmit or amend the Quote submission after the Quote Submission Date.

C The Commonwealth reserves the right to request additional information from secondary sources (such as a Dunn & Bradstreet report) which, in the Commonwealth's opinion, is necessary to assure that the Offeror's competence, number of qualified employees, business organization, and financial resources are adequate to perform according to the GESA Contract.

D The Commonwealth may conduct investigations deemed necessary to determine the ability of the Offeror to perform the work, and the Offeror shall furnish to the Commonwealth all such information and data for this purpose as may be requested by the Commonwealth. The Commonwealth reserves the right to reject any Quote if the evidence submitted by, or investigation of, such Offeror fails to satisfy the Commonwealth's requirement that such Offeror possesses the capability to fully perform the requirements of the GESA Contract and complete the work specified therein.

2.2 Quote Submission.

A This RFQ is intended to provide interested Offerors with the basic information necessary to evaluate the Project scope and requirements. Each Offeror shall develop an independent assessment of the Project that shall form a suitable basis for their respective Quote. Each Offeror shall prepare the Technical Submission simply and economically, providing a straightforward, concise description of the Offeror's ability to meet the requirements of the RFQ. An official authorized to bind the Offeror to the provisions of the GESA Contract must sign the Quote Submission. The Technical Submission shall be a complete response to the RFQ following the format described in this RFQ. Each Offeror

should include information for all items requested in the RFQ as completely and accurately as possible. By submitting a Quote, the Offeror agrees to the terms and conditions stated in this RFQ. For this RFQ, the Quote Submission, as submitted, must remain valid for 180 calendar days after the Quote Submission Deadline.

2.3 Quote Requirements.

A To qualify for evaluation, each Quote must include or satisfy the items listed on the Requirements Checklist (provided as an Appendix to the RFQ). Any Quote that does not comply with these listed requirements may be rejected as non-responsive.

B Offeror must be ITQ qualified on or before the issue date of the RFQ.

2.4 Quote Format.

A The Quote shall consist of 3 **separate parts and shall be submitted in separately sealed envelopes or packages clearly labeled as:**

Volume I	Technical Submission (6 copies and 1 CD)
Volume II	ECM/Cost Submission (6 copies)
Volume III	Small Diverse Business Submission (1 copy)

B The label on each separately sealed package should include the Offeror's name, address, and Project information, including the specific contract for which the Quote is being submitted, as described in Part 1 of this RFQ.

C The Offeror should submit a cover letter in the Technical Submission envelope providing, at a minimum, the following information:

- Company Name
- Company mailing address
- Contact person
- Contact person's phone number, fax number and e-mail address
- Company PA Vender Number

2.5 Technical Submission Requirements.

A The Offeror shall submit six (6) hardcopies of its Technical Submission and **one (1**) electronic version of the Technical Submission on a compact disc/ flash drive in a separately sealed envelope/package RFQ.

The Technical Submission must include a:

1) Signed Quote Signature Page signed, and

2) Signed and notarized Non-Collusion Affidavit.

B **Offerors shall not include cost information (ECMs and construction cost or energy savings) for this Project in the Technical Submission.** This separation ensures that the Evaluation Committee's scoring of the Technical information is not tainted by knowing any of the Offeror's costs for this project. Cost information for other projects that the Offeror worked on, including project budget and actual costs, may be included in the Technical Submission. Small Diverse Businesses may be identified as such in the Technical Submittal, so long as **no cost information** is revealed.

C **If cost information for this Project (including, but not limited to monthly cash flow, design costs, subcontract dollar values, or total proposed savings or other values) is revealed in the Technical Submission, the Quote will be rejected as non-responsive. Any Quotes rejected for this reason will not be permitted to be corrected and resubmitted.**

D **Technical Submission Sheet/Page and Font Size Limits:**

1. A "sheet" means 1 piece of paper, consisting of 2 pages (front and back). A "page" means the 1 side of a sheet. Text font should not be smaller than Times New Roman 11 point. Offerors are advised to take notice of suggested number of sheets/pages.

E **Technical Sections to be Submitted**

The Technical Submission shall include the following Sections, which should be clearly labeled and segregated or tabbed with pages numbered for ease of reference (dividers and tab sheets do not count toward the suggested number of sheets/pages). Each Section must adhere to set sheet/page limits and should be presented in the order listed below, as well as provide the information in the order set forth below.

2-5.1 Project Management Team Overview

(Suggested number of sheets/pages: 2 sheets plus a single 11 x17 sheet, front only, for Organization Chart)

A Provide Project Team Organization Chart that graphically depicts the hierarchy and reporting structure of the Team members, with specific personnel identified.

1. Personnel identified should include, as practical, executives, project managers, etc. down through field supervisors;

B Provide a brief description regarding the assignment of responsibilities for major tasks and the interrelationships and management structure of the overall Project Management Team. Describe the reporting hierarchy and the history, if any, of working relationships with other firms on the Project Management Team, including the process utilized in selecting subcontractors.

C The Evaluation Committee will consider the degree to which the proposed Management Team will effectively manage this Project. Information considered in this evaluation includes: the proposed management organization, roles and responsibilities, qualifications and experience of key personnel, and quality control of all subcontractors. Quotes should therefore discuss:

1. A clear assignment of responsibility for various Project tasks to specific individuals and assignment of qualified individuals to fulfill designated responsibilities;

2. The percentage of time that key personnel are assigned to this Project; and

3. The ability to manage construction, repairs, regular service and emergencies effectively.

D If awarded a contract, the GESA Contractor shall not substitute personnel identified on the Project Management Team and shall not alter the structure of the Project Management Team organization chart without prior written authorization by the DGS.

2-5.2 Work Plan For This Project

(Suggested number of sheets/pages: 4 sheets).

A The Offeror shall describe its technical plan for completing the Project. The Work Plan should outline and describe the steps necessary to successfully undertake the Project from the GESA Contract execution through completion of construction, including commissioning. This portion of the Quote discusses ECMs in general terms but shall not include any discussion on costs or savings. The Evaluation Committee will consider the degree to which the Quote addresses or discusses the following:

1. Demonstrate Offeror's understanding of the design process and how they will coordinate with Energy Consultant;

2. Identify potential design issues;

3. Describe how the Team will manage and execute the Project;

4. Address early construction packages, long lead items and phases of construction;

5. Identify critical material and equipment. Discuss/explain why these are critical and timing/lead times for acquisition;

6. Address construction challenges and proposed solutions;

7. Outline a construction plan that includes: site operations, site layout, logistics, lay-down, field offices, parking areas and etc., including how the Offeror intends to accomplish the work within a fully occupied environment;

8. Address Project Safety Plan, Management and Monitoring;

9. Provide outline and effectiveness of QA/QC Plan;

10. Describe closeout process for training of Funding Agency personnel, manuals, Occupancy Permits, commissioning, and final close-out.

2-5.3 RFQ Project Schedule

(Suggested number of sheets/pages: 2 sheets, plus a maximum of 2 single-sided 11x17 sheets).

This RFQ Project Schedule shall not be construed as the Final CPM Schedule. Do Not Submit a Full and Complete detailed CPM Schedule in the Technical Submission. DGS does not accept the logic or durations of the activities in this RFQ Project Schedule. The purpose of this RFQ Project Schedule is only to allow DGS to evaluate and score the Offeror's scheduling ability. After the GESA Contract is executed, the successful GESA Contractor shall submit a full and complete project schedule per the requirements of the General Conditions and Project Administrative Procedures.

A The Evaluation Committee will consider the degree to which the Quote addresses or discusses the following:

1. A narrative for the schedule that discusses the challenges of the schedule and proposed solutions. Address critical aspects of the schedule, associated risks and the Team process to ensure achievement of critical milestone dates.

2. Submit an executive level graphic schedule commencing at Notice of Selection, showing estimated overall project duration and milestone dates. At a minimum, milestone dates should include: commencement and completion of the IGA and submission of the resulting Report, full execution of the GESA Contract (a minimum of 60 calendar days), submission and approval of all required permits from every entity having jurisdiction, procurement of all major equipment, commencement of on-site work (at least 10 but no more than 20 calendar days from execution of contract), final inspection of all construction, commissioning of the project and training of Funding Agency personnel.

3. The ability to coordinate project construction with local utilities, subcontractors, equipment suppliers and Funding Agency facility personnel.

2-5.4 Qualification Forms

(See specific suggested sheets/pages below. Note also that "Entity's Resource Availability" shall be as of the date of the Technical Submission)

A The Evaluation Committee will consider the degree to which the Quote provides experienced and qualified personnel capable of designing and implementing the scope of work on the project, including training Funding Agency staff once the work is complete.

GESA Contractor (Suggested number of sheets/pages: 10 sheets, or if GESA Contractor is a Joint Venture, no more than 5 sheets per joint partner. Also, one single-sided 11x17 sheet for organization chart plus 1 sheet per person.)

1. Provide clear and concise information that will demonstrate the following qualifications:

   a. Offeror's experience on at least five (5) GESA projects completed over the last ten (10) years with a total construction cost greater than $5 million each.

      (1). For each project, include date(s), scope, location, owner, owner contact information, capital costs at Quote stage and final contract, energy and operational savings proposed and actually achieved subject to M&V, including an explanation for past projects not meeting the targeted energy savings and any legal action taken by the Owner to ensure replacement of equipment or otherwise achieve the guaranteed savings. Complete and/or incomplete projects may be submitted. Discuss status of project and if completed as originally scheduled. Demonstrate the Offeror's ability to plan and complete all phases of the project within budget, including the ability to reconcile accounts for adjusting windfall/shortfalls in project cash flow.

      (2). Responses must be limited to ONLY those projects that have been managed directly by the specific branch, division or office who will be specifically assigned to this project.

   b. Management Team Individual Qualifications (6 person limit)

      (1). Describe project responsibilities, time with firm, experience with GESA projects, educational or technical training, LEED accredited projects, and any other information relevant to the evaluation of the individual.

   c. Offeror's Financial Ability to Provide Guarantee

      (1). Offeror shall provide: most recent available independently audited financial statements for private corporations and/or Form 10-K on file

with the Securities and Exchange Commission (SEC); Annual Shareholder's report for public companies, as applicable, to demonstrate their financial ability to provide guarantees of energy savings of at least $5,000,000 (no third party insurance will be permitted); and a history of at least five (5) other project guarantees and the dollar amount of those projects. Offeror should not include any ECM or cost information on the Project in this portion of the Technical Submission; if ECMs or costs are included, the Quote will be rejected, and there will be no opportunity to correct the Quote.

d. Offeror's Resource Availability (Capacity)

(1). As defined by the following equation, reported in US Dollars: (average of the last 3 years gross sales) minus (the average of next 3 years committed backlog). Committed backlog is defined as all committed contract balances for the next 3 years as of the date of the Technical Submission.

(2). If the Offeror is a legally combined entity, the formula shall represent the pro-rata share of each member per the legal agreement. Example: If A and B are a Joint Venture, A is 60% and B is 40%, then the reported availability should be 0.6 * A's availability + 0.4 * B's availability.

e. Offeror's Statement of Readiness and Commitment of Resources

(1). Provide a written statement confirming the persons identified in this RFQ are available and will be committed to the Project for the time period(s) referenced in the above RFQ Project Schedule, and that the Resource Availability reported above will be committed to the Project, as referenced in the RFQ Project Schedule and Work Plan.

f. Offeror's Notification of Default and Debarment.

(1). Provide a listing including owner, project, date, and explanation of any contract default or debarment within the last 5 years.

2. **Design – Consultant(s) (Suggested number of sheets/pages: 4 sheets, plus 1 sheet per person)**

a. Firm's Experience on GESA projects.

(1). Include date(s), location, owner, owner contact, project amount, and description. Complete and/or incomplete projects may be submitted. Discuss status of project and if completed as originally scheduled.

b. Individual Qualifications (4 person limit)

(1). Describe project responsibilities, time with firm, and experience with GESA projects, educational or technical training, and any other information relevant to the evaluation of the individual.

c. Firm's Statement of Readiness and Commitment of Resources per the RFQ Project Schedule

(1). Provide a written statement confirming the person(s) identified in this RFQ are available and will be committed to the Project for the time period(s) as described in the RFQ Project Schedule.

d. Entity's Notification of Default or Debarment.

(1). Provide a listing including owner, project, date, and explanation of any contract default or debarment within the last 5 years.

3. **Construction – Key Subcontractors (Suggested number of sheets/pages: 8 sheets, plus 1 sheet per person)**

a. Offeror shall provide clear and concise information that will demonstrate the following qualifications for any Key Subcontractors that will be used on the Project:

(1). Each Key Subcontractor's Experience on GESA Projects greater than $5 million.

(a). Include date(s), location, owner, owner contact, project amount, and description. completed as originally scheduled.

(2). Each Key Subcontractor's Superintendent's Qualifications (4 person limit)

(a). Describe project responsibilities, time with firm, and experience with GESA projects, educational or technical training, and any other information relevant to the evaluation of the individual.

(3). Each Key Subcontractor's Statement of Readiness and Commitment of Resources per the Project Master Schedule**.**

(a). Provide a written statement confirming the person(s) identified in this RFQ are available and will be committed to the Project for the time period(s) referenced in the attached RFQ Project Schedule.

(4). Each Key Subcontractor's Workman's Compensation Experience Modification Rating for the calendar years 2012, 2013, and 2014.

(5). Each Key Subcontractor's Notification of Default or Debarment.

(a). Provide a listing including owner, project, date, and explanation of any contract default or debarment within the last 5 years.

2.6 Energy Conservation Measures/Cost Submission.

A The Offeror shall submit six (6) hardcopies and **one (1**) electronic version of the Technical Submission on a compact disc/ flash drive in its ECM/Cost

Submission, all copies together in a single sealed envelope/package, separate from the Technical and Small Diverse Business Submissions. **The ECM/Cost Submission must include Quote Security as discussed in the Quote Security information below.**

B Quote Security.

1. The Offeror shall submit Quote security in the form of either: (1) a bid bond issued by a surety licensed to do business in Pennsylvania in the sealed ECM/Cost Submission; (2) a Cashier's check drawn on a Pennsylvania bank; or (3) a certified check. For information on approved sureties, contact the PA Department of Insurance, Division of Companies, at (717) 787-5890 or go to www.insurance.pa.gov. If a bid bond is submitted, it shall be identical to the one included as an Appendix to this RFQ. In the event the Offeror attempts to withdraw the Quote, or the GESA Contractor fails to execute a contract within the timeline provided in the RFQ, the Quote security shall be forfeited as liquidated damages to the Commonwealth.

    a. **The Quote security must be at least Ten Percent (10%) of the ECM/Cost Submission Amount.**

    b. By submitting a Quote, the Offeror agrees that its Quote will remain valid for at least one-hundred eighty (180) days after the Quote Submission Deadline.

    c. If a bid bond is submitted, it must be accompanied by a Power of Attorney from surety company licensed to do business in Pennsylvania, indicating that the agent signing the bond has the authority to bind the company. The Power of Attorney should bear the same date as the bid bond.

    d. Alterations to the pre-printed portions of the bid bond, e.g., erasures, write-overs, or white outs, are not acceptable and will be rejected as not responsive. Any alterations to the filled in spaces on the bid bond, e.g., erasures, write-overs, or white outs, are not acceptable, unless initialed by an authorized representative of the surety, preferably the agent signing the bond. Such unauthorized alterations, if they are to the date, amount of bond, or name of Offeror, may result in the Quote being rejected as not responsive.

        (1). If Offeror is awarded the GESA Contract, they will be required at that time to sign and return a Contract Bond on the form provided by DGS in the penal sum equal to the amount of the awarded GESA Contract, for the faithful performance of the GESA Contract, and to cover the prompt payment in full for all materials furnished and labor supplied or performed and equipment actually rented (but not sold). The Contract Bond must be executed by a surety company or companies licensed to do business in Pennsylvania.

C Page and Font Size Limits.

1. A “sheet” means 1 piece of paper, consisting of 2 pages (front and back). A “page” means the 1 side of a sheet. Text font should not be smaller than Times New Roman 11 point. Offerors are advised to take notice of suggested number of sheets/pages.

2. The ECM/Cost Submission is suggested to be a total limit of **15 sheets (30 pages, front and back)**.

D Energy Conservation Measures and Costs.

1. Information considered in this submission includes depth of the proposed solution(s) for the Project facility, including: ECM descriptions; selected equipment; proposed energy cost savings; proposed energy baseline and adjustment factors; proposed method and schedules for annual energy audit and verification of energy and operational cost savings; and the GESA Contractor’s proposed maintenance program. Although the Evaluation Committee will score specifically using the Scoring Matrix attached as an appendix to this RFQ, each scorer will consider in general the degree to which the Quote addresses or discusses the following:

   a. The IGA that will be conducted for this Project <u>after the selection of the GESA Contractor</u>. The Quote must include information on the systems that will be covered, the personnel to be involved, the general method to be used, and the time frame for completion of each item. The Quote must detail the Offeror’s methodology for the calculation of the energy baseline. The utility usage data is provided as an appendix to this RFQ. The Quote should also establish the timeline to commence and complete the IGA, which should be reflected in the RFQ Project Schedule.

   b. Proposed ECMs in the RFQ. If there is a reason a proposed ECM listed in the Appendix to this RFQ by the Commonwealth is not included in the scope of the Quote, the Offeror must provide a detailed explanation as to why the ECM was excluded from the scope.

      <u>Failure to include the estimated cost and cost savings or to discuss why the ECM should not be included will result in a five (5) point deduction the ECM/Cost submission score for each ECM not included or discussed.</u>

   c. A preliminary assessment of the energy efficiency opportunities available at the Project facility based upon the information provided in this RFQ and a tour of the facility. List the ECMs to be implemented under the Quote with the estimated implementation cost and the energy cost savings, including detailed energy savings calculations.

   d. The degree to which the Quote demonstrates the technical feasibility, suitability, reasonableness, comprehensiveness, and acceptability of the proposed ECMs, including the proposed equipment and quality of said equipment for the proposed savings.

e. The training to be provided to Funding Agency staff, including the scope and personnel who will be providing the training and whether the training will be videotaped for future use.

f. The degree to which the proposed measures will meet the future and changing needs of the Commonwealth.

g. Offeror's includes and describes additional ECM not already listed as the core ECM's in their quote

h. Provide annual financial projections for the length of the GESA Contract, to a maximum of 20 years using a discount rate of 3% and assume an interest rate of 3%. Also, assume payments will be made annually at the end of the period. The format should include the following:

(1).*Annual energy costs **without** improvements;*

(2).Annual energy costs **with** improvements;

(3).Annual energy cost savings (A-B);

(4).Payments for financing equipment;

(5).Payments for monitoring and maintenance services;

(6).Net annual benefit; (Must be cash positive every of proposed term, with no negative cash flow on any year of the project)

(7).Cumulative cash flow; and

(8).Net Present Value of cash flow.

i. The degree to which the proposed energy analysis demonstrates sound engineering principles and the reasonableness of the proposed savings.

j. The ongoing Project monitoring and maintenance services Offeror will provide. Specifically discuss the following: personnel, including identity of supervisor responsible; schedules; conditions; equipment covered; and extra costs (if any) of providing scheduled preventive maintenance, warranty work, emergency service, training of Funding Agency staff; and monitoring of energy use. The Quote should also include a discussion of how this work will be performed in an occupied facility. There will not be a service contract.

k. The degree to which the proposed Measurement and Verification (M&V) plan adheres to all M&V protocol standards and demonstrates scalability for measurement and verification of the proposed energy baseline, adjustment factors, and energy cost savings.

2.7 Small Diverse Business Submission.

A Each Offeror shall submit one (1) copy of its Small Diverse Business Submission in a sealed envelope separate from the Technical and ECM/Cost Submissions. The SDB Submittal Form is provided as an appendix to this RFQ. A value for each ECM with its associated Small Diverse Business participation percentage should be entered into the Small Diverse Business Submission Form. If no form is submitted or if the submitted form is left blank, DGS will presume that the value is 0% for each ECM and the submission will be scored accordingly. If an Offeror commits to 0%, the quote will not be rejected as non-responsive, but the Offeror will receive 0 points for their Small Diverse Business Submission.

SDB commitment percentages are to be based and listed for core ECMs only. Any SDB commitments on non-core ECMs will not count toward the overall SDB commitment percentage.

1. The Small Diverse Business Submission percentage per ECM represents the dollar value the GESA Contractor will pay to Small Diverse Businesses for that ECM in accordance with the calculation in section 4 below.

2. Small Diverse Businesses may provide a wide variety of services and supplies on any GESA project. Commitments include payments beyond the initial tier of subcontractors and suppliers ("trickle down" until payments are made to a SDB) and may also include design costs.

3. The Small Diverse Business Submission percentage for each Core ECM will apply to the value of each ECM included in the GESA Contract. **Deletion of Core ECMs will also delete that ECM's SDB percentage.** Any SDB commitments on non-core ECMs will not count toward the overall commitment percentage.

4. The Offeror should recognize that:

   a. Small Diverse Business subcontractors performing at least 60% of the subcontract with their own employees will be credited toward the provided Small Diverse Business percentage at 100% of the total dollar value of the subcontract/supply contract. Any Small Diverse Business subcontract where the subcontractor performs less than 60% of the subcontract will not be credited.

   b. Small Diverse Business manufacturers are credited at 100% of the total cost of the materials or supplies purchased.

   c. For each Small Diverse Business which is a supplier, the Offeror shall specify whether that supplier is a stocking or non-stocking supplier.

      (1). Stocking suppliers will be credited at 60% of the total cost of the materials or supplies purchased.

(2). Non-Stocking suppliers are credited at only the amount of the fee or commission charged by the Small Diverse Business non-stocking supplier for assistance in the procurement of the materials and supplies provided the fees or commissions are reasonable and not excessive as compared with fees customarily allowed for similar services and with the understanding that under no circumstances shall the credit, for a Small Diverse Business non-stocking supplier, exceed 10% of the purchase order cost.

End of Part 2

PART 3

Evaluation Process and Criteria for Selection

3.1 Competitive Sealed Quote Award.

A If the Commonwealth awards a GESA Contract, the award will be made only to the responsive and responsible Offeror whose Quote conforms to the requirements of this RFQ and receives the highest overall score by the Evaluation Committee in accordance with the evaluation factors, procedures, and criteria set forth in this RFQ.

3.2 Selection Formula.

A The RFQ Coordinator will use the following formula to calculate the Quote Score for each responsive and responsible Quote. The selected Offeror will be such Offeror whose Quote has obtained the highest Total Quote Score. The maximum Quote Score is 500.

Total Quote Score =

Technical Submission Score (max 500 Points) x (.40)
+
ECM/Cost Submission Score (max 500 Points) x (.40)
+
Small Diverse Business Submission Score (max 500 Points) x (0.20)

3.3 Quote Evaluation Process.

A The Quotes will be evaluated by a Quote Evaluation Committee (the Evaluation Committee) comprised of three scoring members, a representative from DGS' Office of Chief Counsel (OCC) and, on an as-needed basis at DGS' discretion, the Energy Consultant.

B After the Quote Submission Deadline, a representative from OCC will assist a representative of DGS' Bidding Unit in opening each Quote and will conduct a Quote Compliance Review, the purpose of which is to determine each Quote's compliance with the Mandatory Quote Requirements.

C After the OCC/Bidding Unit representatives determine the responsiveness of all the Quotes received, the OCC representative will forward the Technical Submissions to the RFQ Coordinator. The ECM/Cost Submissions and the Small Diverse Business Submissions will remain in the custody of OCC until the RFQ Coordinator has notified OCC that the Evaluation Committee has completed its evaluation of the Technical Submissions. The RFQ Coordinator will not distribute the Technical Submission for any Quote that has been deemed non-responsive.

1. Technical Submission Evaluation

a. Each Evaluation Committee scoring member will evaluate each Technical Submission independently from other Evaluation Committee Members using the scoring matrix which has been tailored to reflect the needs of this specific project. The scoring matrix that will be used to score each Quote is included as an appendix to this RFQ and may be used by Prospective Offerors in preparing their Quotes. The maximum score on the Technical Submittal is 500.

b. The RFQ Coordinator will convene a meeting of the scoring members of the Evaluation Committee to calculate the Total Technical Submission score for each Offeror. All three scores from each member will be averaged, resulting in a Total Technical Score for each Offeror.

c. **Only Quotes that have a Total Technical Submission Score equal to or greater than 70% of the available points (500 x 70% = 350 points) will be considered responsive and responsible.**

(1). Any Offeror receiving a Total Technical Submission Score less than 70% of available points (less than 350) will be rejected as non-responsive and will not be considered for award of the GESA contract. These Offerors will be notified by a Letter of Rejection.

(2). Every Offeror with a score equal to or greater than 70% will be scheduled for interviews to discuss their ECM/Cost Submission.

(a). The Total Technical Submission Score will be final and will not be adjusted as a result of the interview process.

(b). The Total Technical Submission Scores of the Offerors will not be discussed or revealed until the Notice of Selection is issued.

(c). The Total Technical Submission Score will be used by the Evaluation Committee in determining the successful Offeror.

2. ECM/Cost Submission Evaluation

a. The Evaluation Committee, the RFQ Coordinator, the OCC representative, and Energy Consultant will attend each interview with the Offerors.

b. Each interview will focus upon an in-depth discussion of proposed ECM/Cost Submission.

c. Evaluation Committee scoring members will not finalize or submit scores for any Offeror's ECM/Cost Submission until all interviews have been completed.

d. After all interviews have been completed, the Energy Consultant may provide the scoring members with a summary analysis of the discussions

of all interviews, but will not recommend any scores nor will they recommend a Offeror to be selected as the successful Offeror.

e. The Evaluation Committee members will independently score each ECM/Cost Submission using the scoring matrix included as an appendix to this RFQ.

f. Once the interviews are complete and the scoring members have had sufficient time to evaluate the ECM/Cost Submissions, the RFQ Coordinator will convene a meeting of the Evaluation Committee to calculate EMC/Cost Submission scores for each Offeror. The Energy Consultant will not attend this meeting, but may be available for a conference call if the members have any questions. All three scores from each member will be averaged, resulting in a Total ECM/Cost Submission Score for each Offeror.

g. Once the ECM/Cost Submission Scores are finalized, the OCC representative will provide the Small Diverse Business Submissions to the RFQ Coordinator.

3. Small Diverse Business Submission Scoring

a. Quotes shall be scored on an objective basis, based upon their individual commitments to Small Diverse Businesses. The Offeror with the highest Small Diverse Business (SDB) percentage will receive the most points. The other Offerors will receive points based upon the formula set forth below. Offerors acknowledge that this commitment percentage per ECM constitutes a material element of the scoring for this RFQ and will be included as the binding percentages of the selected ECMs in the GESA Contract. Failure to meet or exceed each ECM percentage included in the GESA Contract may be deemed to be a breach of contract.

$$500 - \frac{(500 \times (\text{Highest Offeror's SDB \%} - \text{Offeror's SDB \%}))}{(\text{Highest Offeror's SDB \%})}$$

4. Calculation of total Quote Score

a. When the RFQ Coordinator and the Evaluation Committee members have calculated the Small Diverse Business Submission Scores, the RFQ Coordinator will calculate the Total Quote Score using the Selection Formula set forth in Paragraph 3-2 of this RFQ.

END OF PART 3

PART 4

Work Statement

4.1 General Description of the Project Scope

A The objective of this RFQ is to solicit Quotes for a project to assist the Funding Agency to become as energy efficient as possible through installation of energy or water conservation measures, upgrades, and implementation of optimal operation and maintenance procedures. DGS wishes to implement the proposed comprehensive energy project on an energy performance contract basis. Only Quotes that evidence a return of investment of less than 20 years, reduce real energy consumption, and are funded under a guaranteed performance basis will be considered by the Commonwealth.

B **The Project goals include, but are not limited to the following, which are listed in no particular order of importance**:

1. Improving comfort conditions and indoor air quality;
2. Replacing and/or upgrading old and/or inefficient systems;
3. Improving utilization of technology;
4. Upgrading air conditioning systems where applicable;
5. Collecting and managing building/facility information in 'real time;
6. Minimizing financial and technical risk to the Commonwealth;
7. Establishing current base usage for energy (oil, gas, electricity, water, etc.);
8. Reducing energy usage; and
9. Reducing operating costs

C Savings or guarantees provided by the successful Offeror must fully offset the Project costs involved for the Commonwealth.

D **The Commonwealth will issue a separate RFQ to obtain financing for the GESA Contract** to obtain the lowest cost possible.

E The Funding Agency will purchase, finance and own any new equipment installed as a result of this project. DGS reserves the right to consider its options relative to the purchase, finance and ownership of any new equipment installed. Quotes shall include the Offeror's services in connection with such arrangements. **All services shall be stated separately**.

4.2 Engineering Services.

A The successful Offeror, who shall become the GESA Contractor upon the effective date of the GESA Contract, shall use internal Architectural/Engineering services or fund the services of Retained Professionals, to prepare the plans and specifications for all Energy Conservation Measures (ECM) proposed, reviewed and accepted by the Commonwealth. The GESA Contractor will provide the Energy Consultant (if used on project) with design details. DGS, the Funding Agency and the Energy Consultant (if used on project) will review for approval the final plans and specifications.

B The cost of the Energy Consultants services (if used on project) shall be funded by the successful Offeror at a rate not to exceed 4% of the of the GESA Contract value for projects equal to or greater than $18 million; or 5% of the GESA Contract value for projects equal to or greater than $13 million but less than $18 million; or 6% of the GESA Contract value for projects equal to or greater than $8 million but less than $13 million; or 7% of the GESA Contract value for projects less than $8 million. Payments shall be in accordance with the following schedule:

1. 25% upon fully executed contract with ESCO;

2. 25% upon approval of all plans and specifications by both the Department and Labor & Industry, to the extent L&I has jurisdiction over the project based upon the scope of the project;

3. 40% divided into equal monthly payments based upon the duration of construction;

4. 10% upon completion of the three years of Measurement and Verification of post-construction services

C The GESA Contractor will retain the services of the Energy Consultant (if used on project) as a representative of the Commonwealth, to do a peer review of all necessary calculations, products, plans and specifications. A copy of the contract between DGS and Energy Consultant is attached as an Appendix to this RFQ. The GESA Contractor shall incorporate the terms and conditions thereof into any agreement between the Energy Consultant and the GESA Contractor. The Energy Consultant shall be aware of and bound by the terms and conditions of the services as provided in the Appendix.

D In addition to any other legal requirements concerning energy performance contracts, the Energy consultant, shall certify that:

1. He or she is free from financial interest in the GESA Contractor and shall do nothing which conflicts with the proper completion of the engineering work associated with the GESA Contract; and

2. Full disclosure has been made to the Commonwealth detailing all financial compensation received by the Energy Consultant from the GESA Contractor.

4.3 Project Parameters.

A Quotes are requested for the provision of services for the reduction of energy and water consumption and for maintenance and operational savings and services on a performance contracting basis at facilities owned by the Funding Agency. Specifically, the GESA Contractor selected as a result of this RFQ will be expected to provide comprehensive energy services at select buildings in the Capitol Complex and located in Harrisburg, including but not limited to:

1. Performance of a IGA;

2. Quote must contain a statement from the Offeror that the total energy savings projected in the final scope of work will be at least 95% of the savings projected in the Quote, the actual ECM costs shall be within 10% of the costs listed in the CEA, and that the project will be self-funded over the financial term of the project (maximum term of 20 years.);

3. GESA Contractor must adhere to all applicable codes and standards;

4. Services in connection with the design and specification of equipment and systems to be used in providing energy efficiency services;

5. Procurement and installation of new equipment and refurbishing existing equipment. All new and refurbished equipment must be consistent with the existing equipment of the Commonwealth;

6. Commissioning of the equipment, as per USGBC-LEED and ASHRAE Guideline 1.1-2007 standards;

7. Preventive and emergency maintenance and servicing of the equipment installed through the warranty period;

8. Staff training;

9. Energy savings performance guarantees;

10. The GESA Contractor must work cooperatively with facility management and the Commonwealth in coordinating this Project;

11. The GESA Contractor has the obligation to determine if hazardous materials/wastes will be disturbed or handled/disposed of in performing the project. Hazardous materials/wastes include, but are not limited, to asbestos, lead paint, mercury and PCBs. If hazardous materials/wastes must be disturbed, removed and/or remediated and/or disposed of, the GESA Contractor must advise the Commonwealth beforehand and perform such activities in accordance with all Federal and State regulations and pay for the cost of said activities out of the Project savings. A copy of the Hazardous Material Management Plan will be made available upon request for use as a guide to ACBM in the various buildings. If a management plan is not available, the GESA Contractor must test all suspect asbestos or lead painted surfaces prior to disturbance;

a. **Note**: The replacement of equipment or disturbance of materials is the GESA Contractor's responsibility and must be performed in a manner that prevents the release of asbestos, lead, PCB's, mercury, and/or other hazardous materials and provide for their proper disposal. The Commonwealth requires a chain of custody of all materials from source removal to disposal.

12. Operating and Maintenance (O&M) costs shall not be included in cash flow or ECMs. Estimates of Operating and Maintenance cost savings may be listed for informational purposes only;

13. Interest or Discount Rates shall be assumed to be 3.0%;

14. Financing term and overall Project shall be assumed to be a 20-year period;

15. One percent (1%) escalation of energy cost per year is permitted;

16. No escalation of Project costs or maintenance costs;

17. Identification of and obtaining all available financial incentives or rate reductions from companies supplying oil, gas, electricity, or transmission or distribution service for gas or electricity. Identifying and obtaining all government incentives, aid, or other benefits;

18. List estimate of available rebates. If the GESA Contractor is receiving the rebates, subtract estimated rebates from Total Project Cost to determine Net Project Cost upon which lease payments are based;

19. Base price for heating oil should be the actual market price paid by the Commonwealth over the last 12 months;

20. Heating season should be generally assumed to be October 15th to April 15th;

21. Cooling season, as applicable should be generally assumed to be April 15th to October 15th;

22. Actual baseline operation hours must be determined for each building and area and refined during the audit process by the GESA Contractor;

23. Assume one year of interest accrual for the construction period in GESA Contractor's financial Pro-Forma;

24. Use the Commonwealth's most recent provided fiscal year as the baseline for your energy usage in the project response;

25. As discussed in further detail in the General Conditions, provide written documentation no later than project close-out to Funding Agency of the system and installation, including but not limited to:

    a. Test Results;

b. Equipment specifications;

c. Authority over all sequence of operations;

d. Multiple licenses and software;

e. Back-up copies of all software programming provided on non-magnetic media;

f. All documentation, maintenance manuals, and as-builts; and

g. System configurations and equipment locations.

26. Include Measurement and Verification (M&V) costs for 3 years as part of your Quote. M&V methods must be in accordance with the International Performance Measurement and Verification Protocol (IPMVP) as appropriate. Indicate in your RFQ response the M&V Option being employed for each measure. At no time, may measures be simply noted as "stipulated savings".

4.4 Scope of Work.

A **The "Core Energy Conservation Measures**" set forth in the Appendix to this RFQ must be considered and discussed as part of every Quote. If an item is considered, but determined not feasible for inclusion in the Project, the GESA Contractor must provide a narrative explaining why the ECM is not feasible.

B In addition to the "Core ECMs", the GESA Contractor may identify additional cost effective ECMs that can be taken to reduce consumption and costs for heating, cooling, ventilation, lighting, water heating and other energy uses in each facility. The Quote should address consumption of all energy sources including oil, gas and electricity. Measures may involve controlling, modifying, adding or replacing equipment and systems. The GESA Contractor shall establish consumption levels for all current services as a baseline for measurement of savings.

C The Commonwealth reserves the right to negotiate the final scope of ECMs with the successful Offeror as further described in this RFQ.

D The Commonwealth's final scope of work will reflect an acceptable project without out-of-pocket expense, deficit or negative cash flow at any time during the project term, as opposed to a maximization of cash flows. **Quotes shall guarantee recovery of contract costs from energy savings realized by the Commonwealth during the term of the GESA Contract, which shall not exceed twenty years**.

E Each building, including all portables, identified in this solicitation must be evaluated for any potential savings.

4.5 Conditions to Be Maintained

A The following energy end use conditions must be maintained at the facility. Any efficiency measures proposed must allow for the maintenance of these

conditions, as well as comply with State Code and all requirements of the Funding Agency:

1. Minimum Temperature: Temperatures in occupied areas during the hours of 7:00AM TO 5:00PM must be maintained at no less than 68 degrees F during the heating season from October 15th through April 15th or during scheduled activities;

2. Maximum Temperature: Temperatures in occupied areas during the hours of 7:00AM TO 5:00PM or during scheduled activities must be maintained at no more than 76 degrees F during the cooling season (where air conditioning equipment is located);

3. Water Heating: Domestic hot water must be delivered at a temperature between 100 and 115 degrees F;

4. Indoor and Outdoor Lighting: Funding Agency's lighting level standards must be maintained;

5. Air Changes/Ventilation Requirements: Within code at all times, including ASHRAE standards for fresh air ventilation: and

6. Existing ventilation code requirements not met shall be identified as such. Failure to do so will subject bid to be non-compliant.

B The Commonwealth reserves the right to increase or decrease the minimum and maximum temperatures provided above.

4.6 Maintenance Agreement Minimum Terms.

A To the extent a Quote includes a Maintenance Agreement, the services must provide a two (2) hour maximum response to any service interruption problem from the time of notification of system outage or other major system failure that involves the loss or significant interruption or slowdown of any service to the facility. The Agreement must provide a four (4) hour maximum response from the time of notification for a minor failure or intermittent failures that involve any service other than a loss of connectivity.

B The Respondent must maintain a service log at the Funding Agency Maintenance Office.

END OF PART 4

APPENDIX A

Quote Signature Page

Quote Signature

Offeror's Representations and Authorizations. Offeror by signing on the signature page and submitting its Quote understands, represents, acknowledges and certifies that:

1. All information provided by, and representations made by, the Offeror in the Quote are material and important and will be relied upon by the Issuing Office in awarding the contract(s). Any misstatement shall be treated as fraudulent concealment from the Issuing Office of the true facts relating to the submission of this Quote. A misrepresentation shall be punishable under 18 Pa. C.S. § 4904.

2. No attempt has been made or will be made to induce any firm or person to refrain from submitting a Quote on this contract, or to submit a Quote higher than this Quote, or to submit any intentionally high or noncompetitive Quote or other form of complementary Quote.

3. The Quote is made in good faith and not pursuant to any agreement or discussion with, or inducement from, any firm or person to submit a complementary or other noncompetitive Quote.

4. To the best knowledge of the person signing the Quote for the Offeror, the Offeror, its affiliates, subsidiaries, officers, directors, and employees are not currently under investigation by any governmental agency and have not in the last four (4) years been convicted or found liable for any act prohibited by State or Federal law in any jurisdiction, involving conspiracy or collusion with respect to bidding or proposing on any public contract, except as disclosed by the Offeror in its Quote.

5. To the best of the knowledge of the person signing the Quote for the Offeror and except as otherwise disclosed by the Offeror in its Quote, the Offeror has no outstanding, delinquent obligations to the Commonwealth including, but not limited to, any state tax liability not being contested on appeal or other obligation of the Offeror that is owed to the Commonwealth.

6. The Offeror is not currently under suspension or debarment by the Commonwealth, or any other state, or the federal government. If the Offeror has received, within three years of the issuance of this RFQ, a Notice of Default from the Commonwealth, other state or the federal government, then the Offeror shall submit, as part of the Technical Submission, seven copies of a written explanation of why such Notice of Default was issued. This written explanation shall not exceed 1 sheet (2 pages) and shall not count towards the sheet and page limit established for the Technical Submission of the Quote.

7. The Offeror has not, under separate contract with the Issuing Office, made any recommendations to the Issuing Office concerning the need for the services described in the Quote or the specifications for the services described in the Quote.

8. Each Offeror, by submitting its Quote, authorizes all Commonwealth agencies to release to the Commonwealth information related to liabilities to the Commonwealth including, but not limited to, taxes, unemployment compensation, and workers' compensation liabilities.

9. Until the awarded GESA Contractor receives a fully executed and approved written contract from the Issuing Office there is no legal and valid contract, in law or in equity, and the GESA Contractor should not begin to perform.

10. The total energy savings projected in the final scope of work will be at least 95% of the savings projected in the Quote and that the project will be self-funded over the financial term of the project (maximum term of 20 years.)

11. Offeror agrees and certifies in accordance with the enclosed Commonwealth of Pennsylvania:

    - Nondiscrimination/Sexual Harassment Clause
    - Tax Liability Certification
    - Americans Disabilities Act
    - GESA Contractor Integrity Provisions
    - GESA Contractor Responsibility Provisions
    - Environmental Statement
    - Compliance with State and Federal Statutes, Rules and Regulations
    - Non-Collusion Affidavit

I am authorized to sign this Quote on behalf of the Offeror and I agree and state that

_____ (Name of Firm) understands and acknowledges that the above representations are material and important, and will be relied upon by the Department of General Services in awarding the contract(s) for which this Quote is submitted. I understand and my firm understands that any misstatement shall be treated as fraudulent concealment from the Department of General Services of the true facts relating to the submission of this Quote.

_____
Signature

_____
Print Name Legibly

_____
Title

APPENDIX B

Non-Collusion Affidavit

INSTRUCTIONS FOR NONCOLLUSION AFFIDAVIT

1. This Noncollusion Affidavit is material to any contract awarded pursuant to this Quote. According to §4507 of the Commonwealth Procurement Code, 62 Pa.C.S. §4507, governmental agencies may require Noncollusion Affidavits to be submitted with Quotes.

2. This Noncollusion Affidavit must be executed by the member, officer, or employee of the Offeror who makes the final decision on prices and the amount quoted in the Quote.

3. Bid rigging and other efforts to restrain competition, and the making of false sworn statements in connection with the submission of Quotes are unlawful and may be subject to criminal prosecution. The person who signs the affidavit should examine it carefully before signing and assure himself or herself that each statement is true and accurate, making diligent inquiry, as necessary, of all other persons employed by or associated with the Offeror with responsibilities for the preparation, approval or submission of the Quote.

4. In the case of a Quote submitted by a joint venture, each party to the venture must be identified in the Quote documents and an affidavit must be submitted separately on behalf of each party to the joint venture.

5. The term “complementary Quote” as used in the affidavit has the meaning commonly associated with that term in the Quote process, and includes the knowing submission of Quotes higher than the Quote of another firm, any intentionally high or noncompetitive Quote, and any other form of Quote submitted for the purpose of giving a false appearance of competition.

6. Failure to submit an affidavit with the Quote in compliance with these instructions may result in disqualification of the Quote.

NONCOLLUSION AFFIDAVIT

DGS Project Number: _____

State of _____:

County of _____: s.s.

I state that I am the _____ (Title) of _____ (Name of Firm) and that I am authorized to make this affidavit on behalf of my firm, and its owners, directors, and officers. I am the person responsible in my firm for the prices(s) and the amount of this Quote.

I state that:

1. The price(s) and amount of this Quote have been arrived at independently and without consultation, communication or agreement with any other contractor, Offeror, or potential Offeror.

2. Neither the price(s) nor the amount of this Quote, and neither the approximate price(s) nor approximate amount of this Quote, have been disclosed to any other firm or person who is a Offeror or potential Offeror, and they will not be disclosed before the Quote submission date.

3. No attempt has been made or will be made to induce any firm or person to refrain from proposing on this contract, or to submit a Quote higher than this Quote, or to submit any intentionally high or noncompetitive Quote or other form of complementary Quote.

4. The Quote of my firm is made in good faith and not pursuant to any agreement or discussion with, or inducement from, any firm or person to submit a complementary or other noncompetitive Quote.

5. _____ (Name of Firm) its affiliates, subsidiaries, officers, directors, and employees are not currently under investigation by any governmental agency and have not in the last four years been convicted or found liable for any act prohibited by state or federal law in any jurisdiction, involving conspiracy or collusion with respect to proposing and/or bidding on any public contract, except as follows:
   _____

I state that _____ (Name of Firm) understands and acknowledges that the above representations are material and important, and will be relied upon by the Department of General Services in awarding the contract(s) for which this Quote is submitted. I understand and my firm understands that any misstatement in this affidavit is and shall be treated as fraudulent concealment from the Department of General Services of the true facts relating to the submission of this Quote.

_____
(Signature)

_____
(Signatory's Printed Name)

_____
(Signatory's Title)

SWORN TO AND SUBSCRIBED BEFORE ME THIS _____ DAY OF _____, 20_____.

_____
Notary Public

My Commission Expires_____

APPENDIX C

Quote Security (Bid Bond)

INSTRUCTIONS ON BID BOND

1. If a bid bond is used as Quote security, the Bid Bond MUST be submitted on the following GSBPSAS-147 (2009 Ed) form. If the principal is a corporation, the President or Vice President and the Secretary or Treasurer of the corporation must sign; if a partnership, the partners must sign; if a joint venture, the joint venture must sign.

2. The Surety must sign the Bid Bond.

3. The Surety MUST attach to the Bid Bond a Power-of-Attorney, which must be dated the same date as the Bid Bond, showing that the person signing the Bid Bond for the Surety has authority to do so.

4. All signatures by the Surety of the Bid Bond MUST be original and hand-scripted. Faxed or copied signatures are unacceptable.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF GENERAL SERVICES
GSBPSAS-147 (2009 Ed.) Bond No. _____

CONSTRUCTION BID BOND
(Please Complete All Blanks)

KNOW ALL MEN BY PRESENTS, that we, _____ (hereinafter called the "Principal") as Principal and _____
a corporation duly organized under the laws of the State of _____
(hereinafter called the "Surety") as Surety, are held and firmly bound unto The Department of General Services, Harrisburg, Pennsylvania (hereinafter called the "Obligee"), in the sum of Ten (10%) Percent of the ECM/Cost Submittal Amount for the payment of which sum, well and truly to be made, we, the said Principal, and the said Surety, bind ourselves, our heirs, our administrators, successors, and assigns, jointly and severally firmly by these presents.

Sealed with our seals and dated this_____ day of _____A.D.

Two Thousand and _____.

WHEREAS the Principal has submitted a bid upon Contract
No._____
For_____
_____
NOW, THEREFORE, the conditions of these obligations are such that if the Principal shall not withdraw its bid prior to the expiration of the award period after the opening of the bids; and shall comply with all requirements set forth in the "Quote" and the "Instructions to Bidders;" and if the said contract be awarded to the Principal and the Principal shall, within such time as may be specified, enter into the contract in writing, and give bond, with Surety acceptable to the Obligee, covering the faithful performance of the said contract and payment of claims for labor, material, and equipment rental, all of which shall be supplied on the forms as specified by said Obligee; or if the Principal shall fail to do so, pay to the Obligee the lesser of the following amounts: 1) the amount of this bond as herein above set forth, or 2) the difference between the amount specified in the Principal's bid and such larger amount for which the Obligee may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be void; otherwise to remain in full force and effect.

WITNESS (OR ATTEST IF A CORPORATION) **PRINCIPAL**

_____

_____

(CORPORATE SEAL) **SURETY**

_____

DRAFT

APPENDIX D

Small Diverse Business Submission Form

SMALL DIVERSE BUSINESS SUBMISSION FORM

Submit 1 original in a sealed envelope separate from the Technical Submission and the ECM/Cost Submission

After examination of the contract documents, which are made a part hereof as if fully set forth herein, the Offeror commits to the following percentage for Small Diverse Business participation on this project. The Offeror understands the language in the RFQ regarding the calculation of the percentage.

Project: GESA 2017-1 Capitol Complex

Offeror (Firm) Name

_____

Commitment for Small Diverse Businesses for each ECM:
(FILL IN)

ECM	Dollar Value of ECM	% SDB Commitment	Dollar Value SDB Commitment
			($ Value of ECM x % Commitment)
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
TOTAL		N/A	

Offeror's SDB % = 100 X $\frac{\text{Total Dollar Value SDB Commitment}}{\text{Total Dollar Value of ECMs}}$

_____% _____ Percent
(Figure) (Written)

APPENDIX E

Mandatory Requirements Checklist

RESPONSIVENESS CHECKLIST

RFQ for Project No. :_____

Offeror's Name: _____

Office of Chief Counsel Rep.: _____ Date: _____
Bidding Unit Rep.: _____ Date: _____

Mandatory Submittal Requirements

Indicate in the spaces provided if the Quote meets each of following mandatory Quote requirements. Any Quote that has a "No" checked will be rejected as non-responsive.

Mandatory requirements	**Yes**	**No**
Offeror appears on DGS' list of plan holders		
Technical, ECM/Cost, and SDB Submissions included and separately sealed		
If Offeror is a Joint Venture:		
• Joint Venture Agreement submitted		
• Entity Authorization to Enter Into Joint Venture is included		
If Bank or Cashier's Check included, in the Amount of 10% of ECM/Cost		
Bid Bond		
• is identical to the Bid Bond provide to Offerors		
• has been properly and completely filled out		
• is from a Surety authorized to conduct business in Pennsylvania		
• has original signatures from Offeror and Attorney-in-fact		
Power-of-Attorney		
• included and shows that the Attorney-in-Fact who signed the Bid Bond is authorized to bind the bonding company		
Non-Collusion Affidavit properly completed and notarized		
• If Joint Venture, one Non-Collusion Affidavit for each entity		
Quote Signature properly completed and signed		
Technical Quote contains no project specific Cost Submission Information		

APPENDIX F

Evaluation Committee Technical Scoring Matrix

APPENDIX F

Evaluation Committee Scoring Matrix

SCORING MATRIX FOR TECHNICAL SUBMISSION

RFQ SECTION	DESCRIPTION	TOTAL POINTS
2-5.1	**Project Management Team Overview**	**40**
(A)	• Organizational Chart clearly depicts hierarchy and reporting structure of Team members with specific individuals and their assigned roles.	5
(B)	• Offeror described the assignment of responsibilities for major tasks and the interrelationship and management structure of overall Team, including history or working relationship between Offeror and selected Subcontractors on GESA projects.	5
(C1)	• Offeror described assignment of responsibilities for various Project tasks for this Project to specific individuals.	5
(C2)	• Reasonableness of percentage of time key personnel are assigned to this Project.	5
(C3)	• Offeror described ability to manage construction, repairs, regular service and emergencies effectively.	20
2-5.2	**Work Plan**	**110**
(1)	• Offeror demonstrated thorough understanding of the design process.	5
(2)	• Offeror identified potential design issues.	10
(3)	• Offeror described how the Team will manage and minimize DGS' risk.	10
(4)	• Offeror identified early construction packages, long lead items and phases of construction.	10
(5)	• Offeror demonstrated understanding of critical material and equipment and why they are critical, timing/lead times for acquisition and how they will be managed.	10
(6)	• Offeror demonstrated understanding of construction challenges and proposed solutions.	15
(7)	• Offeror thoroughly described a construction plan, including site operations, logistics, lay down area, including a detailed discussion on how the Offeror will accomplish the work within a fully occupied environment.	15
(8)	• Offeror discussed Project Safety Plan, Management and Monitoring.	10
(9)	• Offeror discussed an effective QA/QC plan.	10

(10)	• Offeror demonstrated understanding of the close out process for training of personnel, manuals, Occupancy Permits, commissioning and final closeout.	15
2-5.3	**RFQ Project Schedule**	**90**
(1)	• Narrative clearly identifies and discusses critical aspects of the schedule, associated risks, and the process to ensure achievement of critical milestone dates.	35
(2)	• CPM sets forth a logical progression of critical path, including at least the Notice of Selection, duration and submission of the Comprehensive Energy Audit, execution of GESA Contract, permit submission and approval dates (including but not limited to L&I, DEP Title V, and Hartford Insurance), durations of on-site work, scheduling of start-up and testing of equipment, commissioning and training of personnel.	45
(3)	• CPM integrates and coordinates construction with local utilities, subcontractors, equipment suppliers and Funding Agency facility personnel.	10
2-5.4	**Qualification Forms**	**260**
2-5.4.1	GESA Contractor Qualification Form	**125**
(a)	• Entity's experience with GESA projects.	35
(b)	• Management Team Individual Qualifications (6 person limit).	30
(c)	• Entity's financial ability to provide guarantee.	35
(d)	• Entity's Resource Availability	10
(e)	• Entity's Statement of Readiness and Commitment of Resources per the RFQ Project Schedule.	10
(f)	• Entity's Notification of Default or Debarment.	5
2-5.4.2	Design – Consultant Qualification Form	**60**
(a)	• Entity's experience with GESA projects.	30
(b)	• Individual Qualifications (4 person limit)	20
(c)	• Entity's Statement of Readiness and Commitment of Resources per the RFQ Project Schedule.	5
(d)	• Entity's Notification of Default or Debarment.	5
2-5.4.3	Construction – Key Subcontractor Qualification Forms	**75**
(1)	• Entity's experience with GESA projects.	30
(2)	• Superintendent Qualifications (4 person limit).	30
(3)	• Entity's Statement of Readiness and Commitment of Resources per the RFQ Project Schedule.	5
(4)	• Each Entity's Workman's Compensation Rating for 2012, 2013 and 2014.	5
(5)	• Entity's Notification of Default or Debarment.	5
	TOTAL POINTS	500

APPENDIX G

Evaluation Committee ECM/Cost Scoring Matrix

APPENDIX G
Evaluation Committee Scoring Matrix
SCORING MATRIX FOR ECM/COST SUBMISSION

RFQ SECTION	DESCRIPTION	TOTAL POINTS
2-6	**Investment Grade Audit (IGA)**	**25**
(D.1-a)	• Quote clearly and thoroughly describes the scope of the IGA, including systems covered, personnel, methodology and schedule milestones.	25
	Energy Conservation Measures (ECMs)	**210**
(D.1-b)	• Every ECM described in Appendix to RFQ is either calculated into the Project scope or the Offeror set forth a detailed justification for exclusion of the ECM.	25
(D.1-c)	• Quote provides a preliminary assessment of the ECMs, including a detailed estimate of implementation costs, energy cost savings (including detailed calculations) for each ECM.	60
(D.1-d)	• Quote thoroughly demonstrates the technical feasibility, suitability, reasonableness, comprehensiveness and acceptability of the proposed ECMs, including the proposed equipment and level of quality of the equipment for the proposed savings.	60
(D.1-e)	• Quote thoroughly describes training to be provided to Funding Agency staff, including scope and personnel who will be providing the training and whether the training will be videotaped for future use.	20
(D.1-f)	• Degree to which the proposed ECMs will meet the future needs of the Commonwealth.	15
(D.1.g)	• Quote includes additional ECMs not already included in the project	30
	Costs	**165**
(D.1-h)	• Quote provides annual financial projections for the length of the GESA Contract and each projection appears in the proper format listed in the RFQ.	115
(D.1-i)	• Proposed energy analysis demonstrates sound engineering principles and the reasonableness of the proposed savings.	50
	Monitoring and Maintenance	**100**
(D.1-j)	• Quote thoroughly describes the methods, schedule, scope and personnel who will be performing ongoing monitoring and maintenance services.	50
(D.1-k)	• Proposed Measurement and Verification (M&V) plan adheres to all M&V protocol standards and demonstrates scalability for measurement and verification of the proposed energy baseline, adjustment factors and energy cost savings.	50
	TOTAL POINTS	500

APPENDIX H

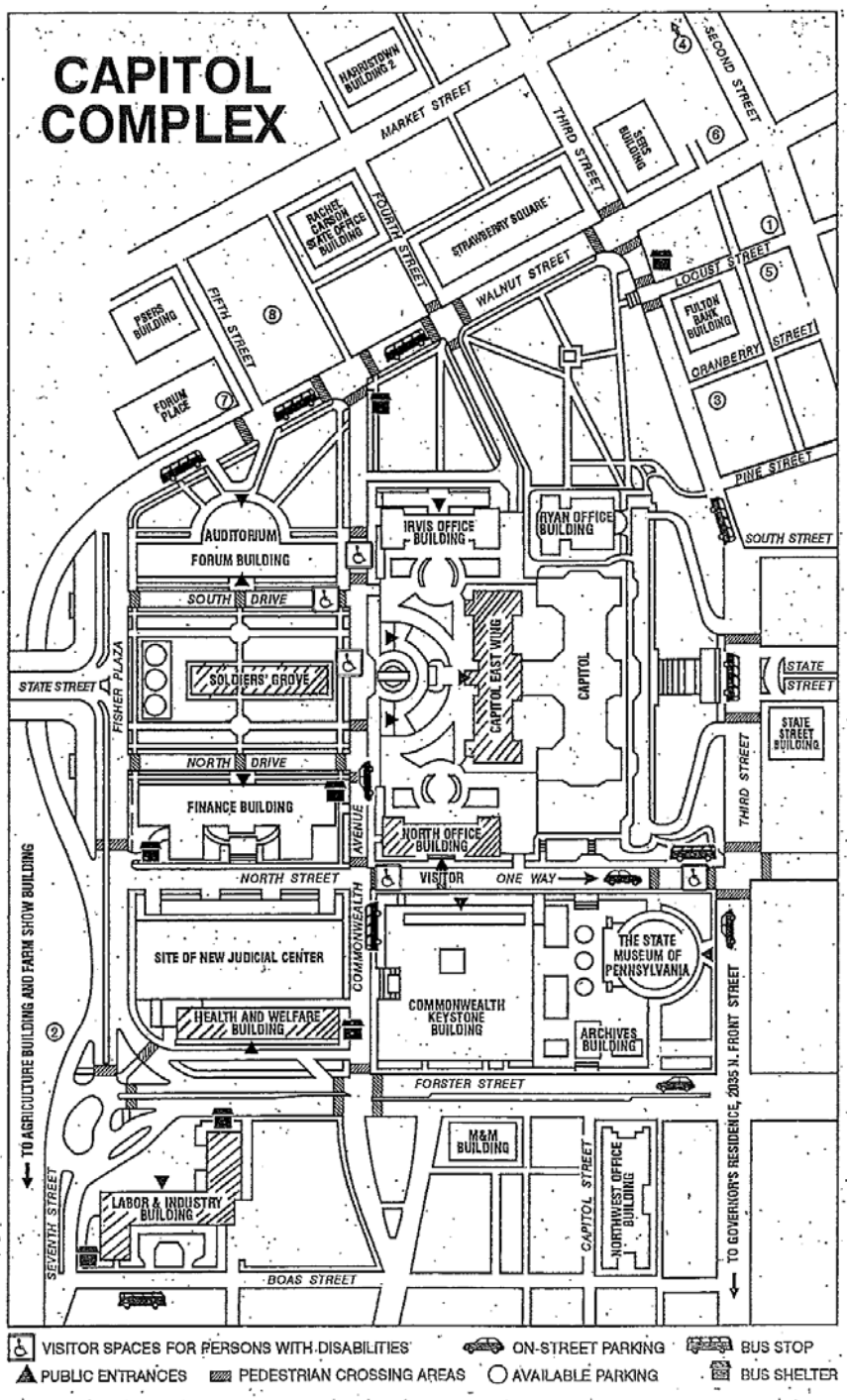
Energy Data

APPENDIX H

For Energy Data please download information at the Energy and Resource Website. Data will be included in the project folder.

APPENDIX I

Site Plans


CAPITOL COMPLEX
HARRISBURG BUILDING 2
MARKET STREET
THIRD STREET
SECOND STREET
SEOG BUILDING
RACHEL CARSON STATE OFFICE BUILDING
FOURTH STREET
STRAWBERRY SQUARE
WALNUT STREET
LOCUST STREET
FULTON BANK BUILDING
CRANBERRY STREET
BERS BUILDING
FIFTH STREET
FORUM PLACE
PINE STREET
AUDITORIUM
FORUM BUILDING
IRVIS OFFICE BUILDING
RYAN OFFICE BUILDING
SOUTH STREET
SOUTH DRIVE
STATE STREET
FISHER PLAZA
SOLDIERS' GROVE
CAPITOL EAST WING
CAPITOL
STATE STREET
STATE STREET BUILDING
NORTH DRIVE
FINANCE BUILDING
AVENUE
NORTH OFFICE BUILDING
THIRD STREET
NORTH STREET
VISITOR
ONE WAY
TO AGRICULTURE BUILDING AND FARM SHOW BUILDING
SITE OF NEW JUDICIAL CENTER
COMMONWEALTH
THE STATE MUSEUM OF PENNSYLVANIA
HEALTH AND WELFARE BUILDING
COMMONWEALTH KEYSTONE BUILDING
ARCHIVES BUILDING
FORSTER STREET
TO GOVERNOR'S RESIDENCE, 2035 N. FRONT STREET
M&M BUILDING
CAPITOL STREET
NORTHWEST OFFICE BUILDING
SEVENTH STREET
LABOR & INDUSTRY BUILDING
BOAS STREET
VISITOR SPACES FOR PERSONS WITH DISABILITIES
ON-STREET PARKING
BUS STOP
PUBLIC ENTRANCES
PEDESTRIAN CROSSING AREAS
AVAILABLE PARKING
BUS SHELTER

APPENDIX J

SUPPLEMENTAL PROVISIONS

STATE CAPITOL BUILDINGS

APPENDIX J

STATE CAPITOL BUILDING - SUPPLEMENTAL PROVISIONS

CONTRACTOR BEHAVIOR AND ACTIVITIES

Part 1 GENERAL

1.1 PERSONAL BEHAVIOR

A. Contractors are responsible for disseminating to their employees the special restrictions on personal behavior and the procedures/potential penalties for violations.

B. Identification tags or badges will be issued and worn according to MD 625.10 (included).

1.2 VEHICLES

A. Construction vehicles and employee's vehicles will be parked in an area designated by the Department and locked at all times. The license numbers of vehicles to be left overnight will be reported to the Capitol Police on a daily basis by the Contractors.

B. Vehicles may not be operated or parked on any lawn areas, unless otherwise permitted.

1.3 WORK AREAS

A. All work areas are to be kept safe and orderly at all times.

B. Passenger elevators are not to be used to transport materials, unless written authorization is given specifying dates and times when it is permissible.

C. Flammable liquids are not to be stored inside occupied buildings.

D. Do not compromise Life Safety Code requirements without prior written consent of the facility's Safety Manager, who will develop and implement alternate plans.

E. Contractors are to be aware of the locations of fire alarms, fire extinguishers and related equipment. The DGS Fire, Safety and Environmental Section is available to instruct the Contractors in the proper operation of fire safety equipment.

1.4 ALCOHOL AND CONTROLLED SUBSTANCES

A. Alcoholic beverages and controlled substances shall not be carried, stored or consumed on facility property nor left in any vehicle.

1.5 GAMBLING

A. Gambling or wagering of any type is not permitted on facility property.

1.6 WEAPONS

A. Weapons (other than tools applicable in Paragraph 9.04) shall not be permitted on facility property. Non-compliance with this policy may result in criminal charges.

B. Definitions:

1. As used in this section, the word "unlawfully" means surreptitiously or contrary to law, regulation, or order of the detaining authority.

2. As used in this section, the word "weapon" means any implement readily capable of lethal use and shall include any firearm, knife, dagger, razor, other cutting or stabbing implement or club, including any item which has been modified or adapted so that it can be used as a firearm, knife, dagger, razor, other cutting or stabbing implement or club. The word "firearm" includes any unloaded firearm and the unassembled components of a firearm.

1.7 SEARCH

A. Any person entering this facility is subject to a search of his or her person at any time. While the person may refuse, such refusal may be cause for denial of further entrance.

1.8 ORIENTATION PROGRAM

A. The facility agrees to provide an orientation program for covering security rules and regulations for the Contractors' personnel, if so requested.

1.9 EMPLOYEE CRIMINAL RECORD CHECK

A. The Prime Contractor must obtain a criminal record check for all of its employees as well as the employees of Subcontractors or suppliers who will be required to enter the building as part of this project.

B. The criminal record check must be requested from the Pennsylvania State Police by completing a ‘REQUEST FOR CRIMINAL RECORD CHECK’ FORM and submitting it to the Pennsylvania State Police.

C. All Prime Contractors are responsible for the costs incurred with the record check including the processing fee for all of their employees as well as the employees of Subcontractors or suppliers who will be required to enter the building as part of this project.

D. The forms must be obtained directly from the Pennsylvania State Police.

E. If the Criminal Record Check discloses a criminal record for a Contractor, Subcontractor or supplier employee, the Contractor shall not allow the employee access to the building unless authorized by the Department.

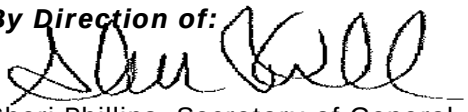
F. Contractors must submit the request for criminal record check to the Pennsylvania State Police with a copy to the Department not less than twenty-four (24) hours prior to individual starting work on the project.

END OF SECTION

MANAGEMENT DIRECTIVE

Commonwealth of Pennsylvania

Governor's Office

Subject: Card Reader and Emergency Response Access to Certain Capitol Complex Buildings and Other State Office Buildings	***Number:*** 625.10 Amended
Date: June 2, 2014	***By Direction of:***  Sheri Phillips, Secretary of General Services

Contact Agency:
Department of General Services, Office of Property and Asset Management, Bureau of Police and Safety, Capitol Police Security Administration, Telephone 717.346.1402

Access to certain Capitol Complex buildings and other state office buildings is controlled by means of card readers and secured visitors' entrances. This directive sets forth the policy, responsibilities, and procedures for use of photo identification access badges and photo identification badges. This amended version deletes all references to *Act 18 of 2012.* Marginal dots are excluded.

1. **PURPOSE.** To establish policy, responsibilities, and procedures for employee access to the Capitol Complex and other state office buildings. The policy and procedures outlined in this directive will enable employees to gain safe and easy access to those buildings while helping to maintain a satisfactory level of security during routine and emergency operations. The Emergency Response Designation criteria included in paragraph k. (page 3) and Enclosure 2, Emergency Response Designation for Critical Personnel, will apply to all commonwealth employees regardless of work location.

2. **SCOPE.** This directive applies to all commonwealth employees and contracted personnel under the Governor's jurisdiction and those employed by independent agencies as well as other individuals and organizations with offices or work locations in the Capitol Complex and other state office buildings.

3. **OBJECTIVE.** To ensure all commonwealth employees, contracted personnel, lobbyists and credentialed press maintain the appropriate photo identification/access badge and the requirements and fees.

4. **DEFINITIONS.** For purposes of this directive, the following words and phrases shall be defined as:

   a. **Agency Project Manager.** An individual within an agency who is responsible for overseeing and coordinating the various phases of work performed by contracted persons (including subcontractors, their subcontractors, and suppliers) and insures the general conditions and all requirements of a project are met for the commonwealth.

   b. **Agency Security Liaison.** Designated by agency head and is responsible for providing employees with photo identification access badges and maintaining an agency database. These individuals will work closely with DGS, Capitol Police Security Administration in obtaining and returning photo identification access badges.

   c. **Biometric Reader.** A device that reads the electronic encryption on an access card and makes an automatic non-invasive assessment of a unique body feature whereby access control systems may be activated.

   d. **Building Maintenance Spaces.** Data closets; air handling equipment rooms; and major electrical and building services spaces.

   e. **Capitol Complex.** Capitol Building (including the Main Capitol Building and its East Wing), Ryan Building, North Office Building, Speaker K. Leroy Irvis Building, Forum Building, Finance Building, Health and Welfare Building, Labor and Industry Building, Keystone Building, Northwest Office Building, the Judicial Center, State Museum and connecting tunnels.

   f. **Capitol Police Security Administration.** The Capitol Police Security Administration under the Superintendent of the Capitol Police is responsible for establishing procedures for issuance of photo identification badges and photo identification access badges. The Capitol Police Security Administration produces photo identification badges and photo identification access badges, including the "Emergency Response" designation and expiration dates, as well as maintains photo identification access badge permissions.

   g. **Card Reader.** A device that reads the electronic inscription on an access badge whereby locks or other access control systems may be activated.

   h. **Credentialed Press.** Professional members of the press – newspaper, magazine, wire service, radio, TV, cable TV, or other broadcast organization or news gathering organization – who represent a bona fide media organization and are regularly assigned to report on Pennsylvania State Government issues.

   i. **DGS.** Department of General Services.

   j. **Door Contacts.** An electronic device that indicates the status of a door (open, closed, locked).

k. Emergency Response Designation. A red banner with "Emergency Response" printed on the photo identification access badge or a photo identification badge. This designation is determined by the agency and allows the individual access to state offices during an emergency.

l. Newsroom Tenant. A media organization or employee of a media organization with which the Department of General Services has a current, executed lease, license agreement or occupancy agreement to occupy space in the Capitol Newsroom, 524 Main Capitol.

m. Other State Office Buildings. Department of Agriculture; DGS Annex Complex (formerly the Harrisburg State Hospital complex); DGS Public Works; DGS at 22nd and Forster Streets; Harristown #1 and #2 (leased); Philadelphia and Pittsburgh Annex Buildings (leased); and the Scranton and Reading state office buildings.

n. Photo Identification Access Badge. A card with an individual's photograph, name, and department programmed to permit access through use of a card reader. This badge may be issued to employees or newsroom tenants.

o. Photo Identification Badge. A card with the individual's photograph, name and association issued to a registered lobbyist, the employee of a contractor, or credentialed press for presentation at a visitor entrance.

p. Registered Lobbyist. A registrant under the *Lobbying and Disclosure Act, 65 Pa.C.S. § 1303A*.

5. POLICY.

a. Commonwealth employees under the Governor's jurisdiction and those employed by independent agencies and other organizations with offices in the Capitol Complex and other state office buildings will be required to possess a commonwealth photo identification access badge to gain access to those buildings and to display the badge at all times when in one of the buildings.

b. Commonwealth contracted personnel who have regular and routine business in commonwealth worksites may be issued a photo identification or access badge subject to the requirements of the contracting agency and DGS. The requirements, policy, and procedures for contracted personnel are set forth in Enclosure 3, Capitol Police Security Administration Photo Identification and Access Badges - Policy and Procedures for Contracted Personnel.

c. Registered lobbyists and credentialed press who have regular and routine business in the Capitol Complex may be issued a photo identification badge, and Newsroom Tenants may be issued a photo identification access badge subject to the requirements, policies, and procedures set forth in Enclosure 4, Capitol Police Security Administration Photo Identification Badges - Policy and Procedures for Registered Lobbyists and Enclosure 5, Capitol Police Security Administration Photo Identification Badges - Policy and Procedures for Credentialed Press/Newsroom Tenants.

d. There will be designated card access entrances.

e. If an employee who works in the Capitol Complex or other state office buildings desires to gain access without his/her photo identification access badge, he/she must gain access through a visitor entrance as a visitor.

f. If an employee's photo identification badge or photo identification access badge is damaged, destroyed, stolen or lost, the employee must immediately report it to his/her immediate supervisor. The employee must apply for a replacement photo identification or photo identification access badge through established procedures in Enclosure 1, Capitol Complex Security System Policies and Procedures. The employee will be charged $15.00 for each replacement photo identification badge and $25.00 for each replacement photo identification access badge. An agency may waive the $25.00 fee if it determines that the damage, destruction, theft or loss of the badge was not due to negligence by the employee. Employees who are covered by collective bargaining agreements or memoranda of understanding may grieve the decision to charge the $15.00 or $25.00 replacement fee using the applicable grievance procedure.

g. Only employees with parking permits and photo identification access badges for Parking Area 1 will be permitted to use elevators leading from that area into the East Wing.

h. All perimeter or other security administration covered doors within the Capitol Complex are to remain closed at all times unless authorized by the Capitol Police.

i. Regardless of which entrance an employee uses to gain access, he/she will be subject to the prohibition against bringing weapons or explosives into a building. The employee will be subject to screening and inspection and having possessions pass through x-ray equipment or other method of inspection.

j. Employees who work in the Capitol Complex or other state office buildings and who must possess photo identification access badges shall not permit any other person, regardless of whether the person is an employee or not, access to a building by that employee's photo identification access badge.

6. RESPONSIBILITIES.

a. Agency Heads will be responsible for designating an Agency Security Liaison and for disseminating and enforcing this policy.

b. Supervisors will be responsible for ensuring that their employees are fully informed about the requirements and are to remind employees on a periodic basis of the rules for access to the Capitol Complex and other state office buildings.

c. All employees working in, or who otherwise must be in, the Capitol Complex or other state office buildings are required to comply with this directive. Failure to comply with this directive may subject an employee to appropriate disciplinary action and possible arrest.

d. Capitol Police Security Administration is responsible for photo identification badge and photo identification access badge procedures, providing and maintaining access permissions, maintaining all applications in accordance with Records Retention and Disposition Schedules and producing photo identification and access badges.

e. Agency Security Liaison will be responsible for determining access permissions, designating agency staff for the "Emergency Response" designation and communicating this information to the DGS Capitol Police Security Administrator.

f. DGS, Capitol Police Administrative Lieutenant will be responsible for ensuring that appropriate criminal history background checks are completed and, as necessary, will authorize the issuance of photo identification or access badges for contracted personnel.

g. DGS, Press Office will be responsible for reviewing all applications for photo identification badges and photo identification access badges submitted by credentialed press and for making a determination regarding the appropriate badge to be issued.

7. PROCEDURES.

a. Exceptions to this policy may be requested by agency heads from the Secretary of General Services.

b. A copy of this directive is to be posted throughout each agency with employees in the Capitol Complex and other state office buildings. Also, a copy of this directive will be provided to an employee on request.

c. The provisions of this directive are to be included in orientation of new employees, included in employee handbooks, and incorporated into appropriate supervisory and management training programs.

d. Employees will be informed when to obtain photo identification access badges and when to begin using those badges.

e. DGS has developed specific procedures as set forth in Enclosures 1-5 for issuance of photo identification badges and photo identification access badges.

Enclosure 1 - Capitol Complex Security System Policies and Procedures
Enclosure 2 - Emergency Response Designation for Critical Personnel
Enclosure 3 - Capitol Police Security Administration Photo Identification and Access Badges - Policy and Procedures for Contracted Personnel
Enclosure 4 - Capitol Police Security Administration Photo Identification Badges – Policy and Procedures for Registered Lobbyists
Enclosure 5 - Capitol Police Security Administration Photo Identification and Access Badges – Policy and Procedures for Credentialed Press/Newsroom Tenants

This directive replaces, in its entirety, *Management Directive 625.10,* dated June 29, 2012.

CAPITOL COMPLEX SECURITY SYSTEM
POLICIES AND PROCEDURES

1. The Capitol Complex Security System is a multifaceted security system provided by the Department of General Services (DGS). The Capitol Police are responsible for system enforcement. One important part of this security system is the utilization of badges for commonwealth employees to gain access to various buildings, floors, and sections of buildings. Agencies are responsible for providing Capitol Police Security Administration with specific employee access requirements (User Access Groups to which an employee is entitled). That information, in combination with a digital photograph, will be utilized by Capitol Police Security Administration to manufacture access badges for those authorized. This document is intended to enumerate the procedures to be utilized by commonwealth agencies when requesting new badges, making modifications to existing badge access authorization, through changing jobs, gaining a new security profile, transferring to another agency, or reporting damaged, destroyed, lost or stolen badges, and badges being turned in by individuals separating from commonwealth employment. The following general policies apply:

a. All badges, damaged or otherwise, must be returned to Capitol Police Security Administration within 48 hours when they are no longer in service. Some of those badge numbers will be reassigned. If an employee separates from commonwealth service or is placed on long-term leave, the agency security liaison will get the badge from the employee, contact Capitol Police Security Administration to cancel all access on his/her badge, and return it to Capitol Police Security Administration. If an employee is separating from commonwealth service or is being placed on long-term leave does not surrender his/her badge, the agency shall take appropriate action similar to that taken for failure to surrender other items, equipment, etc. If an employee is transferred to another job within the agency or otherwise gains a new security profile in the job he/she currently holds, the employing agency will notify Capitol Police Security Administration of the new access profile. If an employee is transferred to another agency, he/she will keep their badge. The old agency shall contact Capitol Police Security Administration to cancel access permissions and the new agency shall contact Capitol Police Security Administration with new access permissions. Capitol Police Security Administration will then print a new face badge with the new agency. There is no need to have a photo taken again.

b. If an employee's photo identification badge or photo identification access badge is damaged, destroyed, stolen or lost through employee negligence, as determined by Capitol Police Security Administration and the employing agency, the employee will be required to pay $15.00 for a replacement photo identification badge and $25.00 for a replacement photo identification access badge. Payment will be in the form of check or money order payable to the "Commonwealth of Pennsylvania". An employee shall not be charged for a replacement badge when replacement is due to normal wear and tear or the damage, destruction, theft or loss was not the result of employee negligence. Employees who are covered by collective bargaining agreements or memoranda of understanding may grieve the decision to charge the $15.00 or $25.00 replacement fee through the applicable grievance procedures.

c. Each using agency will have a single, agency security liaison for the electronic security system. That agency security liaison, and a list of authorized persons from that organization with phone numbers and e-mail addresses, must be provided to Capitol Police Security Administration and updated as any changes occur. It is the using agency's responsibility to notify Capitol Police Security Administration of any modifications to that list. For verification purposes, each "badge action" must be channeled through the agency security liaison. Capitol Police Security Administration will **only** honor new badge issuance, badge modification requests, and badge cancellations when passed through the agency security liaison.

d. Requests for new badges and modifications to existing badges should be e-mailed to Capitol Police Security Administration at ra-idaccess@pa.gov.

e. If a badge is lost or suspected stolen, the badge holder shall immediately notify his/her supervisor, who will then contact the agency security liaison, who shall immediately call Capitol Police Security Administration at 717.346.1402, to inform them. The badge will be placed in a "lost" status within the system. Access will not be granted to this badge, but an alarm will indicate its use. This telephone call shall be followed with an e-mail from the agency security liaison to ra-idaccess@pa.gov.

f. New employee badges can only be issued after an identification photograph has been taken. Capitol Police Security Administration personnel in Room 410 of the North Office Building will take these photographs. In Harrisburg, the agency security liaison should e-mail ra-idaccess@pa.gov for an appointment time, date and place. Arrangements for photographs to be taken at the state office/annex buildings outside of Harrisburg should be made with the building administrator.

Philadelphia: 215.560.2884 or 215.560.7016
Reading: 610.378.4185
Pittsburgh: 412.565.5428
Scranton: 570.963.4817

g. If system security identifies repeated attempts by an employee to access prohibited areas, Capitol Police will notify Capitol Police Security Administration, who will investigate the circumstances of repeated access attempts.

h. The security access badge can be programmed to include the Emergency Response red stripe indicator thus replacing the Red Card system. Agencies are responsible for determining those employees who need the Emergency Response indicator on their badge and making arrangements through their agency security liaison to have their access badge modified through the DGS Capitol Police Security Administration personnel. Agencies with non-badged employees should follow the procedures outlined in Enclosure 2, Emergency Response Designation for Critical Personnel.

i. Security system questions and administrative matters pertaining to the system should be addressed to Capitol Police Administrative Lieutenant at 717.787.9013.

j. Agency relocations and new building occupancy issues will require special procedures, which will be handled on a case-by-case basis. The agency security liaison should contact Capitol Police Administrative Lieutenant as far in advance as possible of the intended move or relocation.

k. It is imperative that agencies develop internal procedures to support this policy. Agencies should develop internal access card databases, managed by the agency security liaison, which contain information on agency employees and the buildings/areas to which they have access. All identification/access badge utilization and maintenance is at agency request.

EMERGENCY RESPONSE DESIGNATION FOR CRITICAL PERSONNEL

1. Employees that provide critical services to the commonwealth should be designated by the agency head or designee as Emergency Response personnel. Emergency Response personnel include, but are not limited to:

a. Employees that provide snow removal, HVAC, electrical, IT systems, and other services needed to ensure access and continued operations of commonwealth worksites.

b. Employees that are deemed responsible for the execution of work that is needed to support a critical function that is integral to the mission of the organization.

c. Employees that have been identified as providing support to the agency in its role of providing emergency services (external as well as internal) in the commonwealth.

d. Employees that have a high level of decision making responsibility.

2. The Human Resource office should confirm the appropriateness of all identified Emergency Response personnel with the appropriate management staff of the agency.

3. The agency security liaison will notify Capitol Police Security Administration and arrange for the issuance of the "Emergency Response" designation.

4. Agencies should inform the designated Emergency Response personnel of the circumstances under which they are expected to report to work.

5. The Emergency Response designation provides verification to law enforcement that the cardholder has been designated by the commonwealth to report to work under otherwise restricted conditions. Law enforcement agencies are not required to honor the Emergency Response designation if there are greater safety concerns.

6. The Emergency Response designation does not provide any additional access to buildings that are equipped with card readers. Access is based on the clearance level as defined by the agency security liaison.

7. This directive and enclosures are consistent with the information contained in *Management Directive 530.17, Partial and Full Day Closings of State Offices,* regarding essential and nonessential personnel.

CAPITOL POLICE SECURITY ADMINISTRATION PHOTO IDENTIFICATION AND ACCESS BADGES

POLICY AND PROCEDURES FOR CONTRACTED PERSONNEL

1. The following policy and procedures are in place to ensure that personnel of all contracted firms, companies and associations are approved to perform work or provide services in the Capitol Complex and other secured buildings and premises. This does not include suppliers, visiting vendors or delivery persons who must enter through secured visitors' entrances.

a. Contracted personnel who will be on the premises during the business day (Monday through Friday, 6 a.m. through 6 p.m.) for less than two weeks will NOT need identification badges, and will be admitted to buildings through the security checks at visitors' entrances. All contracted personnel who will be on the premises for more than two weeks during the business day, or after business hours, on weekends, and on holidays MUST HAVE identification badges and are considered to be prime contracted personnel.

b. An Agency Project Manager oversees and coordinates the various phases of work performed by contracted persons (including subcontractors, their subcontractors, and suppliers) and insures the general conditions and all requirements of the project are met for the commonwealth. This includes security related issues for contractor access and compliance with the Request for Criminal History Record Information Act check (CHRIA) performed by the Pennsylvania State Police. An Agency Project Manager provides to the Capitol Police Security Administration Office a list of all prime contracted persons who perform work on the Capitol Complex premises.

c. Agency Project Managers will coordinate with and provide Capitol Police Security Administration with a list of contracted personnel who require badges. Agency Project Managers will ensure that contracted personnel have complied with the criminal history background check process. Personnel requiring photo identification badges must present a cleared CHRIA report and photo identification to Capitol Police Security Administration before the badge is issued. To cover costs incurred by the Department of General Services (DGS) in processing requests for badges by contracted personnel, a processing fee of $10.00 for a photo identification badge or $20.00 for a photo identification access badge must be paid before a badge will be issued. Badges that have been damaged, destroyed, stolen or lost through negligence will be replaced only after payment to Capitol Police Security Administration fee of $15.00 for a photo identification badge or $25.00 for a photo identification access badge. Payment for badges will be in the form of check or money order payable to the Commonwealth of Pennsylvania. All badges must be returned to Capitol Police Security Administration at the completion of an assignment or project. The employer of contracted personnel is responsible for paying the replacement/lost badge fee for any badge not returned at the completion of the project.

2. **Scheduling of Photos.** Agency Project Managers will advise Capitol Police Security Administration of individuals requiring appointments for photo identification. The Project Manager will address all communication regarding photo appointments to ra-idaccess@pa.gov. If you have any questions, please call Capitol Police Security Administration at 717.346.1402.

3. **Badges.** The appropriate identification badge will be issued to contracted persons who have a clear CHRIA report. If a CHRIA report reflects a positive criminal history, the Capitol Police Security Administration will make appropriate review and determination. The badge will be issued for a one-year period from date of issue or for the duration of the contract or project. Badges subject to renewal will be coordinated in the same manner as new issue badges. A new CHRIA certification and processing fee are required each year. Capitol Police Officers will be required to check expiration dates and decline access to those whose badges have expired dates with no exceptions. All badges must be returned to Agency Project Managers at the completion of a project or contract. Agency Project Managers must return terminated badges to the Capitol Police Security Administration. The employer of contracted personnel is responsible for paying the replacement/lost badge fee, specified in 1c. above, for any badge not returned at the completion of the project.

4. **CHRIA.** To obtain your CHRIA report, access Web site: (https://epatch.state.pa.us). Fill out the information form and use your credit card. If you have no criminal history, you will receive a clear CHRIA report almost immediately to your e-mail address. Click on the control number and then certified form. Print the certified form. Capitol Police Security Administration will only accept the certified form that contains the state seal. Please note that the only acceptable redaction to this document is to the first five (5) digits of the applicant's social security number. If there is a criminal history, the CHRIA will be sent by mail.

CAPITOL POLICE SECURITY ADMINISTRATION PHOTO IDENTIFICATION BADGES

POLICY AND PROCEDURES FOR REGISTERED LOBBYISTS

1. The following policies and procedures are intended to facilitate entrance to the Capitol Complex and other secured buildings by registered lobbyists.

a. Applications. A registered lobbyist may obtain an application for photo identification in the Capitol Police Security Administration Office, Room 410 North Office Building or by calling 717.346.1402. Upon filing the application with Capitol Police Security Administration, an appropriate identification badge may be issued.

b. Fees. To cover costs incurred by the Department of General Services (DGS) in processing requests for photo identification badges by a registered lobbyist, a $10.00 processing fee must be paid before a badge will be issued. Payment for badges will be in the form of check or money order payable to the Commonwealth of Pennsylvania. A new $10.00 processing fee is required each year. Badges that have been damaged, destroyed, stolen or lost through negligence will be replaced only after payment to Capitol Police Security Administration of a $15.00 replacement fee.

c. Badges. The appropriate identification badge will be issued to registered lobbyists who have a clear Criminal History Record Information Act (CHRIA) report issued by the Pennsylvania State Police. If a CHRIA report reflects a positive criminal history, Capitol Police Security Administration will make appropriate review and determination. The badge will be issued for a one-year period from date of request on the CHRIA report. Badges are subject to renewal and will be coordinated in the same manner as new issue badges. In addition, badge recipients are required to have an annual CHRIA update check. DGS, Capitol Police Officers will be required to check expiration dates and decline access to those whose badges have expired dates with no exceptions. Badges must be returned to Capitol Police Security Administration immediately if requested by the Capitol Police Security Administration or if the holder of the identification badge ceases to be a registered lobbyist.

d. CHRIA. To obtain your CHRIA report, access Web site: (https://epatch.state.pa.us). Complete the information form and use your credit card. If you have no criminal history, you will receive a clear CHRIA report almost immediately to your e-mail address. Click on the control number and then certified form. Print the certified form. Capitol Police Security Administration will accept only the certified form that contains the commonwealth seal. Please note that the only acceptable redaction to this document is to the first five (5) digits of the applicant's social security number. If there is a criminal history, the CHRIA will be sent by mail.

CAPITOL POLICE SECURITY ADMINISTRATION PHOTO IDENTIFICATION AND ACCESS BADGES

POLICY AND PROCEDURES FOR CREDENTIALED PRESS/NEWSROOM TENANTS

1. The following policies and procedures are intended to facilitate entrance to the Capitol Complex and other secured buildings by credentialed press and newsroom tenants.

a. Applications. A credentialed member of the press may obtain an application for photo identification in the Capitol Police Security Administration Office, Room 410 North Office Building or by calling 717.346.1402. Upon filing the application with Capitol Police Security Administration, the Department of General Services' (DGS) Press Office will make a determination as to the appropriate identification badge to be issued.

b. Fees. To cover costs incurred by DGS in processing requests for badges, a processing fee of $10.000 for a photo identification badge or $20.00 for a photo identification access badge must be paid before a badge will be issued. Payment for badges will be in the form of check or money order payable to the Commonwealth of Pennsylvania. Badges that have been damaged, destroyed, stolen or lost through negligence will be replaced only after payment to Capitol Police Security Administration of a replacement fee of $15.00 for a photo identification badge or $25.00 for a photo identification access badge.

c. Badges. A photo identification badge will be issued to credentialed press who have a clear Criminal History Record Information Act (CHRIA) report issued by the Pennsylvania State Police. A photo identification access badge may be issued to newsroom tenants who have a clear CHRIA report. If a CHRIA report reflects a positive criminal history, Capitol Police Security Administration will make appropriate review and determination. The badge will be issued for a one-year period from date of request on the CHRIA report. Badges are subject to renewal and will be coordinated in the same manner as new issue badges. In addition, badge recipients are required to have an annual CHRIA update check. DGS, Capitol Police Officers will be required to check expiration dates and decline access to those whose badges have expired dates with no exceptions. Badges must be returned to Capitol Police Security Administration immediately if requested by the Capitol Police Security Administration, if the holder of the photo identification badge ceases to be a credentialed member of the press, or if the holder of the photo identification access badge ceases to be a newsroom tenant.

d. CHRIA. To obtain your CHRIA report, access Website: (https://epatch.state.pa.us). Complete the information form and use your credit card. If you have no criminal history, you will receive a clear CHRIA report almost immediately to your e-mail address. Click on the control number and then certified form. Print the certified form. Capitol Police Security Administration will accept only the certified form that contains the commonwealth seal. Please note that the only acceptable redaction to this document is to the first five (5) digits of the applicant's social security number. If there is a criminal history, the CHRIA report will be sent by mail.

APPENDIX K

Hazardous Material Abatement Information

(Hard copies of asbestos reports will be available for reference)

APPENDIX L

GESA Contract

GUARANTEED ENERGY SAVINGS CONTRACT

BETWEEN

DEPARTMENT OF GENERAL SERVICES

AND

THE GESA CONTRACTOR

Project No. DGS GESA 2017-1
Capitol Complex
Dauphin County, Pennsylvania

This Guaranteed Energy Savings Contract (hereinafter "the GESA Contract"), executed this _____ day of _____, 20_____, by and between the DEPARTMENT OF GENERAL SERVICES ("Funding Agency") an executive agency of the Commonwealth of Pennsylvania authorized to enter into a Guaranteed Energy Savings Contract pursuant to 62 Pa C. S. §§3751-3758, and

_____

_____

_____

their heirs, executors, administrators and assigns, hereinafter called "the GESA Contractor".

ARTICLE 1 – THE CONTRACT DOCUMENTS

The Contract Documents consists of the Invitation to Qualify (ITQ) documents (including the ITQ and all appendices and attachments, the ITQ Quote submitted by the GESA Contractor, and the ITQ contract; this GESA Contract and all attachments hereto; the Request for Quote, ("the RFQ"); the GESA Contractor's Quote submitted in response to the RFQ; the Contract Bonds; the Conditions of the Contract (General, Special, Supplementary, and other Conditions); all drawings created by or for the GESA Contractor and/or the GESA Contractor Design Consultant; the specifications created by or for the GESA Contractor and/or its GESA Contractor Design Consultant; the Investment Grade Audit (IGA) prepared by the GESA Contractor setting forth the approved energy conservations measures (ECMs – Attachment 1); all bulletins and addenda issued before and after to execution of the contract; all change orders; the GESA Project Design Manual; and the Administrative Procedures for the GESA Contract. All of these documents form the contract and are as fully part of the contract as if attached to this Contract or repeated herein.

ARTICLE 2 – THE WORK

The GESA Contractor shall be the Professional of Record for the Project and shall design the Scope of Work. The GESA Contractor shall provide all Architectural and Engineering services during the Project, including but not limited to structural, mechanical and electrical engineering services, required to complete the GESA Project. The GESA Contractor warrants that the architects and engineers who are and will be in responsible charge, are regularly licensed, as required by the Pennsylvania Statutes and Pennsylvania Code (Architects Licensure Law, Act of Dec. 14, 1982, P.L. 1227, as amended, 63 P.S. §34.1 et seq. and Regulations of the State Architects Licensure Board, 49 PA. CODE §9.1 et seq. and the Engineer, Land Surveyor and Geologist Registration Law, Act 367, 63 P.S. §148-158.2, as amended and Regulations of the Board of Engineers, Land Surveyors and Geologists, 37 PA. Code §37.31 et seq.), to practice their professions in the Commonwealth of Pennsylvania. All drawings, specifications and other documents prepared by the GESA Contractor shall comply with all applicable laws, statutes, ordinances, codes, orders, rules and regulations in effect at the time said drawings, specifications and other documents are submitted to the Department.

The GESA Contractor shall also perform all the work required by the Contract Documents as set forth in the RFQ for the implementation/construction of the Scope of Work.

ARTICLE 3 – TIME OF COMMENCEMENT AND COMPLETION

The Work to be performed under this GESA Contract shall be commenced upon the effective date of the GESA Contract. This date shall be defined, pursuant to the terms of the General Conditions of the GESA Contract, to be the date upon which the last Commonwealth official who is required to execute the contract executes the contract. The GESA Contractor shall complete all work to the satisfaction and approval of the Funding Agency on or before _____ calendar days from the effective date of the GESA Contract.

GESA Contractor further agrees that the time is of the essence on this GESA Contract and that if it fails to complete the work within the time specified above, the GESA Contractor will pay as Liquidated Damages and not as a penalty for such failure, the sum of $_____.00 dollars ($ .00) per day for each and every calendar day after the completion date until the Work is completed and accepted. The Funding Agency may extend the completion date of the GESA Contact for causes set forth in the General Conditions of the GESA Contract that, in fact, delay the completion of said work. In such case, GESA Contractor is liable for said Liquidated Damages only after the expiration of the extended period.

ARTICLE 4 – CONTRACT SUM

The Funding Agency will authorize an energy financing provider, procured separately, to pay the GESA Contractor for the performance of the Work subject to additions and deductions by change order, as provided in the General Conditions of the GESA Contract, the contract sum of _____dollars ($_____). Payment will be made as set forth in the General Conditions of the GESA Contract. Deductions from or additions to this sum will be made as set forth in the General Conditions of the GESA Contract.

ARTICLE 5 – PROGRESS PAYMENTS

Based upon applications for payment submitted by the GESA Contractor, the Funding Agency will authorize the energy financing provider to release progress payments on account of the contract sum to the GESA Contractor, as provided in the General Conditions of the GESA Contract.

ARTICLE 6 – FINAL PAYMENT

Final Payment will be approved by the Funding Agency for release by the energy financing provider to the GESA Contractor within thirty (30) days after Close-out Inspection of the Work if the Contract has been fully performed and a Final Application for Payment has been submitted, as provided in the General Conditions of the GESA Contract.

ARTICLE 7 – SMALL DIVERSE BUSINESS PARTICIPATION

The GESA Contractor provided its Small Diverse Business (i.e., Minority Business Enterprises (MBEs), Women Business Enterprises (WBEs), Veteran Business Enterprises (VBEs), and Service-Disabled Veteran Business Enterprises (SDVBEs), Lesbian Gay Bisexual Transgendered Business Enterprises (LGBTEs), Disability Owned Business Enterprises (DOBEs) (together referred to hereinafter as Small Diverse Businesses)) percentage for Small Diverse Business subcontracts, suppliers, and manufacturers for this project in the GESA Contractor's RFQ Quote. The GESA Contractor's Small Diverse Business percentage is ___% of the GESA Contractor's Contract.

ARTICLE 8 – MISCELLANEOUS PROVISIONS

8.1 Terms used in this GESA Contract defined in the General Conditions of the GESA Contract have the meanings designated in those Conditions.

8.2 In addition to any other guarantees or warrantees, the GESA Contractor covenants and agrees, after acceptance of the Work performed under this GESA Contract, to remedy without cost to the Funding Agency any such defect in the Work provided said defects in the judgment of the Funding Agency, or its successors having jurisdiction over the premises, are caused by defective or inferior materials, equipment or workmanship. If the corrective work is not completed within thirty (30) days after the notification by the Funding Agency to the GESA Contractor, the Funding Agency may do the work and submit those costs to the Surety Company for reimbursement.

8.3 The Contract Bonds given by the GESA Contractor conditioned upon the faithful performance of the GESA Contract and for the payment of labor, material, equipment and public utility service claims are attached to this GESA Contract and are made a part of it. No third party shall acquire any rights against the Funding Agency under the Contract Documents.

8.4 The GESA Contractor agrees to abide by and be bound by the Laws of Pennsylvania including those relating to and regulating the hours and conditions of employment.

8.5 Nothing in this GESA Contract shall be deemed to waive or otherwise affect the sovereign immunity of the Commonwealth, and its agencies, officers, and employees, or to subject any Commonwealth party to any liability not expressly authorized by law.

8.6 Any person, co-partnership, association or corporation furnishing labor, material, equipment or renting equipment or rendering public utility services in connection with the performance of this GESA Contract has a right of action to recover the cost thereof from the GESA Contractor and the Surety on the Bond given to secure the payment of such labor, material, equipment or equipment rental and services rendered by public utility as though such person or corporation had been named as Obligee in such Bond. For those who do not have a contract directly with the GESA Contractor, this right of action may not be exercised unless the GESA Contractor is notified of the claim within ninety (90) days from the last performance of labor or provision of materials. The GESA Contractor shall include in all of its subcontracts or supply contracts a provision requiring that its subcontractors and suppliers notify, in writing, their subcontractors and suppliers of this requirement. It is hereby agreed that no third party rights arise against the [Commonwealth] for any reason under this Article, and the GESA Contractor hereby agrees to so inform all subcontractors and suppliers in writing.

ARTICLE 9 – CONTRACT COMPLIANCE REGULATIONS

Refer to the appropriate paragraph of the General Conditions of the GESA Contract (which are made a part of this Contract by incorporation by reference as if fully set forth herein), which prohibits discrimination in hiring or employment opportunities. Also made a part of this Contract by incorporation by reference are all State and Federal Laws prohibiting discrimination in hiring or employment opportunities. The contract documents also list applicable statutory provisions which are incorporated by reference into this GESA Contract as if set forth fully herein.

ARTICLE 10 – ASSURED PERFORMANCE GUARANTEE

The GESA Contractor is required to guarantee energy and cost savings stipulated in this GESA Contract on an annual basis. The savings must be guaranteed to provide the project financing payment plus the service fees during that year for the Contract duration. No credit for savings above the annual guarantee will be credited toward the performance guarantees for future years of this GESA Contract. The recovery of contract costs from energy savings over the term of this GESA Contract shall not exceed twenty (_20_) years. Refer to the Assured Performance Guarantee (which is made a part of this Contract by incorporation) for the GESA Contractor's requirements regarding documenting and verifying the annual energy and/or cost savings that are attributed to this project (Attachment 2).

[Signature Page Immediately Follows]

IN WITNESS WHEREOF, the DEPARTMENT OF GENERAL SERVICES and the GESA Contractor have caused this contract to be executed on the day and year above written.

Witness: GESA CONTRACTOR

Attest:

_____ _____
Secretary/Treasurer Date:_____ President Date:_____

Witness: COMMONWEALTH OF PENNSYLVANIA
ACTING THROUGH THE DEPARTMENT OF
GENERAL SERVICES

_____ _____
Date:_____ Commissioner Date:_____

_____
Comptroller Operations

APPROVED AS TO LEGALITY
AND FORM

_____
Office of Chief Counsel – DEPARTMENT OF General Services

_____
Office of General Counsel

_____
Office of Attorney General

CONTRACT BOND

KNOW ALL PERSONS BY THESE PRESENTS, That we the undersigned

_____

_____

_____

as Principal and

_____

_____

_____

as the Surety Company, a Corporation organized and existing under the Laws of the State of _____ and authorized to transact business in Pennsylvania, as surety, are held and firmly bound unto the Department of General Services (as hereinafter set forth, in the full and just several sums of:

(A)_____ Dollars

($_____) for faithful performance of the GESA Contract as designated in Paragraph "A" below; and

(B) _____Dollars

($_____) for payment for labor, material equipment rental and public utility services as designated in Paragraph "B" below; and

Sealed with our respective seals and dates this _____ day of _____.

WHEREAS, the above Principal has entered into a GESA Contract with the Department of General Services dated the _____ day of _____, 20__ for _____upon certain terms and conditions in said GESA Contract more particularly mentioned; and

WHEREAS, it is one of the conditions of the Award of the Department of General Services pursuant to which said GESA Contract is about to be entered into, that these presents be executed;

NOW, THEREFORE, the joint and several conditions of this obligation are such:

A. That, if the above Principal as GESA Contractor shall well and faithfully do and perform the things agreed by it to be done and performed according to the terms of said Contract Documents, including the plans and specifications therein referred to and made part thereof, and such alterations as may be made in said plans and specifications as therein provided and which are hereby made part of this Bond the same as though they were fully set forth herein, and shall indemnify and save harmless the Department of General Services and all of their officers, agent and employees from any expense incurred through the failure of said GESA Contractor to complete the Work as specified and for any damages growing out of the manner of performance of said GESA Contract by said GESA Contractor or its Subcontractors, or their agents or servants, including, but not limited to, patent trademark and copyright infringements, then this part of this obligation shall be void; otherwise, it shall be and remain in full force and effect.

B. That, if the above Principal shall and will promptly pay or cause to be paid all sums of money which may be due by the Principal or any of its Subcontractors to any person, co-partnership, association or corporation for all material furnished and labor supplied or performed in the prosecution of the work, whether or not the said material or labor entered into and become component parts of the Work or improvements contemplated, and for rental of equipment used, and services rendered by public utilities in, or in connection with, the prosecution of such Work, then this part of this obligation shall be void; otherwise, it shall be and remain in full force and effect.

C. It is further agreed that any alterations which may be made in the terms of the GESA Contract or in the Work to be done or materials to be furnished or labor to be supplied or performed, or equipment to be rented, or public utility services to be rendered, or the giving by the Department of General Services of any extension of time for the performance of the GESA Contract, or the reduction of the retained percentage as permitted by the GESA Contract, or any other forbearance on the part of either the Department of General Services or the Principal to the other, shall not in any way release the Principal and the surety or sureties or either or any of them, their heirs, executors, administrators, successors or assigns, from their liability hereunder; notice to the surety or sureties of any such alterations, extension or forbearance being hereby waived.

D. The Principal and Surety hereby jointly and severally agree with the Department of General Services herein that every person, co-partnership, association or corporation which, whether as subcontractor as a person otherwise entitled to the benefits of this Bond, has furnished material or supplied or performed labor or rented equipment used in the prosecution of the Work as above provided and any public utility, which has rendered services, in, or in connection with, the prosecution of such Work, and, which has not been paid in full therefore, may sue in assumpsit on this Bond in his, their, or its name and prosecute the same to final judgment for such sum or sums as may be justly due him, them, or its, and have execution thereon; provided, however, that the Department of General Services shall not be liable for the payment of any cost or expenses of such suit to a third party under any theory of law or equity.

E. Recovery by any persons, co-partnership, association or corporation hereunder is subject to the provisions of the Pennsylvania Procurement Code, 62 Pa.C.S §§101-4509, as amended, which Act is incorporated herein and made a part hereof, as fully and completely as though its provisions were fully and at length herein recited, except that, where said Act refers to the Commonwealth of Pennsylvania or a Department thereof, it is deemed to refer to the Department of General Services.

IN WITNESS WHEREOF, the said Principal and Surety have duly executed this Bond under seal the day and year above written.

Witness:

_____ (Date)

_____
Principal (Date)
GESA Contractor

(Corporate Seal)

_____
Surety

By:_____
Attorney-in-Fact (Date)

APPROVED AS TO FORM AND LEGALITY

_____
Office of Chief Counsel,
Department of General Services

_____
Office of Attorney General

APPENDIX M

General Conditions for GESA Contract

pennsylvania

DEPARTMENT OF GENERAL SERVICES

GENERAL CONDITIONS

OF THE GESA CONTRACT

HARRISBURG, PENNSYLVANIA

MAY 2017 EDITION

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GENERAL CONDITIONS
OF THE GESA CONSTRUCTION CONTRACT

ARTICLE 1: DEFINITIONS

The following is in addition to any ITQ language on the matter. Where there are discrepancies between the ITQ and these General Conditions, these General Conditions take precedence.

Whenever in the Contract Documents the following words and expressions occur, they have the following meanings, which shall be construed in conjunction with the applicable definitions of the Commonwealth Procurement Code:

1.1 **ADMINISTRATIVE PROCEDURES**: The Department of General Services' (DGS**)** construction procedures manual to be followed for various administrative functions.

1.2 **Bi-weekly**: An event occurring every two weeks.

1.3 **Commonwealth**: The Commonwealth of Pennsylvania.

1.4 **Contract Documents**: As described in Article I of the GESA Contract, the Contract Documents consists of the Invitation to Qualify (ITQ) documents (including the ITQ and all appendices and attachments, the ITQ Quote submitted by the GESA Contractor, and the ITQ contract; this GESA Contract and all attachments hereto; the Request for Quote, ("the RFQ"); the GESA Contractor's Quote submitted in response to the RFQ; the Contract Bonds; the Conditions of the Contract (General, Special, Supplementary, and other Conditions); all drawings created by or for the GESA Contractor and/or the GESA Contractor Design Consultant; the specifications created by or for the GESA Contractor and/or its GESA Contractor Design Consultant; the Investment Grade Audit (IGA) prepared by the GESA Contractor setting forth the approved energy conservations measures (ECMs – Attachment 1); all bulletins and addenda issued before and after to execution of the contract; all change orders; the GESA Project Design Manual; and the Administrative Procedures for the GESA Contract. These documents form the contract and are as fully part of the contract as if attached to this Contract or repeated herein. To the extent that any of these documents are amended by statute, the statutory language will control.

1.5 **Contract Duration**: The number of calendar days set forth in the Contract Documents for completion of the Work, also referred to as Contract Time.

1.6 **Contract Limits**: The area designated on the Contract Documents as the limit of construction, within which the Contractor may perform the Work.

1.7 **Contract Start Date**: For purposes of calculating dates for completion of the Work, this is the date upon which the GESA Contract is fully executed and is transmitted to the GESA Contractor.

1.8 **Contractor**: The GESA Contractor.

1.9 **Days**: Calendar days unless specifically stated otherwise in the Contract.

1.10 **Deficiency Item**: Any work or activity, either performed or unperformed, which the DGS will not certify as being performed in accordance with the Contract Documents.

1.11 **Effective Date of Contract**: The date on which the last Commonwealth official who is required to execute the contract executes it.

1.12 **Escrow Agent**: If applicable, the financial entity designated by the Third Party Lender or Energy Financial Provider to maintain and administer the Escrow Account from which the Contractor will be paid upon submission of approved Applications for Payment during design and construction.

1.13 **Extension of Time**: A formal approved extension of a contract duration.

1.14 **Field Order**: A record of a minor adjustment in the Work that results in no change in cost or duration of the Contract.

1.15 **Final Inspection**: A review of the Work conducted by the Contractor, Funding Agency, DGS and Energy Consultant after the Contractor requests a Final Inspection. The review will determine whether the Work is substantially complete. If, as a result of this inspection, the Work is determined by DGS and Funding Agency to be substantially complete, the Energy Consultant generates a certificate of final inspection and a Punch List of incomplete items and a reasonable estimated cost of completion.

1.16 **Funding Agency**: The agency of the Commonwealth that operates the facility where the GESA project will occur. The Funding Agency will sign the GESA contract on behalf of the Commonwealth and manage the Project. In the case where DGS operates the facility and signs the GESA Contract, references of the Funding Agency or to DGS and the Funding Agency as though they are two separate entities shall mean only "DGS".

1.17 **GESA Contractor's Professional ("Professional")**: the entity(s) by the Contractor to provide necessary professional design services under the GESA contract.

1.18 **Milestone activity**: An indication on the Project Schedule that designates the start or completion of a significant construction activity

1.19 **Notice of Deficiency**: A document to record non-conforming work, deficient work and/or schedule slippage.

1.20 **Off-Site Work**: All Work that is not physically carried out within the Contract Limits.

1.21 **On-Site Work**: All Work that is physically carried out within the Contract Limits.

1.22 **Postconsumer Recovered Paper**: Any paper, paperboard and fibrous wastes from retail stores, office buildings, homes and so forth, after they have been passed through their end-usage as a consumer item including: used corrugated boxes, old newspapers, old magazines, mixed waste paper, tabulating cards and used cordage, as well as all paper, paperboard and fibrous wastes that enter and are collected from municipal solid waste.

1.23 **Project**: The total Work to be performed by the Contractor.

1.24 **Project Procedures Manual**: The Project Procedures Manual for GESA Projects ('the Design Manual' or 'PPM') that provides the Energy Consultant and the Contractor's Professional with a guideline of procedures and standards for the design and construction of GESA projects. The Manual's organization reflects the sequence in which services and submissions will normally occur.

1.25 **Project Schedule**: The Critical Path Method (CPM) schedule prepared by the Contractor.

1.26 **Recovered Materials**: Waste material and byproducts which have been recovered or diverted from solid waste, but such term does not include those materials and byproducts generated from, and commonly reused within, an original manufacturing process.

1.27 **Request for Information (RFI)**: A written question issued by the Contractor seeking clarification of the Contract Documents.

1.28 **Samples**: Physical examples furnished by the Contractor to illustrate materials, equipment or workmanship, and to establish standards by which the work will be judged.

1.29 **Secretary**: DGS' administrative head.

1.30 **Superintendent**: The Contractor's full time construction representative at the project site. The Superintendent is responsible for continuous field supervision, coordination and completion of the construction work, and, unless another person is designated in writing by the Contractor to DGS, for the prevention of accidents. The Superintendent shall have full

authority to act on behalf of the Contractor in relation to construction activities and associated work.

1.31 **Supplier**: An individual, firm, partnership, association, corporation or other legal entity who receives compensation from the Contractor, pursuant to the terms of a purchase order or invoice, to provide any material and/or any equipment to the Project. Nothing contained in the Contract Documents between the Contractor and DGS creates any contractual relationship between DGS and any Supplier. A Supplier lacks privity of Contract to DGS and every Supplier agrees that it neither acquires nor intends to acquire any rights against DGS on a third-party beneficiary theory or any other theory.

A **Stocking Supplier**: a firm that owns, operates, or maintains a store, warehouse, or other establishment, in which the materials, supplies, articles or equipment of the general character described by the specifications and required under the contract are bought, kept in stock, and regularly sold or leased to the public in the usual course of business.

B **Non-stocking Supplier**: non-stocking supplier does not carry inventory but orders materials from a manufacturer, manufacturer's representative or a stocking supplier. In order for a non-stocking supplier to receive credit, it must perform a useful business function by engaging in meaningful work (i.e., negotiating price; and determining quality and quantity; and ordering materials; and paying for the materials).

ARTICLE 2: EXECUTION, CORRELATION, INTENT AND INTERPRETATIONS

The following is in addition to any ITQ language on the matter. Where there are discrepancies between the ITQ and these General Conditions, these General Conditions take precedence.

2.1 **Contract Execution**. The Funding Agency and Contractor shall sign the GESA Contract in triplicate. All drawings created during the design portion of the Project shall be sealed as appropriate by the Contractor. No oral contract or conversation with any officer, agent or personnel of DGS or Funding Agency either before or after the execution of the Contractor Contract shall affect or modify any of the terms or obligations herein contained.

2.2 **Contract Interpretation**.

A The Contract Documents are complementary, and what is required by any one of the Contract Documents is binding as if required by all. The intention of the Contract Documents is to include all labor, materials, equipment and other items or conditions necessary for the proper design, construction and testing of the Work for its intended use. The omission of words or phrases for brevity of the Contract Documents, the inadvertent omission of words or phrases or obvious typographical or written errors shall not nullify DGS' interpretations so long as that interpretation is reasonably inferable from the Contract Documents as a whole. Except as noted otherwise, references to standard specifications or publications or associations, bureaus, or organizations shall mean that latest edition or revision of the referenced standard specification or publication as of the issuance date of the RFQ. Words which have well-known technical or trade meanings are used in this contract in accordance with such recognized meanings.

B In the event of a conflict in the Contract Documents, the Contractor shall notify the Energy Consultant and DGS. The Energy Consultant or DGS (as appropriate) shall interpret the Contract Documents using the following priorities:

1. Change Orders shall govern over all Contract Documents (with subsequent Change Orders governing over prior Change Orders).
2. The GESA Contract for the Project and any attachment thereto including the General Conditions, Administrative Procedures, and RFQ for the Project;
3. Bulletins or addenda and subsequent addenda shall govern over prior addenda only to the extent modified.
4. The RFQ shall govern over Design Documents.

2.3 **Contract Errors or Conflicts**. If the Contractor, in the course of design and construction, finds any conflict, error or discrepancy on or among the Contract Documents, such conflict, error or discrepancy shall be immediately referred to the Contractor's Professional in writing, with a copy of each such referral to be forwarded to DGS. If the matter concerns the Design Documents only, Energy Consultant must review the matter and issue an interpretation to DGS in writing within seven (7) days after receipt of the Contractor's written request, with a copy of each such interpretation to be forwarded to DGS for acceptance. If the matter concerns the RFQ documents, DGS shall review the matter and issue an interpretation to the Contractor in writing within seven (7) days after receipt of the Contractor's written request, with a copy to the Professional.

2.4 **Copies of Drawings and Specifications**. Unless otherwise provided in the Contract Documents, the Contractor will furnish two (2) complete paper sets and two (2) complete sets in DGS accepted electronic format and media of drawings and specifications to DGS at the time they are issued for construction of the project. These two sets of drawings and specifications shall be in addition to any drawings and specifications submitted in response

to the RFQ or required as preliminary design documents. If DGS requires additional sets for DGS' use during the project, DGS shall pay for the cost of obtaining additional specifications and drawings. All drawings, specifications and copies thereof furnished by the Contractor and/or the Contractor's Professional are and shall remain the property of DGS. They are not to be used on any other project, and, with the exception of one Contract set for each party to the Contract, are to be returned to DGS on request at the completion of the Work.

ARTICLE 3: PROJECT DESIGN, CONTRACTOR, AND CONTRACTOR'S PROFESSIONAL

The following is in addition to any ITQ language on the matter. Where there are discrepancies between the ITQ and these General Conditions, these General Conditions take precedence.

3.1 **Relationship between DGS, Funding Agency, Energy Consultant, Contractor and Contractor's Professional.** The Contractor shall be the professional of record for the Project. Where the Contractor designs in-house and does not retain a Professional, the Contractor shall be considered the "Design Professional" as it relates to these documents. The Contractor's Professional will coordinate with the Energy Consultant on the scope and design of Energy Conservation Measures for the project. The Contractor's Professional shall be in-house or under contract to the Contractor. The Contractor's Professional is responsible to the Contractor and only the Contractor may give instructions which bind the Contractor's Professional. Neither DGS nor the Funding Agency assume any privity or liability for the performance of the Contractor and or the Contractor's Professional. The Contractor shall construct the Project for Funding Agency in accordance with the Contract Documents. Neither the Energy Consultant, the Contractor or the Contractor's Professional may change scope or direct that items be included in the design that will increase the Contract Amount without the prior written approval of DGS and the Funding Agency.

A **Project Design**. The Contractor and/or the Contractor's Professional shall provide all Architectural and Engineering services during the Project, including but not limited to structural, mechanical and electrical engineering services, required to complete the GESA Project.

1. If the DGS or Funding Agency do not approve the plans, or any portion thereof, the Contractor and/or Contractor's Professional shall promptly revise the document(s) to comply with their requirements, unless the requirements violate federal, state and/or local laws governing the project, and/or the standard of professional care used in the industry governing the project.

2. The Contractor and/or the Contractor's Professional shall prepare and submit for review and approval all documents, applications, and other submittals as the same may be required by DGS and any other governmental agency, Local, State or Federal, having jurisdiction over the projects (s).

3. The Contractor and/or the Contractor's Professional shall compile and bind the Project Manual for the Project, which shall include technical specifications and drawings for the project and such other material necessary to provide a complete manual for construction purposes.

4. At DGS's request, the Contractor and/or the Contractor's Professional shall prepare drawings, specifications and other documentation and supporting data in connection with Change Orders for the Funding Agency's approval and execution in accordance with the General Conditions. All drawings, specifications and other documents prepared by the Contractor and/or the Contractor's Professional shall comply with all applicable laws, statutes, ordinances, codes, orders, rules and regulations in effect at the time said drawings, specifications and other documents are submitted to DGS.

5. Any errors or omissions on drawings, specifications or other documents furnished by the Contractor shall be promptly corrected by the Contractor at no cost to the DGS, Funding Agency, or the Energy Consultant. Nothing contained herein shall preclude a claim against the Contractor by DGS for damages arising from errors or omissions on drawings, specifications or any other of the Contract Documents furnished by the

Contractor. Change orders resulting from the Contractor's errors or omissions shall not be subject to any additional Contractor's fees. DGS's or the Funding Agency's approval, acceptance, use of or payment for all or any part of the Contractor's services or of the project shall not in any way alter the Contractor's obligations or DGS's or the Funding Agency rights hereunder.

B **Additional Services**. The following services shall be compensated to the Contractor as additional services if so approved by DGS or Funding Agency:

1. Making revisions in Drawings, Specifications or other documents when such revisions are required by the enactment or revision of codes, laws or regulations effective subsequent to the completion by the Contractor of the construction documents.

2. If the Funding Agency requests a Change Order, including, but not limited to, size, quality, and complexity, the Contractor shall receive a pre-negotiated fee on the change order. However, the Contractor shall not be entitled to additional fees for services related to the modification of documents as required for approval.

3. DGS or the Funding Agency shall not be responsible for paying for Contractor to provide consultation concerning replacement of Work damaged by fire or other cause during construction, and furnishing services required in connection with the replacement of such Work as long as this damage was not the fault of the Contractor.

3.2 **Administration of Contract**. The GESA Professional will assist Energy Consultant in providing administration of the Construction Contracts. Energy Consultant will review all DGS forms that require a Professional's review and signature under the Contract. Energy Consultant will also review submittals as provided in the Submittal Article of these General Conditions.

3.3 **Site Visits**. The GESA Professional should visit the site at least bi-weekly, or more often as required by the construction activities and progress during periods of active construction. The Energy Consultant is not responsible for the construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work.

3.4 **Access to Work**. The GESA Professional and the Energy Consultant shall have full access to the Work at all times.

3.5 **Interpretation of Documents**. Energy Consultant or DGS and/or the Funding Agency (as appropriate) shall be the interpreter of the Design Documents themselves. Interpretation shall comply with Article 2 of these General Conditions.

3.6 **Cooperation with Local Bodies**. During the design of the Project, the Contractor's Professional shall keep the local government informed about the Project and comply with any applicable requirements of local zoning, planning and supervisory bodies. If any of these requirements vary with the RFQ and substantially increase the cost of the Project, or should any required approvals be withheld by the local bodies, the Contractor's Professional shall immediately notify both the Energy Consultant and DGS in writing of the issue.

3.7 **Coordination with Existing Facilities and Utilities**. The Contractor's Professional and Energy Consultant shall consult with the DGS and Funding Agency to obtain all necessary data for coordinating the Project with existing structures and all support utilities. The Contractor's Professional shall consult with Funding Agency regarding any correlation of design with future planning. Energy Consultant and the Contractor's Professional shall verify the information provided in the RFQ regarding the various public services and utility companies, such as gas, electric, water, steam, waste water treatment/disposal, surface water disposal, telephone and communication, the commitment of their capability to service this Project, and shall submit same to DGS as part of its design submissions. The Contractor's Professional shall bring to DGS' immediate attention any reservations to this commitment by the utility companies, such as in-house engineering and construction costs

and any inconsistencies regarding the locations and characteristics of such utilities between the actual field conditions and those indicated.

3.8 **Standards of Quality**. Refer to the Standards of Quality and Substitution of Materials in Article 8.

3.9 **Rejection of Work**. Energy Consultant is authorized to recommend rejection of Work that does not conform to the Contract Documents and shall immediately notify DGS, the Funding Agency and the Contractor of such rejection. If Energy Consultant discovers Work that is non-conforming or discovers an unforeseen condition, the Energy Consultant must make all necessary and appropriate recommendations, in writing, to DGS and the Funding Agency as soon as possible, but no later than twenty-four (24) hours after such discovery, with regards to directing any or all Contractors to stop any portion of the Work, or requiring special inspection or testing of the Work as provided in Testing and/or Special Testing paragraph of these General Conditions. Neither Energy Consultant authority to make recommendations under this paragraph, nor any decision made by Energy Consultant in good faith to either exercise or not to exercise such authority shall give rise to any duty or responsibility of the Energy Consultant to the Contractor, or any Subcontractor, any of their agents or employees, or any other person performing any of the Work.

3.10 **Non-Conforming Work**. If corrective work or drawings are required due to defective or non-conforming work by the Contractor, the cost for Energy Consultant's additional services shall be borne by the Contractor.

3.11 **As-Built Record Documents Submission**. No later than at Final Inspection of the Project, the Contractor shall submit As-Built Record Documents showing all changes or variations from the original contract drawings and specifications made during the course of construction. These drawings shall indicate all items uncovered during the Work and show details of the work as actually built, including but not limited to horizontal and vertical dimensional references of all concealed pipe, conduit and other lines and equipment and similar items. Recorded changes shall be obtained from clearly marked field prints provided by the construction contractors and field office and from change orders. These As-Built Record Drawings shall be in pdf and AutoCAD format on CD/Flash drive (three copies) and shall be identified as “DGS As-Built Record Documents", shall be delivered to Project Coordinator, and shall become the sole property of DGS.

3.12 **Operations and Maintenance Data**. Prior to Final Inspection of the Project, the Contractor shall assemble, as provided in the Construction Documents, a final draft of the Operation and Maintenance Instructions Manuals prepared by the Contractor and its various subcontractors. Energy Consultant shall review the draft for completeness including all pertinent shop drawings, diagrams, catalog data, manufacturers operating instructions, manufacturer's or supplier's maintenance instructions, certificates, warranties, guarantees and other pertinent operating and maintenance data. Energy Consultant shall indicate its approval of the draft with correction if necessary or request a revised draft and resubmission of the manual. Upon receipt of the two (2) final bound manuals from the Contractor, Energy Consultant shall review them for accuracy and content, and when they meet with its approval, forward to DGS the two (2) copies and two (2) identical, additional copies in electronic format(s) and on media acceptable to DGS prior to Final Inspection.

3.13 **Replacement of Contractor’s Professional**. If the Contractor terminates its Professional, the Contractor may hire a new Professional whose status under the Contract Documents shall be that of the former Contractor’s Professional. The decision of whether to terminate the Professional rests solely with the Contractor. DGS expressly reserves the right to evaluate and either accept or reject the Contractor’s replacement Professional. The Contractor’s decision as to replacement of the Contractor’s Professional shall not give rise to any claim for additional costs or time to complete the GESA Contract.

ARTICLE 4: THE DEPARTMENT (DGS)

The following is in addition to any ITQ language on the matter. Where there are discrepancies between the ITQ and these General Conditions, these General Conditions take precedence.

4.1 **ADMINISTRATIVE PROCEDURES**. The RFQ contains a copy of the GESA Administrative Procedures, which are incorporated herein by reference and made a part hereof, as if fully set forth herein. In the event there is any redundancy, conflict, contradiction, discrepancy or inconsistency between any portions of or criteria set forth in the Administrative Procedures and the other Contract Documents, the most restrictive or demanding of the criteria shall take precedence over any less restrictive or demanding criteria as determined by DGS and/or its designee.

4.2 **COMMONWEALTH NOT RESPONSIBLE FOR GESA CONTRACTOR ACTS OR OMISSIONS**. Neither DGS nor Funding Agency are responsible for the acts or omissions of the Contractor, or any of its subcontractors or any of their agents or employees, or any other persons performing any of the Work for the Contractor.

4.3 **DGS' ACCESS TO THE WORK**. DGS and its designee will, at all times, be provided full access to any area DGS deems necessary in order to observe the Work. The Contractor shall provide the facilities for such access so DGS may perform its functions under the Contract Documents.

4.4 **REJECTION OF WORK.** DGS may reject Work that is not in conformance with the Design Documents or direct the Contractor to stop any portion of the Work, or to require special inspection or testing of the Work whenever such action is necessary or advisable to insure the proper implementation of the Contract Documents. DGS' failure to reject Work does not relieve the Contractor from performing Work in accordance with the Contract Documents.

ARTICLE 4A: THE ENERGY CONSULTANT

The following is in addition to any ITQ language on the matter. Where there are discrepancies between the ITQ and these General Conditions, these General Conditions take precedence.

4A.1 INFORMATION AND SERVICES REQUIRED OF THE ENERGY CONSULTANT

A If the DGS retains an energy consultant on the project, the energy consultant shall carry out the duties specified in the contract between DGS and the energy consultant, acting as an agent and authorized representative/designee of the DGS and funding agency.

1. The Energy Consultant will determine in general if the Work is being performed in accordance with the requirements of the Contract Documents, will keep the DGS and the Funding Agency informed of the progress of the Work, and will endeavor to guard the Funding Agency against defects and deficiencies in the Work.
2. The Energy Consultant will not have control over or charge of and will not be responsible for construction means, methods, techniques or procedures in connection with the Work, since these are solely the Contractor's responsibility.
3. The Energy Consultant will review, certify and recommend release of payment for all acceptable Applications for Payment from the Contractor, including final payment.
4. The Energy Consultant will review and advise the Funding Agency and the DGS on Change Orders.

B At a point in time no later than two weeks from notice to the Consultant of being the selected firm of the RFQ. The Energy Consultant shall provide the Contractor with a list of its principal staff assignments, including the Site Representative and other personnel to be in attendance at the site, identify individuals, their duties and responsibilities and list their addresses and telephone numbers.

C For purposes of this GESA Contract, the Contractor shall consider and assume that any requisite approval shall be deemed to have been given by DGS for any such authority exercised by the Energy Consultant.

D Except as expressly stated in the GESA Contract, the Energy Consultant shall have no authority and no liability to relieve the Contractor of any of its obligations under the Contract.

E It is not the intention of these General Conditions to inhibit communications between the Energy Consultant and the Contractor as it relates to clarification, interpretation and other issues related to progressing of the Work. The Energy Consultant is available to discuss issues, provided such discussions or communications are coordinated with the Energy Consultant.

F If, in the opinion of the Energy Consultant, an emergency occurs affecting the Work or adjoining property, the Energy Consultant may, without relieving the Contractor of any of its duties and responsibilities under the Contract, instruct the Contractor to execute all such Work or to do all such things as may, in the opinion of the Energy Consultant, be necessary to abate or reduce the risk. The Contractor shall immediately comply, despite the absence of approval of DGS or the Funding Agency with any such instruction of the Energy Consultant.

G The Energy Consultant's Site Representative will be responsible for the Construction Management of this Project, and shall carry out all required duties and exercise such authority as may be required under the terms of this Contract, including but not limited to reviewing Change Orders, Applications for Payment and Extensions of Time.

H The Energy Consultant's Site Representative will execute the duties and authorities vested in the Energy Consultant. The Energy Consultant's Site Representative has been fully vested with a level of authority that is adequate to execute the requirements of the Construction Management for this Project. The Contractor is expected to and allowed to rely upon the directions that may be provided from the Energy Consultant's Site Representative.

I Any communication given by the Energy Consultant's Site Representative to the Contractor in accordance with such delegation shall have the same effect as though given by the Energy Consultant or DGS.

J The Energy Consultant may appoint any number of persons from its staff to assist in the carrying out of the Energy Consultant's duties. Such assistants shall have no authority to issue any instructions to the Contractor unless such instruction may be necessary to enable the Contractor to carry out their duties and to secure their acceptance of materials, equipment or workmanship as being in accordance with the Contract, and any instructions given by any of them for those purposes shall be deemed to have been given by the Energy Consultant.

K Instructions given by the Energy Consultant shall be in writing, but if, for any reason, the Energy Consultant considers it necessary to give any such instruction orally, the Contractor shall comply with such instruction. Written confirmation of such oral instruction given by the Energy Consultant shall be deemed to be an instruction within the meaning of this subparagraph. If the Contractor, within seven (7) days of the oral instruction, confirms in writing to the Energy Consultant the oral instruction and such confirmation is not contradicted in writing within seven (7) days by the Energy Consultant, it shall be deemed to be an instruction of the Energy Consultant. The provisions of this subparagraph shall equally apply to instructions given by the Energy Consultant's assistants.

L In all cases of misunderstanding and disputes, verbal instructions that were not subsequently reduced to writing as discussed above in the preceding subparagraph will not be considered binding upon DGS or the Funding Agency. The Contractor must produce written evidence in support of its contentions and shall advance no claim in the absence of such written evidence, or use, or attempt to use any conversation with any parties against the Energy Consultant, the Funding Agency or DGS, or in prosecuting any claim against the Energy Consultant, the Funding Agency or DGS.

M Wherever, under the Contract, the Energy Consultant is required to exercise its discretion by:

1. Giving decision, opinion or consent; or
2. Expressing satisfaction or dissatisfaction; or
3. Determining value; or
4. Otherwise taking action which may affect the rights and obligations of DGS or the Contractor,

the Energy Consultant shall exercise such discretion impartially within the terms and conditions of the Contract and having regard to all the circumstances. To the extent the Contractor disagrees with the Energy Consultant's determination on an issue, any such decision, opinion, consent, expression of satisfaction, or dissatisfaction, determination of value or action may be subject to the Disputes Article of these General Conditions of the Contract.

N The Energy Consultant's failure to insist on strict compliance with any term, condition or provision of this Contract or instruction under it, or to exercise any right, remedy, privilege or power provided under this Contract, or the Energy Consultant's waiver of any breach, shall not relieve the Contractor of responsibility for compliance with the Contract

requirements and shall neither waive nor prevent the Energy Consultant, the Funding Agency or DGS from subsequently requiring strict compliance with that term, condition, provision, instruction, right, remedy, privilege or power.

4A.2 Energy Consultant's Access to the Work. The Energy Consultant or the authorized representative of the Energy Consultant, will at all times be provided full access to any area it deems necessary in order to perform its responsibilities to assist coordination and inspect the Work. The Contractor shall provide the facilities for such access so the Energy Consultant may perform its functions under the Contract Documents.

4A.3 Replacement of Energy CONSULTANT. In case of the termination of the Agreement for Energy Consultant Services, DGS may appoint a new Energy Consultant whose status under the Contract Documents shall be that of the former Energy Consultant. The decision of whether or not to replace and/or appoint a new Energy Consultant or to assume construction management responsibilities is solely within DGS's discretion.

4A.4 Energy Consultant Is Not Responsible for Contractor Acts or Omissions. The Energy Consultant is not responsible for the acts or omissions of the Contractor, or any of its subcontractors, or any of their agents or employees, or any other persons performing any of the Work for the Contractor.

4A.5 Contractor Not an Intended Third Party Beneficiary of the Energy CONSULTANT'S AGREEMENT. The Contractor is not an intended third party beneficiary of the Agreement for Energy Consultant Services between DGS and the Energy Consultant. Nothing in the Contract Documents should be construed to authorize any person not a party to the Agreement for Energy Consultant Services to maintain any lawsuit involving that contract, unless otherwise provided by law.

4A.6 Communications to DGS. At least bi-weekly, The Energy Consultant will provide the Energy and Resource Management Office with a GESA Project report detailing: any changes or expected changes to the schedule, all additional expenditures or use of the contingency funds, additional testing, any changes in material, any/all disputes relating to the project and any condition that would affect the original scope or work.

ARTICLE 5: THE GESA CONTRACTOR

The following is in addition to any ITQ language on the matter. Where there are discrepancies between the ITQ and these General Conditions, these General Conditions take precedence.

5.1 Review of Contract Documents and Site Conditions.

A Quote Preparation Stage Investigation and Document Review. During the Quote preparation stage, the Contractor has an affirmative duty to examine the nature and location of the Work, the soil and rock conditions if applicable and the character, quality and quantity of the materials that are required for the Work. The Contractor may rely upon the geotechnical information, if any, available for review on the Project. The Contractor also has a duty to carefully study and compare the existing documents to the physical conditions of the site. If the Contractor does not request a clarification during the Quote preparation stage regarding the site conditions or discrepancies within the Contract Documents, the Contractor may not submit a claim after award of the contract alleging insufficient data, ambiguity in the documents or incorrectly assumed conditions.

B Post-Award Investigation and Document Review. If, after award, the Contractor finds any material change in the condition of the site since the submission date of the Quote, the Contractor must immediately inform DGS in writing of the change site condition. DGS will, within 7 days from receipt of such notice, address the alleged material change in the site conditions and notify the Contractor in writing of such review.

5.2 Supervision and Construction Procedures. The Contractor is solely responsible for all construction means, methods, techniques, procedures, and safety programs in connection with the work under the Contract. Furthermore, the Contractor shall perform the Work in accordance with applicable industry standards for performance, service life, deterioration and wear; in a good and workmanlike manner, and in accordance with manufacturer's recommendations and requirements; in compliance with regulatory approvals and applicable laws, regulations, and ordinances; and in accordance with the Contract Documents.

5.3 Coordination of the Work. The Contractor is solely responsible for the coordination of the Work, ensuring the proper function and sequence to avoid delays. The progress of the Work shall not be delayed by any disputes between the Contractor and any subcontractors and/or suppliers.

5.4 Coordination of Subcontractors. The Contractor shall be responsible for all acts of its subcontractors utilized under the GESA Contract and for their compliance with all terms and provisions of the GESA Contract applicable to their performance. The Contractor shall continuously coordinate the Work of all subcontractors to assure proper processing and progress of the Work. The Contractor's subcontractors shall not be removed from the Project without DGS' review and acceptance. Subcontractors are also subject to review by DGS as set forth in the Administrative Procedures. The Contractor will not receive an extension of time or additional compensation for the removal of any unacceptable subcontractors. The failure of any subcontractor to complete its portion of the Work in a satisfactory manner within the proper time will not relieve the Contractor of responsibility for the proper and satisfactory execution and completion of the entire Work.

5.5 Use of Site. The Contractor shall confine its apparatus, the storage of equipment, tools and materials and its operations and workers at the site to the limits of contract as permitted by Funding Agency, the law, ordinances, permits and the Contract Documents. The Contractor shall not unreasonably encumber the site with any materials or equipment.

5.6 Job Conferences. Job Conferences may be held as often as required, but shall be held at least bi-weekly and must be attended by the Contractor. The names of the authorized

representative of the Contractor shall be submitted to DGS and the Funding Agency at the first Job Conference. The Funding Agency will also attend the Job Conferences. The Funding Agency will advise the Contractor of the dates and times of the Job Conferences and will be placed in the conference meeting notes. Failure to attend a Job Conference or any other mandatory meeting (unless excused by DGS) constitutes a breach of the Contractor contract.

5.7 Drawings and Specifications at the Site.

A The Contractor shall maintain in good order at the site one record copy of all drawings, specifications, bulletins, addenda, contract modifications, change orders and requests for information. As appropriate, the above will be updated regularly to record accurately as-built conditions, selections and changes. The Contractor shall include the value of the as-built drawings as a cost item and activity in the Contract Breakdown. The value included in the Project Schedule for this item is subject to the acceptance of DGS.

B The Contractor shall also maintain at the site one record copy of approved shop drawings, catalog data, operating and maintenance instructions, certificates, warranties, samples and similar submittals. These shall be available to DGS, Funding Agency and Energy Consultant at all times, and they shall be delivered to Funding Agency as part of the Operation and Maintenance Instruction Manuals.

5.8 Provision of Labor and Materials. Unless otherwise specifically noted, the Contractor shall provide and pay for all labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and all other facilities and services necessary for the proper execution and completion of the Work.

5.9 Responsibility for those Performing Work. The Contractor is responsible for the acts and/or omissions of all of its employees and all subcontractors, their agents and employees, and all other persons performing any of the Work under a subcontract or purchase order with the Contractor.

5.10 Equipment and Materials. The Contractor shall furnish and deliver the necessary equipment and materials in ample quantities and as frequently as required the proper prosecution of the work in an acceptable manner and at a satisfactory rate of progress as depicted in the Contractor's Schedule. The equipment used on any portion of the work shall be such as not to endanger the lives of the operators or any persons in the vicinity of the equipment nor cause damage to adjacent property or highways. Any damages resulting from the operations of such equipment to any person or property is the responsibility of the Contractor.

5.11 Supervision. The Contractor shall provide on-site supervision by an employee who shall act as the duly authorized and competent Superintendent. This Superintendent shall be on-site during the progress of the Work, including any time when any Work is being performed by any Contractor or any subcontractor that will impact the Work of the Contractor. The Superintendent shall represent the Contractor, and all communications given to the Superintendent shall be binding as if given to the Contractor.

5.12 Good Order Among Employees. The Contractor shall at all times enforce good order and conduct among its employees and subcontractors. Every employee and subcontractor shall be skilled in the performance of work assigned to that employee or subcontractor. All Contractor personnel shall be respectful of all Commonwealth employees and the general public. Any incidents of disrespect, verbal abuse, threatening statements, unwelcome comments, unwelcome interaction or any form of harassment from any Contractor personnel toward any Commonwealth employee, or the general public is strictly prohibited. Any violation is sufficient cause for DGS to direct the Contractor to remove such person from employment on the site.

5.13 Permits and Fees. Due to the UCC, all state-owned facilities fall under the jurisdiction for plan review and inspection only by the Commonwealth Department of Labor & Industry.

Consequently, the Contractor shall not obtain any building permits from local authorities. The Contractor shall, however, continue to obtain and pay for all other necessary permits, licenses, and certificates required by law for the proper execution and completion of its work. The Contractor shall furnish proof of payment for all such items, or proof that no such items are required. No change order will be issued for these costs since they are to be included in the lump sum cost submission portion of the RFQ.

A Sewer and Water Tap-In Fees shall be obtained and added to contract cost without mark-up. Tap Fees shall be included in the Contractor's Quote price.

5.14 PCCA/UCC Inspections and Compliance with Applicable Laws, Ordinances, Regulations, etc.

A The Contractor shall give all notices and comply with all applicable laws, ordinances, regulations, rules and orders of any public authority bearing on the performance of the Work. If the Contractor observes any of the Contract Documents conflicting with applicable laws, ordinances, regulations, rules and orders of any public authority in any respect, it shall promptly notify the Professional of Record, Energy Consultant and DGS in writing. Any necessary modifications will be made by Professional of Record at no cost to DGS unless applicable laws, ordinances, regulations, rules and/or orders are changed after the receipt of the Contractor's Cost Submittal, If the Contractor performs any work knowing it to be contrary to such applicable laws, ordinances, regulations, rules or orders, and without such written notice to the Professional, Energy Consultant and DGS, the Contractor assumes full responsibility therefore and shall bear all costs attributable thereto.

B This Project shall be subject to the Pennsylvania Construction Code Act (PCCA) and the Uniform Construction Code Statute. The Contractor shall become familiar, and is responsible for complying, with all aspects of the PCCA and the UCC, including but not limited to the site inspection procedure set forth in the Department of Labor & Industry's Inspection Procedures. For purposes of inspection, the Contractor shall be deemed the "owner" as described in the PCCA/UCC. The most recent list of inspections required by L&I can be found on L&I's website.

C Contractor must include the PCCA/UCC inspections (to the extent they are applicable to their scope of Work on this Project) in the Project Schedule created pursuant to the applicable paragraph(s) in the General Conditions and Administrative Procedures.

D The L&I mandated advance notice, defined for each inspection activity, shall be considered and included as GESA time in the development of the Master Project Schedule. The Contractor shall assume the responsibility of the permit applicant/permit holder as applicable. The Contractor shall be responsible to contact L&I to schedule the required inspections in accordance with the inspection procedures outlined in the Building Permit. Failure by Contractor to do so shall not be cause for a delay claim against the DGS. A copy of the Building Permit, which includes a list of the required inspections and the time frames for notifying the Department of Labor & Industry, is available from the DGS.

5.15 Surveys, Lay-Out and Execution of the Work.

A The Contractor is responsible for laying out their work from the points established by the drawings.

B The Contractor shall utilize a competent licensed surveyor to lay out the Work from the initial points established on the drawings.

C The surveyor shall take as a basis the figures on the plans, and shall lay out all intersections, all building lines at corners and centers, test and check all elevations and levels, locate levels and plumb lines of floors, walls, beams and columns and other parts of the construction as the Work progresses.

D All Work of every description shall be laid out by the Contractor, who is solely responsible for its correctness. The Contractor shall pay for all expenses in connection with this Work.

E The Contractor shall submit one copy of its survey notes to Funding Agency for record keeping. Submission of the survey notes does not relieve the Contractor of its duty to identify discrepancies on the site or in the Contract Documents.

5.16 Existing Utilities and Services.

A The Contractor shall comply with all notification requirements established by applicable law relative to protection of underground utilities and shall also check the location of existing utilities required to remain in place, including those overhead or underground, and take all necessary precautions to prevent injury or damage during the performance of the Work.

B When performing excavation, the Contractor is responsible for costs associated with locating all existing underground utilities prior to commencing excavation, including utilities that are owned and operated by DGS or Funding Agency.

C The Contractor shall be responsible for the costs associated with utility interruption and repair due to any excavation if the utility location was not requested and/or proper location procedures were not performed and/or followed prior to commencing excavation.

D If the Contractor damages a utility, the Contractor shall immediately notify the utility company, Funding Agency and DGS and assume the cost of relocating the service of any utility disrupted due to excavation, or any Contractor action, whatever the circumstance. DGS reserves the right to immediately restore the service of any utility disrupted due to actions of the Contractor and to deduct the cost of such restoration from the Contractor's next Application for Payment.

E Utilities and/or other service which are shown or not shown but encountered shall be protected by the Contractor from any damage from any Work and operations of the Contractor, unless or until they are abandoned

5.17 Interruption of Existing Services. Whenever it becomes necessary to interrupt existing services in use by Funding Agency, such as sewer, water, gas, steam, and electric, the Contractor shall perform the Work during such hours as required by Funding Agency so as to complete the Work and restore all existing services with minimal interruption or disruption to Funding Agency. The Contractor shall continue its work on a twenty-four hour bases until the Work is completed and the services restored or at such alternate time required by Funding Agency. Before beginning the Work, the Contractor shall apply in writing and receive acceptance in writing from Funding Agency to establish a time when interruption of the service will cause minimum interference with the activities of the Funding Agency. The Contractor's request to interrupt service must be submitted to Funding Agency at least 15 calendar days prior to the date desired for interruption.

5.18 Contractor Performing Excavation or Demolition. If the Contractor performs excavation or demolition work, the Contractor shall fully comply with the requirements of Act 287-74, as amended, approved December 10, 1974, relative to protection of underground utilities which shall include, but not be limited to:

A Ascertain approximate location and type of utility lines at the site by inspecting drawings or by obtaining a list of utility companies' lines on the site from the County Recorder of Deeds and then contacting the utility company.

B Three (3) days before excavation or demolition, request information from the utility companies regarding the steps the Contractor should take to avoid damage.

C Provide each equipment operator or blaster (if applicable) with information obtained in (1) and (2) above.

D Report to the utility company any damage to utility line made or discovered in the course of the work.

E Alert occupants of premises as to any emergencies created or discovered.

F Provisions of (a) (b) and (c) do not apply in an emergency. An emergency is any condition constituting a clear and present danger to life or property by escaping gas, exposed wires or other utility line breaks or defects.

5.19 Cutting and Patching of Work. The Contractor shall do all cutting, fitting or patching of existing materials required for its Work to make its several parts fit together properly, and shall not endanger any work by cutting, excavating or otherwise altering the work, or any part of it.

5.20 Cleaning the Project.

A The Contractor shall be responsible for the cost of cleaning and removing from the site its identifiable debris, including but not limited to, bulky debris, packaging containers, unused materials and equipment and materials not suitable for disposal by standard commercial procedures, such as masonry, concrete materials, crates and combustible items. Good housekeeping shall be observed at all times, and waste, debris, and garbage shall be removed daily or placed in appropriate waste containers outside of the work place and all materials, tools and equipment shall be stored in a safe and orderly fashion.

B The Contractor shall insure that the Work shall not damage streets connecting to the Project, which shall be protected from mud, sand, and stones/gravel. Streets and adjacent property sites shall be kept free from run-off, litter and/or debris in any form from the Project site. Mud, litter, and/or debris from the Project site that appears on adjacent property shall be removed immediately.

C The Contractor is prohibited from discharging any waste products from concrete trucks or from concrete coring work or any other unsuitable materials, fluids or other products on the site or into the storm water system.

5.21 Repair of Damaged Work. The Contractor shall coordinate the repair of all new Work as well as existing Work required remaining but which becomes damaged during the course of the Work. This repair work shall include, but not be limited to, restoration of surfaces to the original condition, grading, landscaping or seeding, pavement markings and refinishing.

5.22 Chases and Openings. The Contractor will construct, or have built, into new walls, new partitions, and new floors, all such chases and openings as are required. The Contractor will be responsible to see that the chases and openings affecting its work are installed in accordance with the contract drawings.

5.23 Chases and Openings after Construction of Walls. If cutting of chases and openings is required after construction or of existing walls, partitions and floors is completed, the work shall be performed in such a manner as to result in unmarred work, even to the extent of requiring the removal and rebuilding of walls and partitions, all of which shall be at the sole cost of the Contractor.

5.24 Tests. If the Contract Documents, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction that are in effect at the time of receipt of the GESA Contractor's Cost Submittal require any work to be inspected, tested or approved, the GESA Contractor shall give Energy Consultant, DGS and the Funding Agency timely notice of its readiness and of the date arranged, so Energy Consultant and the Funding Agency may observe such inspection, testing or approval. The GESA Contractor shall bear all costs of such inspections, tests and approvals, unless otherwise provided.

5.25 Special Testing: With the GESA Contractor's assistance and upon the GESA Contractor's advice that such services are necessary, the Energy Consultant or funding Agency shall authorize the GESA Contractor to engage appropriate entities for structural, mechanical,

chemical, air and water pollution tests, tests for hazardous materials, and other laboratory and environmental tests, inspections and reports required by law or the Contract Documents. The GESA Contractor shall request of DGS such soil, foundation, hazardous material, and other tests, inspections, surveys and reports (collectively 'tests' in this subparagraph) as may, in the GESA Contractor's professional judgment, be appropriate in the circumstances. When the GESA Contractor determines such services are necessary as a result of existing site conditions, DGS shall authorize the GESA Contractor to engage the services of a geotechnical engineer or specialist. Such services may include but are not limited to test borings, test pits, determinations of soil bearing values, percolation tests, evaluations of hazardous materials, ground corrosion and resistancy tests, including necessary operations for anticipating subsoil conditions, with reports and appropriate professional recommendations. To the extent qualified to do so as an engineer, and as necessary, the GESA Contractor shall cooperate in the formulation of such tests. The GESA Contractor shall take into account the results of such tests in performing the GESA Contractor's services.

A The GESA Contractor shall bear all costs of such inspections, tests and approvals, including such assistance, labor, electricity, fuels, storage, apparatus and instruments as are normally required for examining, measuring and testing any materials or Work and shall supply samples of materials, before incorporation in the Work, for testing as may be selected and required by the Professional, Energy Consultant and the Funding Agency.

B Work requiring testing, inspection or verification of probable compliance of Work shall not proceed to be concealed, covered or closed up until approval is given by Professional, Energy Consultant and the Funding Agency. Examples of work to be reviewed before being concealed include but are not limited to sub-grades prior to backfilling, verification of rebar and formwork prior to placing concrete and installed Work in concealed spaces before the space is closed.

C The non-productive downtime or delay in an operation required to provide the reasonable opportunity for testing, inspection or verification constitutes a portion of Contract Work and is included in the GESA Contractor's Contract Sum. No claim for additional compensation will be allowed related to establishment and timely observation of testing, inspection or verification of Work.

D GESA Contractor is responsible for all Quality Control testing as specified in the Contract Documents.

E If, after the commencement of the work, Energy Consultant, DGS and/or the Funding Agency determines that any work requires special inspection, testing or approval, the Energy Consultant, DGS and the Funding Agency will, by written authorization, instruct the GESA Contractor to order such special inspection and/or testing. The GESA Contractor shall give the Energy Consultant, DGS and the Funding Agency sufficient notice, if such special inspection or testing reveals a failure of the Work to comply with the requirements of the Contract Documents or with respect to the performance of the work, with laws, ordinances, rules, regulations or orders of any public authority having jurisdiction. The GESA Contractor shall bear all costs thereof, including any the additional services by the GESA Contractor's Professional necessitated by such failure. If the Work is in compliance with the Contract Documents, however, Energy Consultant and/or the Funding Agency shall bear such costs, and will either be funded through the GESA contingency fund or directly from the Funding Agency.

5.26 Certificates of Inspection. The Contractor is responsible to secure any required certificates of inspection, testing or approval. Such required certificates of inspection, testing and approval include those required by the UCC. The certificates shall be delivered to Energy Consultant or the Funding Agency after they are secured by the Contractor.

5.27 Observation of Testing. Energy Consultant, Funding Agency and, where required by the UCC, L&I, shall observe the inspections, tests or approvals required by the Tests and

Special Testing paragraphs of these General Conditions. It shall be the Contractor's responsibility to serve sufficient notice to Energy Consultant, Funding Agency and, where required by UCC, to L&I of such inspections, tests or approvals to enable the timely inspection of the Work without impacting the Project Schedule.

5.28 Effect of Tests. Observations of tests by persons other than the Contractor shall not relieve the Contractor from its obligations to perform the Work in accordance with Contract Documents.

5.29 Environmental Quality Control. The Contractor and its Subcontractors shall perform their work in a manner that minimizes the possibility of air, water, land and noise pollution.

A The Contractor shall be responsible for all dewatering to prevent surface water and ground water from entering excavations (including foundations and drilled piers) from ponding on prepared subgrades and from flooding the Project site and surrounding areas.

B The Contractor shall be responsible to protect subgrades from softening, undermining, washout and damage by rain or water accumulation. The Contractor shall reroute surface water runoff away from excavated areas. The Contractor shall not allow water to accumulate in excavations. The Contractor shall not use excavated trenches as temporary drainage ditches.

C The Contractor shall be responsible for installing a dewatering system to keep subgrades dry and convey ground water away from excavations. The Contractor shall maintain the dewatering system until dewatering is no longer required.

5.30 Solid Waste. Storage, collection, transportation and final disposal of solid waste shall be in accordance with the Solid Waste Management Act regulations and standards of the Department of Environmental Protection (DEP). Immediately upon the effective date of the contract, the Contractor shall obtain, at its cost, the necessary permit(s) from DEP and conduct waste disposal to sites approved under this permit. A copy of this permit must be submitted to Energy Consultant before commencing waste disposal. A record of receipt of the waste material that is signed by the waste company certified to receive the waste material acknowledging receipt and proper disposal must be provided to Energy Consultant.

5.31 Compliance with Statutes and Regulations Administered by DEP. The Contractor shall comply with all statutes and regulations of the Commonwealth of Pennsylvania concerning environmental quality control administered by DEP. These statutes include those listed in the Environmental Statement set forth in the RFQ and are not limited to, the Clean Streams Law, the Clean Water Act, Pennsylvania Sewage Facilities Act, Air Pollution Control Act, Surface Mining Conservation and Reclamation Act, Bituminous Coal Open Pit Mining Conservation Act, Dams and Encroachments Act, Water Well Driller's Act, Water Works Act and Atomic Energy Act, all as amended to date. The Contractor is responsible for any violations and shall secure all required permits. Erosion control measures are shown on drawings and specifications and/or specified in the General Requirements. The Contractor, if required, shall obtain an erosion control permit. If there are changes to such statutes, regulations and etc. after the time of receipt of the Contractor's Cost Submittal, the Contractor may request an appropriate adjustment through the Changes provision of these General Conditions.

5.32 Burning of Materials. Burning of materials from clearing and grubbing operations periodic and final clean-up, and all related construction, shall be governed by local codes and ordinances and/or the regulations of DEP. Where required, for each day that the Contractor may contemplate open burning, it shall secure written approval from DEP and failure to secure such permission for open burning shall require the Contractor to remove material from the project site and dispose of it in a manner acceptable to DEP.

5.33 Suspension from Metal Roof Decks – New and Existing. Ductwork, conduit, ceiling systems, lighting fixtures or any other miscellaneous equipment shall not be suspended

from metal roof decks. These components shall only be suspended from the structural members or a suspension system supported by the structural members.

5.34 Asphalt or Tar Kettles. Asphalt or tar kettles shall not be used inside of or on the roof of any building. Fired kettles shall not be left unattended. There shall be at least one portable fire extinguisher with a minimum 20 BC rating within thirty feet of each fired kettle and one additional portable fire extinguisher with the same rating by the Work area.

5.35 Insulation. All insulation incorporated into the Project must contain the minimum percentage of postconsumer recovered paper or recovered material as shown below for the applicable product:

Material Type	Percent by Weight
Cellulose loose – fill and spray on	75% postconsumer recovered paper
Perlite Composite Board	23% postconsumer recovered paper
Plastic rigid foam, polyisocyanurate/polyurethane	
1.1 Rigid Foam	9% recovered material
1.2 Foam-in-Place	5% recovered material
1.3 Glass Rigid Foam	6% recovered material
1.4 Phenolic Rigid Foam	5% recovered material
1.5 Rock Wool	50% recovered material

5.36 Enforcement of Insulation Requirement. The Contractor may be required to provide DGS with documentary evidence that the insulation provided for the Project was produced with the required minimum percentage of postconsumer recovered paper or recovered material.

5.37 Construction Products Recycled Content. All construction products offered by the Contractor, or included in the final product offered by the Contractor and sold to the Commonwealth must contain the minimum percentage of postconsumer and recovered material content as shown in the chart below for the applicable products.

Construction Products	Material	% of Post-Consumer Materials	% of Total Recovered Materials
Structural Fiberboard	Recovered Materials	-	80
Laminated Paperboard	Post-consumer Paper	100	-
Rock Wool Insulation	Slag	-	75
Fiberglass Insulation	Glass Cullet	-	20
Cellulose Insulation (loose-fill and spray-on)	Post-consumer Paper	75	-

Construction Products	Material	% of Post-Consumer Materials	% of Total Recovered Materials
Perlite Composite Board Insulation	Post-consumer Paper	23	-
Plastic Rigid Foam, Polyisocyanurate/ Polyurethane: Rigid Foam Insulation	Recovered Material	-	9
Foam-in-Place Insulation	Recovered Material	-	5
Glass Fiber Reinforced Insulation	Recovered Material	-	6
Phenolic Rigid Foam Insulation	Recovered Material	-	5
Floor Tiles (heavy duty/commercial use)	Rubber Plastic	90 -	- 90
Patio Blocks	Rubber or Rubber Blends Plastic or Plastic Blends	90 -	- 90
Polyester Carpet Fiber Face	Polyethylene terephthalate (PET) resin	25	-
Latex Paint: 1.6 Consolidated[1] 1.7 Reprocessed[2] White, Off-White, Pastel Colors Grey, Brown, Earthtones, and Other Dark Colors	 Recovered Material Recovered Material Recovered Material	 100 20 50	 - - -
Shower and Restroom Dividers/Partitions:	Plastic Steel[4]	20 16 67	- 9 33
Carpet Cushion:			

[1] Consolidated latex paint used for covering graffiti, where color and consistency of performance are not primary concerns.

[2] Reprocessed latex paint used for interior and exterior architectural applications such as wallboard, ceiling, and trim; gutterboards; and concrete, stucco, masonry, wood, and metal surfaces.

Construction Products	Material	% of Post-Consumer Materials	% of Total Recovered Materials
Bonded Polyurethane	Old Carpet Cushion	15	-
Jute	Burlap	40	-
Synthetic Fibers	Carpet Fabrication Scrap	-	100
Rubber	Tire Rubber	60	-
Railroad Grade Crossing Surfaces			
1.8 Concrete	Coal Fly Ash	-	15
1.9 Rubber[3]	Tire Rubber	-	85
1.10 Steel[4]	Steel	16	9
		67	33

A The Contractor shall submit certification that the landscaping product(s) which the Contractor used contains the required minimum percentage of post-consumer and recovered material content as shown in this chart. In addition, a Manufacturer's Certification must be completed and signed by the manufacturer before payment will be made to the Contractor for the delivered items. The Manufacturer's Certification must indicate, at a minimum, the manufacturer's federal id number, this project number, and the following paragraph:

B I, the undersigned officer of the manufacturer do hereby certify that I am authorized to provide this certification on behalf of the manufacturer and that THE TYPE OF CONSTRUCTION PRODUCT(S) LISTED ABOVE WHICH MY COMPANY FURNISHED TO THE CONTRACTOR ON THIS PROJECT CONTAINED NOT LESS THAN _____% POST-CONSUMER MATERIALS AND _____% RECOVERED MATERIALS AS THOSE TERMS ARE DEFINED IN THESE GENERAL CONDITIONS. I UNDERSTAND THAT THIS DOCUMENT IS SUBJECT TO THE PROVISIONS OF THE UNSWORN FALSIFICATION TO AUTHORITIES ACT, 18 P.S. §4904.

C DGS shall have no obligation to pay for item(s) until a properly completed and signed Manufacturer's Certification is submitted.

5.38 Storage Enclosure. The Contractor shall provide, at its cost, in a location directed by Funding Agency, a suitable, substantially watertight storage shed in which it shall store all materials that might be damaged by the weather. A mobile trailer is acceptable.

[3]The recommended recovered materials content for rubber railroad grade crossing surfaces are based on the weight of the raw materials, exclusive of any additives such as binders or additives

[4] The recommended recovered materials content levels for steel in this table reflect the fact that the designated items can be made from steel manufactured from either a Basic Oxygen Furnace (BOF) or an Electric Arc Furnace (EAF). Steel from the BOF process contains 25-30% total recovered materials, of which 16% is post-consumer steel. Steel from the EAF process contains a total of 100% recovered steel, of which 67% is post-consumer.

5.39 No Storage in Existing Buildings. The Contractor shall not store any materials in any existing building or beyond the contract limits as defined by the drawings without prior written authorization from Funding Agency.

5.40 Operation and Maintenance Instruction Manuals. The GESA Contractor shall carefully compile during the progress of the Work indexed Operation and Maintenance Manuals to include methods of care and cleaning of all types of visible surface materials, both interior and exterior, and descriptions of all systems and equipment and methods of operations thereof. Descriptions shall give pertinent diagrams, identifying charts, color coding, connections, lubricating instructions, and single line and detailed wiring diagrams, using manufacturers' printed information where possible. Where manufacturers' printed information is not available, the GESA Contractor shall obtain written instructions prepared by subcontractors and sub-subcontractors. The GESA Contractor shall include names, addresses and phone numbers of all subcontractors and sub-subcontractors, and of service firms of each mechanical item, for the Funding Agency's use after expiration of the guarantee period. Prior to Final Inspection, the GESA Contractor shall submit a final draft of the manual in a loose-leaf binder for approval. After approval and before final payment, the GESA Contractor shall furnish two (2) corrected, indexed, bound copies and one (1) electronic copy in DGS accepted formats and media to the Energy Consultant for issuance to the Funding Agency no later than Final Inspection.

5.41 As-Built Record Drawings. No later than at the time of Final Inspection, the Contractor shall prepare and deliver to DGS a complete set of contract prints, corrected with suitable markings to show all changes or variations from the original contract, including all items uncovered during the Work and showing the details of the Work as actually built, including but not limited to horizontal and vertical dimensional references of all concealed pipe, conduit and other lines and equipment.

5.42 Contractor Evaluation. The Contractor, by entering the Construction Contract, consents to the evaluation of its performance by DGS and Funding Agency and understands that any such evaluation may be used in future procurements to determine Contractor's responsibility. DGS and Funding Agency shall provide the Contractor with written notice of any unsatisfactory evaluations and the reasons therefore. Contractor shall be entitled to submit a reply.

ARTICLE 6: SUBCONTRACTORS

The following is in addition to any ITQ language on the matter. Where there are discrepancies between the ITQ and these General Conditions, these General Conditions take precedence.

6.1 Contractor's Interest in Subcontractor/Supplier. Pursuant to Contractor Integrity Provisions (included in the RFQ), as amended June 17, 2010, Item 8, a Contractor may not, except with the consent of the Commonwealth, have a financial interest in any other Contractor, Subcontractor, or Supplier providing services, labor, or material on this project. The Contractor will be requested to disclose the names of all Subcontractors and/or Suppliers in which the Contractor has a financial interest, and which will be utilized in the Project. If DGS has a reasonable objection to the proposed Subcontractors and/or Suppliers, the Contractor shall promptly propose another Subcontract and/or Supplier to whom DGS does not have an objection. DGS' acceptance of the Subcontractors and/or Suppliers will be deemed to be consent for the purposes of Contractor Integrity Provisions. Failure to disclose the names of such Subcontractors and/or Suppliers is sufficient grounds for termination of this Contract. Such failure may also be grounds for the initiation of civil or criminal proceedings. The Contractor shall not replace any Subcontractor and/or Supplier previously selected and/or accepted by DGS, without prior written notification to DGS and receipt of DGS's written acceptance for such substitution.

6.2 Subcontractor/Supplier Responsibility. If the Contractor enters into any subcontracts or purchase orders under this Contract with Subcontractors or Suppliers currently suspended or debarred by the Commonwealth, or who become suspended or debarred by the Commonwealth during the term of this Contract or any extensions or renewals of it, DGS may require the Contractor to terminate such Contract.

6.3 Contractor Responsibility for Actions and Compliance. The Contractor shall be responsible for all acts of its Subcontractors and Suppliers utilized under this Contract, and for their compliance with all terms and provisions of the Contract applicable to their performance. The Contractor shall continuously coordinate the Work of all Subcontractors to assure proper processing and progress of the Work.

A Subcontractors proposed by the Contractor will not be acceptable to DGS if evidence exists or arises during the Work that the Subcontractors are unable or unwilling to comply with the requirements of the Contract Documents which govern the Work of the Subcontractors involved, or if the Subcontractors have experience which is inconsistent with requirements for the Work of the Subcontractors. In the event a Subcontractor is or becomes unacceptable to DGS, the Contractor will not be entitled to a change in the Contract Sum or Contract Duration and shall propose substitute Subcontractors for unacceptable Subcontractors.

B The failure of any Subcontractor to complete its portion of the Work in a satisfactory manner within the proper time will not relieve the Contractor of responsibility for the proper and satisfactory execution and completion of the entire Work.

6.4 Acts and Omissions of Subcontractors. The Contractor acknowledges its full responsibility to DGS for the acts and omissions of its Subcontractors, and of the persons and firms either directly or indirectly employed by them, equally to the extent that the Contractor is responsible for the acts and omissions of persons and firms directly or indirectly employed by it. The Contractor acknowledges that it remains fully responsible for the proper performance of its Contract whether work is performed by the Contractor's own forces or by Subcontractors engaged by the Contractor.

6.5 Subcontractors. All Work performed for the Contractor by a Subcontractor shall be done pursuant to a written subcontract between the Contractor and the Subcontractor. The form of the written subcontract must be the same for all Subcontractors. All subcontracts

between the Contractor and each Subcontractor must be signed by both parties and contain Provisions that sets forth the amount the Subcontractor is to be paid, describes the scope of Work to be performed by the Subcontractor and require that such Work be performed in accordance with the requirements of the Contract Documents.

A Each subcontract must contain language requiring each subcontractor, prior to commencing onsite or offsite work, to comply with the provisions of the Public Works Employment Verification Act (43 P.S. §§ 167.1 – 167.11), which requires subcontractors to utilize the Federal E-Verify program to verify the employment eligibility for every new employee hired after January 1, 2013 and to submit to DGS a Commonwealth Public Works Verification Form available on DGS's web site at www.dgs.state.pa.gov

B Each subcontract must require each Subcontractor to include provisions in each of its subcontracts regarding the applicability of the Public Works Employment Verification Act (43 P.S. §§ 167.1 – 167.11), information regarding the use of the Federal E-Verify program, and reference to DGS's web site to obtain a downloadable copy of the Commonwealth Public Works Employment Verification Form required to be submitted to DGS.

C The Contractor shall submit one copy plus an electronic copy of all subcontracts for Work to be performed on the Project to DGS for the Project prior to the commencement of any Work by the Subcontractor.

D For every purchase order with a Small Diverse Business Supplier and Small Diverse Business Manufacturer, the Contractor shall submit a copy of the purchase order to DGS's Bureau of Small Business Opportunities. The purchase order for a Nonstocking Supplier must include the fee or commission paid to the Nonstocking Supplier

E The Contractor shall identify all material and/or equipment that will be supplied by a Supplier on a separate line item (per Supplier not per material and/or equipment) on the Contract Breakdown Sheet.

6.6 No Contractual Relationship between DGS or the Funding Agency and Subcontractor. Nothing contained in the Contract Documents creates any contractual relationship between DGS and any Subcontractor, Sub-Subcontractor or any of its authorized representatives. Nothing contained in the Contract Documents creates any contractual relationship between the Funding Agency and any Subcontractor, Sub-Subcontractor or any of its authorized representatives. Nothing in the Contract Documents should be construed to authorize any person not a party to the GESA Contract to maintain any lawsuit involving that contract, unless otherwise provided by law.

6.7 No Contractual Relationship between DGS or the Funding Agency and Supplier. Nothing contained in the Contract Documents creates any contractual relationship between DGS and any Supplier or its authorized representatives. Nothing contained in the Contract Documents creates any contractual relationship between the Funding Agency and any Supplier or its authorized representatives. Nothing in the Contract Documents should be construed to authorize any person not a party to the GESA Contract to maintain any lawsuit involving that contract, unless otherwise provided by law.

6.8 Payment of Subcontractors by Contractor Governed By Prompt Payment Schedule. Payments to Subcontractors are subject to the provisions of the Commonwealth Procurement Code (62 Pa. C. S. §3931 et seq.) also known as the "Prompt Payment Schedule". The general description set forth in the General Conditions does not relieve the Contractor from strict compliance with the requirements of the Prompt Payment Schedule. Nothing described in these General Conditions is intended to impose a duty greater than that imposed by the Prompt Payment Schedule.

6.9 Failure to Release Progress Payment. If the Funding Agency or the Energy Consultant does not approve the release of some or all of an approved Application for Payment for any cause which is the fault of the Contractor and not the fault of a particular Subcontractor, the

Contractor shall pay that Subcontractor, upon demand made by the Subcontractor at any time after the approved Application for Payment should otherwise have been issued, for its Work to the extent completed, less the percentage.

6.10 Percentage of Completion. The Energy Consultant may, on request, furnish to any Subcontractor, if practicable, information regarding percentages of completion stated by the Contractor in an Application for Payment of work done by such Subcontractor.

6.11 No Obligation on Part of DGS or Funding Agency to Pay Subcontractors or Suppliers. Subcontractor or Supplier issues concerning delayed and non-payment should be addressed to the Contractor and the Contractor's payment bond surety. Neither DGS nor Funding Agency shall have any obligation to pay or to ensure the payment of any moneys to any Subcontractor, or Supplier except as may otherwise be required by law. Subcontractors or Suppliers acknowledge they have no direct cause of action (unless otherwise provided by law) against the Energy Consultant, DGS or Funding Agency relating to any payment issues.

6.12 Subcontractor and Supplier Claims. The Contractor agrees to require the Subcontractor and Supplier to submit all claims for extras, extensions of time or for damages to the Contractor in the manner provided in the Contract Documents for claims against the Funding Agency. Since neither Subcontractors nor Suppliers have privity of contract with DGS or Funding Agency, they may not pursue a claim directly against the Commonwealth.

ARTICLE 7: PROJECT SCHEDULE

The following is in addition to any ITQ language on the matter. Where there are discrepancies between the ITQ and these General Conditions, these General Conditions take precedence.

7.1 Submission of the Project Schedule. The Critical Path Method (CPM) shall be used to generate the project schedule. The schedule need not be cost-loaded; costs and payment will be governed by the Cost Breakdown sheet. The Project Schedule is to be submitted to DGS within thirty (30) days of the Initial Job Conference. This schedule shall utilize Primavera Version 6 or later and incorporate all activities. The project shall be submitted in .pdf and XER formats. The Project Schedule shall include all design, permitting, procurement, construction, inspections and contract activities through thirty days past Final Inspection.

7.2 DGS Reservation of Rights. DGS reserves the right to accept the Project Schedule developed, signed and submitted by the Contractor while preserving exceptions to any defects in the means, methods, sequences, durations and/or logic which DGS believes exist in the schedule. The acceptance of the updated Project Schedule by DGS in no way relieves the Contractor from their duty to coordinate the Work and shall not make DGS or its designee a guarantor of the Project Schedule.

A The Energy Consultant, DGS Energy and Resource Management Office and the Funding Agency reserves the right to accept the Project Schedule developed, signed and submitted by the GESA Contractor while preserving exceptions to any defects in the means, methods, sequences, durations and/or logic that exist in the schedule. The acceptance of the updated Project Schedule by the Energy Consultant, DGS Energy and Resource Management Office and the Funding Agency in no way relieves the GESA Contractor from their duty to coordinate the Work and shall not make the Energy Consultant, DGS Energy and Resource Management Office and the Funding Agency a guarantor of the Project Schedule.

1. Upon request, the GESA Contractor shall provide to the Energy Consultant and the Funding Agency all the planning data used to develop the Project Schedule. This planning data shall include, but is not limited to: Job Sequences;
2. Activity Logic;
3. Man loading;
4. Crew sizes;
5. Number of shifts planned per working day;
6. Number of crews per shift; and
7. Equipment loading.

7.3 Time Is of the Essence. All time limits stated in the Contract Documents are of the essence. The Contractor shall perform the Work expeditiously with adequate forces using all calendar days to complete the Work no later than the Contract Completion Date. **No float shall be used by the Contractor without written directive from DGS' Energy and Resource Management Office**. Total float is defined as the amount of time between the early start date and the late start date, or the early finish date and the late finish date, for each and every activity in the Project Schedule. Extensions of time to interim milestone dates or the Contract Completion Date under this Contract will be granted only to the extent that equitable time adjustments to the activity or activities affected by the Contract Modification or delay exceeds the total float of the affected or subsequent paths and extends any interim milestone date or the Contract Completion Date. Such determination shall be made at the discretion of the Energy Consultant and Funding Agency.

7.4 Schedule Requirements. The minimum number of construction activities in the Project Schedule diagram shall be at a level to describe a discreet amount of work that can be accomplished within a fixed time frame.

A No activity, except for a design or procurement activity should have durations greater than 30 calendar days.

B Separate subcontractors and other outside activities that could impact progress shall be clearly identified. These activities include, but are not limited to: approval of submittal reviews, inspections/tests, utility outages, and delivery of equipment.

1. Show activities indicating furnished materials and equipment utilizing delivery dates supplied by others.

2. External contractors' or others' activities will be driven by calendars that reflect Saturdays, Sundays and all State Holidays as non-work days unless any additional costs for these being work days are borne by the Contractor.

C The Project Schedule shall consider and include all time durations associated with UCC Inspection criteria by DGS of Labor and Industry, along with all other testing and inspections required by contract. It must take into account the advance notice needed for L&I Inspectors as defined by the UCC Building Permit criteria.

D Use of float suppression techniques, such as preferential sequencing (arranging critical path through activities more susceptible to an owner caused delay), special lead/lag logic restraints, zero total or free float constraints, extended activity times, or imposing constraint dates other than as required by the contract, shall not be used.

7.5 Design Activities.

A Design activities shall include, but are not limited to: Tasks related to site planning, preliminary design, final design, Energy Consultant, DGS and Funding Agency reviews, regulatory requirements, and permitting. Activities will be driven by calendars that reflect Saturdays, Sundays and all State Holidays as non-work days unless any additional costs for these being work days are borne by the Contractor.

B Design Activities will have the same properties as Construction Activities.

C Failure to include adequate time for Energy Consultant, DGS and Funding Agency design reviews in the Project Schedule will be cause for rejection of the submission.

D List design activities as they will be completed. Design activities should be concurrent with construction activities. Design activities will be discreet in description so as to define the particular efforts associated with any one particular building, area, site or system.

7.6 Construction Activities. Construction activities shall include, but are not limited to: Tasks related to mobilization/demobilization; submittal and review activities, the installation of temporary or permanent work; testing and inspections of installed work; start-up and testing of equipment; site management and cleaning, commissioning of building and related systems; scheduling of specified manufacturer's representatives; final clean-up; training to be provided; and administrative tasks necessary to start, proceed with, accomplish or finalize the contract. Contractor activities will be driven by calendars that reflect Saturdays, Sundays and all State Holidays as non-work days unless any additional costs for these being work days are borne by the Contractor. List items of construction as they will be installed. When more than one building, level or floor is included, each building, level or floor shall be listed separately.

7.7 Procurement Activities. Tasks related to the procurement of material or equipment shall be included as separate activities in the project schedule. Examples of procurement activities include, but are not limited to Material/equipment submittal preparation, submittal and approval of material/equipment, material/equipment fabrication and delivery and delivery of O&M manuals.

7.8 Initial Job Conference. The Initial Job Conference will be held within thirty (30) calendar days from the Effective Date of Contract.

7.9 Commencement of On-Site Work. On-site work will commence within ten (10) calendar days after the Initial Job Conference.

7.10 Work During Formation of Project Schedule. Until the Project Schedule is signed by the GESA Contractor and accepted by the Energy Consultant, DGS Energy and Resource Management Office and the Funding Agency, the GESA Contractor must proceed with the Work utilizing all the information available to them, including but not limited to attendance at Job Conferences, two week look ahead activities, weekly superintendent's meetings, and any other means necessary to maintain work progress until such time as the Project Schedule is complete and accepted. As such, the GESA Contractor shall not assert any claim whatsoever for any delay or additional cost incurred with the development of the Project Schedule.

7.11 Maintaining the Project Schedule. The GESA Contractor shall ensure that such manpower, materials, facilities, and equipment is applied to the Work, and shall work such hours as approved, including night shifts, overtime operations, Sundays, and holidays, as may be necessary, to maintain its progress in accordance with the Project Schedule so that no delays are caused to the Project and to insure the progress and completion of the Work within the time allowed by the Contract. If the GESA Contractor refuses or fails to keep up with the Project Schedule or fails to proceed as directed by the Energy Consultant or Funding Agency, DGS' Energy and Resource Management Office will be notified, who will note this refusal/failure in the Contractor Responsibility Program and will consider suspension of the Contractor in accordance with Section 531 of the Commonwealth Procurement Code. DGS may also, in its sole discretion, find the GESA Contractor in breach of its Contract and/or declare the Contractor in default of its Contract in accordance with the Termination Article of these General Conditions.

7.12 Project Schedule Updating. The Project Schedule will be updated at least once per month by the GESA Contractor to reflect actual progress. At its sole discretion, the Energy Consultant/DGS may require more frequent updates if deemed necessary to facilitate the Work. If the Project is not on schedule, Energy Consultant/DGS reserves the right to request additional updates and recovery schedules, at no cost to the Energy Consultant, DGS or the Funding Agency, from the GESA Contractor.

7.13 Recovery Plan. The Energy Consultant/DGS reserves the right to require submission of a Recovery plan if: occurrence of any of the following events:

A The progress of the Work or a single activity falls behind the contract time as shown in a currently updated and approved Project Schedule by more than fifteen (15) calendar days; or

B A missed milestone; or

C When an updated Project Schedule provides a completion date past the Contract Completion Date; or

D When a late finish for any activity does not come within the time allowed by the current Project Schedule.

E When, in the sole opinion of the Energy Consultant/DGS, it appears likely that the Work will not be completed within the Contract Time.

F The GESA Contractor will prepare a Recovery Schedule indicating that all future activities, project completion and occupancy dates will be met within the Contract Duration. The Recovery Schedule shall be implemented within 3 days after written direction from Energy Consultant/DGS. In order to create and maintain the Recovery Plan, the GESA Contractor agrees to undertake, but not be limited to, some or all of the following actions at no additional cost to the Energy Consultant, DGS or the Funding

Agency: increase the manpower, the number of working hours per shift, the number of shifts per day, the number of working days per week, the quantity of equipment, or any combination of the foregoing, and reschedule such activities to bring the project back on schedule. Failure of the GESA Contractor to comply with these requirements may result in default and/or suspension and/or debarment of the GESA Contractor.

7.14 Requests for Extensions of Time. All requests for Extensions of Time shall be submitted to the Energy Consultant/DGS and Funding Agency in writing on the form provided by the Administrative Procedures. Reasons substantiating the request shall be included or the request may be denied. All such requests must be filed within ten (10) calendar days of the end of the event or issue that caused the alleged delay.

7.15 Extensions of Time and Impact on Schedule. A change order, field order or delay may not affect existing critical activities or cause non-critical activities to become critical. Change orders, field orders or delays may result in the Energy Consultant/DGS giving the Contractor part of or the entire available total float that may exist within an activity chain on the Network, thereby not causing any effect on any interim milestone date or the Contract Completion Date of this Contract. The Project Schedule shall not excuse the performance of the Contractor from activities not indicated on the Project Schedule.

7.16 Unfavorable Weather. Unfavorable weather, including but not limited to rain, snow, and cold or freezing weather, is not an excuse for stopping Work under the Contract. The Contractor shall use such methods of protection as may be necessary to continue the Work throughout the period of unfavorable weather. Any Extension of Time due to unfavorable weather conditions shall be excusable and non-compensable.

7.17 Extensions of Time Not an Admission of Liability for Delay. The approval of an Extension of Time only constitutes a release by DGS of DGS' ability to assess liquidated damages against the GESA Contractor for the number of days granted by the Extension of Time. The Energy Consultant's/DGS approval of an Extension of Time shall not be construed or interpreted by the Contractor as an admission that DGS is liable for delay damages. The GESA Contractor agrees that Energy Consultant's/DGS grant of an Extension of Time will not be used as an admission by DGS of any liability for delay in any subsequent dispute regarding delays. This Paragraph does not preclude either the Contractor's rights or DGS' rights to pursue a claim for damages under other provisions of the Contract Documents.

ARTICLE 8: SUBMITTALS & COORDINATION DRAWINGS

The following is in addition to any ITQ language on the matter. Where there are discrepancies between the ITQ and these General Conditions, these General Conditions take precedence.

8.1 Submittals. The Contractor shall submit all necessary submittals to Energy Consultant, DGS or Funding Agency for review as discussed at initial job conference. Submittals shall be in accordance with the Contract Documents and include, but not be limited to, such items as:

A Subcontractor's, manufacturer's or fabricator's shop drawings.

B Descriptive literature including, but not limited to:

1. Catalog cuts
2. Diagrams
3. Operation charts or curves
4. Test reports
5. Samples
6. Operations and maintenance manual, including parts lists
7. Certifications
8. Warranties

C The Energy Consultant's or others review of submittals does not relieve the Contractor of the responsibility for any deviation from the requirements of the Contract Documents. Failure to mention a deviation shall be construed as a non-conformance with the Contract Documents. The Contractor shall be responsible for all costs associated with bringing the Work back into conformance with the Contract Documents, including costs incurred by the Contractor, the Contractor's Professional and DGS as a result of such non-conformance.

8.2 Standards of Quality. Where trade names, catalog number and manufacturers of material or equipment are specified, they are mentioned for the purpose of establishing a standard of quality, performance, and appearance,. If the Contractor wishes to utilize material or equipment that is of the same type, but manufactured by others than those named in the specifications, the Contractor shall certify that the material or the equipment is equal in quality, performance and appearance to that mentioned in the specifications. If the Contractor refuses or fails to proceed as directed, DGS may declare the Contractor in default. The Contractor may file a claim for additional costs resulting from this decision.

8.3 Substitution of Materials. If the Contractor desires to furnish materials or equipment other than that which is specified, the Contractor shall submit to Energy Consultant, DGS and/or the Funding Agency a comprehensive description of the material or equipment proposed for substitution, including engineering, construction, dimension, performance and appearance data, along with a statement of the cost involved. Energy Consultant/DGS, with the approval of DGS and Funding Agency, shall render a written determination to the Contractor. If the substituted material or equipment is approved, the Contractor is responsible for any and all costs incurred and working to eliminate any additional time needed as a result of the substitution. If the cost of the substituted item is less than the specified item, Funding Agency is entitled to a credit for the difference between the cost of the substituted item and the item specified.

ARTICLE 9: PROTECTION OF PERSON & PROPERTY AND INSURANCE AND INDEMNIFICATION

The following is in addition to any ITQ language on the matter. Where there are discrepancies between the ITQ and these General Conditions, these General Conditions take precedence.

9.1 Safety Precautions and Programs. The Contractor is responsible for initiating, maintaining and supervising all safety precautions and programs required under its portion of the Work.

9.2 Safety of Persons and Property. The Contractor shall take all reasonable precautions for the safety of, and shall provide all reasonable protection to prevent damage, injury, or loss to:

A All employees involved in the Work and all other persons who may be affected thereby; and

B All the Work and all materials and equipment to be incorporated therein, whether in storage on or off the site, under the care, custody or control of the Contractor or any of its subcontractors or sub-subcontractors; and

C Other property within the Contract Limits or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction; and

D All areas of the Project site where unauthorized entry or presence would present a potential hazard to the health and safety of trespassers shall be adequately posted to prevent access by unauthorized personnel.

9.3 Compliance with Safety Laws. The Contractor shall comply at all times with all applicable Federal, Commonwealth, and local laws, ordinances, rules, regulations and orders of any public authority having jurisdiction for the safety of persons or property and to protect them from damage, injury or loss. The Contractor shall erect and maintain, as required by existing conditions and progress of the Work, all reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent utilities until the acceptance of all on-site physical work, change order work, and/or demobilization. All areas of the Project shall be hardhat areas. All persons within the Contract Limits are required to be protected by protective helmets in compliance with Occupational Safety & Health Administration (OSHA) requirements.

9.4 Emergency Notification. A procedure will be established by the Contractor to provide emergency communications to all individuals on the site. This procedure will not be used to handle routine calls to individuals.

9.5 Failure to Comply With Safety Requirements. Failure to comply with the Contract safety requirements will be considered as non-compliance with the Contract and may result in remedial action provided by the Contract. The Contractor shall be responsible for payment of all fines and/or claims for damages levied for deficiencies relating to conduct of Contractor's Work.

9.6 Explosives. Unless explicitly permitted in writing from Funding Agency, the use of explosives and other hazardous materials or equipment is not permitted for the execution of the Work. If explosives are permitted, the Contractor shall observe the utmost care, performing such Work with experienced personnel and in accordance with all Federal, Commonwealth, local, Departmental, and institutional regulations, so as not to endanger life

or property. Rock encountered within five (5) feet of pipelines or buildings shall be removed without blasting. All explosives shall be stored in a secure and safe manner, in strict conformity with all Federal, Commonwealth and municipal regulations and all such storage shall be clearly marked "Dangerous-Explosives" and shall be in the care of competent watchmen at all times. The Contractor shall provide insurance in accordance with the special insurance provision in these General Conditions relating to "Blasting". The Contractor shall be responsible for all damages caused by the use of explosives, hazardous materials and/or equipment, and blasting and shall notify DGS of any claims of damage associated with this Paragraph at the time of claim.

9.7 Remediation of Damages. The Contractor shall remedy all damages or loss to any property caused in whole or in part by the Contractor, any Subcontractor, any sub-subcontractor, or anyone directly or indirectly employed by any of them. If damage or loss is attributable to faulty drawings or specifications or to the acts or omissions of DGS, and the damage or loss is not attributable to any fault or negligence of the Contractor, then the Contractor shall not provide remediation.

9.8 Contractor's Liability Insurance. The Contractor, during the progress of the Work and until the acceptance of all on-site physical work, change order work, and/or demobilization, shall purchase and maintain such insurance as will protect it from claims set forth below which may arise out of or result from the Contractor's operations under the Contract, whether such operations by itself or by any Subcontractor:

A Claims under Worker's Compensation Disability Benefit and other similar employee benefit Acts; and

B Claims for damages because of bodily injury, occupational sickness or disease, or death of its employees, and claims insured by usual personal injury liability coverage; and

C Claims for damages because of bodily injury, sickness or disease, or death, of any person other than its employees, and claims insured by usual personal injury liability coverage; and

D Claims for damages because of injury to or destruction of tangible property including loss of use resulting therefrom.

9.9 Insurance Limits. The insurance required by this Article shall be written for not less than any limits of liability specified in this Article, the RFQ, or required by Law.

9.10 Certificates of Insurance. Certificates of Insurance acceptable to DGS shall be filed with DGS prior to the commencement of on-site work. These certificates shall contain a provision that coverages afforded under the policies shall not be canceled or changed until at least ninety (90) calendar days written notice has been given to DGS. Renewal certificates must be provided to DGS prior to the expiration of the prior policy as stated on the certificate. The insurance certificate shall also name the Commonwealth of Pennsylvania as an additional insured.

9.11 Comprehensive General Liability and Automobile Liability Insurances. The Contractor's comprehensive general liability insurance and automobile liability insurance shall be in the amounts set forth in the RFQ.

A For Subcontractors, the Contractor shall either:

1. Require each of its Subcontractors to procure and to maintain Subcontractors' comprehensive general liability, automobile liability, and property damage liability insurance of the type and in the same amounts as specified in this subsection for the life of its subcontract and/or until the acceptance of all of its on-site physical work, change order work, and/or demobilization;

OR

2. Insure the activity of its Subcontractors in its own policy.

B If required by a Special Condition, the Contractor's and its Subcontractors' liability insurance shall include additional riders providing for adequate protection against the indicated special hazards (e.g., blasting, flooding, underpinnings, etc.).

C The Contractor must submit to DGS within ten (10) calendar days from the Initial Job Conference, and prior to the beginning of on-site work, evidence that all subcontractors and sub-subcontractors are covered by insurance.

9.12 Property Insurance. The Contractor shall, until all physical on-site work is complete, including change order work, punch list work, demobilization or seasonal work, maintain insurance on all insurable work included in the Contract against loss or damage by fire and lightning and those perils covered by the extended coverage endorsement. Insurable work includes work both inside and outside of any building being constructed. The insurance (which must include Builder's Risk Insurance or an installation floater that covers all risks) must be in the names of DGS and the Contractor in full insurable value thereof as will fully protect the interests of DGS and the Commonwealth, the Contractor, Subcontractors, and Sub-subcontractors.

9.13 Risk to Construction Work. The risk of damage to the construction work is that of the Contractor and surety. No claims for such loss or damage will be recognized by DGS, nor will such loss or damage excuse the complete and satisfactory performance of the Contract by the Contractor.

9.14 Unacceptable Surety or Insurance Company. If the surety on the bonds or the insurance company providing the required coverage becomes unsatisfactory to DGS, the Contractor must promptly furnish such additional security or insurance coverage as may be required to protect the interest of DGS. The Contractor shall, from time to time, furnish DGS, when requested, satisfactory proof of coverage of each type of Bond and/or insurance required. Failure to comply with this provision shall result in the cessation of the Work, and shall be sufficient grounds to withhold any further payments due the Contractor and/or to declare the Contractor in default. DGS will not consider any claim for an Extension of Time, costs, or damages because of time lost due to such instance brought by the noncompliant Contractor.

9.15 Workplace Drug and Alcohol Policy.

A The Commonwealth is committed to providing a safe workplace for the workers assigned to the Project, promoting high standards of employee health and fostering productivity. Consistent with the intent and spirit of this commitment, DGS requires the Contractor to establish and enforce a drug and alcohol policy for the Project with the goal of maintaining a work environment that is free from the effects of the use of illegal drugs and alcohol. Such policies often include, but are not limited to, important features such as employee education and awareness programs, employee assistance programs and treatment options.

B DGS requires that anyone employed at the Project site will comply with the Contractor's drug and alcohol policy.

C The Contractor is responsible for insuring that all suppliers, vendors, and visitors receive a copy of their policy and consequences for failure to comply with the policy.

D In the event of an incident and/or accident occurrence involving suppliers, vendors, and/or visitors, the same agree to submit to drug and alcohol testing at the DGS' request. Refusal to submit to drug and alcohol testing, which includes failure to take the actual test and/or the tampering or adulterating of the sample, when requested, would be grounds for DGS to have the supplier, vendor or visitor permanently barred from the Project site.

ARTICLE 10: CHANGES IN THE WORK

The following is in addition to any ITQ language on the matter. Where there are discrepancies between the ITQ and these General Conditions, these General Conditions take precedence.

10.1 Changes. Funding Agency, without invalidating the Contract, may direct changes in the Work within the general scope of the GESA Contract, consisting of additions, deletions or other revisions. All such changes in the Work will be authorized by Change Order or Field Order.

A The Contractor agrees that payment under any method noted within this Article will be the exclusive compensation for such addition, deletion, or other revision to the original Contract, including any and all costs associated with acceleration, stacking and re-sequencing of forces required by the change in order to maintain the Project Schedule.

B If it is not possible to complete the Work in accordance with the Project Schedule by acceleration, stacking or re-sequencing, the Contractor may request an Extension of Time. Adequate information and proper form submission must be provided to validate this request. Funding Agency reserves the right to deny requests not accompanied by adequate information and proper form submissions.

C The language in this Article must be construed in conjunction with the detailed language of the Change Order Administrative Procedure.

10.2 Cost of Change Order. The debit or credit cost to Funding Agency resulting from a change in the Work shall be determined in accordance with the Change Order Administrative Procedure.

10.3 Disagreement as to Cost or Credit. If Funding Agency and the Contractor cannot agree as to the cost or credit to Funding Agency resulting from a change in the Work, Funding Agency shall determine the cost or credit. The Contractor must proceed with the Change Order work under this Article if directed to do so. The Contractor may submit the disputed cost to the Funding Agency when the Work is completed for a re-evaluation in accordance with the Dispute Resolution Article of these General Conditions. In the Funding Agency's sole discretion, they may monitor any or all disputed cost work on a time and material force account basis. If the Funding Agency accepts the change as a force account Change Order, the Contractor would be required to show proof of incurred cost.

10.4 Unclassified Excavation.

A Excavation, if required for this Project, will be unclassified and will include all types of earth and soil, any pebbles, boulders, and bedrock, municipal trash, rubbish and garbage, and all types of debris of the construction industry such as wood, stone, concrete, plaster, brick, mortar, steel and iron shapes, pipe, wire asphaltic materials, paper and glass. Unclassified excavation does not include unforeseen concrete foundations, walls, or slabs.

B All materials encountered which are identified as described in the previous paragraph as unclassified shall be removed to the required widths and depths to create a finished product as shown and/or noted on the drawings and as written in the specifications. No additional compensation or time shall be given to the Contractor for this unclassified excavation.

C Any unclassified items described in paragraphs b and c above that are discovered during any excavation are not concealed conditions or unknown physical conditions below the surface for purposes of the Concealed Conditions paragraph of these General Conditions.

10.5 Concealed Conditions. There are only two types of concealed conditions which might be encountered during the performance of the Work, namely:

A Concealed conditions which are unascertainable from the plans, Contract Documents, visits to the site, or reasonable investigation, and which are at variance with the conditions indicated by the Contract Documents; or

B Unknown physical conditions below the surface of the ground of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in this Contract.

C The Contractor has seven (7) days after the first observance of the concealed condition to provide written notice to the Energy Consultant/DGS and the Funding Agency. If the Funding Agency decides that either of the two concealed conditions described above has occurred during construction, then the construction Contract Sum shall be equitably adjusted by Change Order. No adjustment shall be made to the Contract Sum under this paragraph, however, for concealed conditions encountered during cutting and patching of Work.

10.6 No Claims for Additional Cost or Time. No claims for increased costs, charges, expenses, or damages of any kind, except as provided in the General Conditions, shall be made by the Contractor for any delays or hindrances from any cause whatsoever, including, but not limited to, strikes, walkouts or work stoppages during the progress of any portion of the Work. Funding Agency may, however, address such non-compensable delays by extending the time for completion of the Work, as provided in the Contract, which extensions shall constitute the exclusive remedy between the parties.

10.7 Minor Changes in the Work. The Energy Consultant/DGS may direct minor changes in the Work (such as minor relocations or field revisions) that the Funding Agency and the Contractor mutually agree do not involve an adjustment in the Contract Sum or an extension of the Contract time and which are not inconsistent with the intent of the Contract Documents. Such changes may only be enacted by written Field Order, as provided, or by other written order. Such changes are binding on the Funding Agency and the Contractor. The Contractor shall carry out such Field Orders promptly.

10.8 Directive to Commence Change Order Work. DGS may direct the Contractor to commence Change Order Work prior to a fully executed Change Order. Such direction will not be given until DGS generates the scope and confirms that funding is available to complete the Change Order Work.

ARTICLE 11: NON-CONFORMING WORK AND CORRECTIONS

The following is in addition to any ITQ language on the matter. Where there are discrepancies between the ITQ and these General Conditions, these General Conditions take precedence.

11.1 Work Covered Contrary to Request. If any Work is covered contrary to the request of the Funding Agency, DGS or Energy Consultant, the Work must, if required by the Funding Agency, DGS or Energy Consultant, be uncovered for observation and replaced, at the Contractor's expense with no Extension of Time.

11.2 Uncovering of Work. If any Work has been covered which Funding Agency, DGS or Energy Consultant has not specifically requested to observe prior to being covered, Funding Agency, DGS or Energy Consultant may request to see such Work and the Work shall be promptly uncovered by the Contractor.

A If such Work is found to be in accordance with the Contract Documents, the cost of uncovering and replacement shall be paid to Contractor by appropriate Change Order.

B If such Work is found to be not in accordance with the Contract Documents, the Contractor shall pay costs to make the Work conform and the cost of replacement.

11.3 Acceptance of Nonconforming Work. If the Funding Agency knowingly elects to accept nonconforming work, it may do so instead of requiring its removal and correction. If nonconforming work is accepted, a credit Change Order shall be issued to reflect an appropriate reduction in the Construction Contract Sum, or, if the amount is determined after final payment, it shall be paid by the Contractor and/or the Contractor's surety.

ARTICLE 12: PAYMENTS AND COMPLETION

The following is in addition to any ITQ language on the matter. Where there are discrepancies between the ITQ and these General Conditions, these General Conditions take precedence.

12.1 Contract Breakdown. The language in this Article must be construed in conjunction with the detailed language of the applicable Administrative Procedure.

12.2 Energy Consultant Payments.

A The Energy Consultant selected by DGS shall be entitled to receive funds as proposed in the Energy consultant's response to the RFQ and at a sum no greater then as listed below:

1. 4% of the of the GESA Contract value for projects equal to or greater than $18 million; or
2. 5% of the GESA Contract value for projects equal to or greater than $13 million but less than $18 million; or
3. 6% of the GESA Contract value for projects equal to or greater than $8 million but less than $13 million; or
4. 7% of the GESA Contract value for projects less than $8 million.

B Payments shall be in accordance with the following schedule:

1. 25% upon fully executed contract with ESCO;
2. 25% upon approval of all plans and specifications by both DGS and Labor & Industry, to the extent L&I has jurisdiction over the project based upon the scope of the project;
3. 40% divided into equal monthly payments based upon the duration of construction;
4. 10% upon completion of the three years of Measurement and Verification of post-construction services.

C Payments can be released to the Energy Consultant based upon two line items in the GESA Contractor's Contract Breakdown:

1. 5% of the total Contract Value upon approval of an acceptable Contract Breakdown (GSC-30), which occurs after a fully executed contract between the Commonwealth and the GESA Contractor.
2. 5% of the total Contract Value upon the Commonwealth's approval of plans and specifications.

12.3 Application for Progress Payments.

A During the progress of the Work, the Contractor shall submit to the Energy Consultant and DGS itemized Applications for Progress Payment on the form specified in the Administrative Procedures. The Energy Consultant and DGS will review the application for validity, and if the Work is acceptable, shall approve the release of funds to the Contractor.

B If, upon the determination by the Energy Consultant and DGS as to reasonableness, payments are to be released to the Contractor on account of materials or equipment which are not incorporated in the Work, but are delivered and suitably stored at the site, or at some other location agreed to in writing, such release of payment shall be conditioned upon submission by the Contractor of Bills of Sale forms to establish Funding

Agency's title to such materials or equipment as well as the compliance with the requirements in the Administrative Procedures. The Contractor shall remain responsible for all losses of materials and equipment that remain under its custody and control, regardless of the exclusions in insurance policies. Warranties do not begin until the date of Final Inspection.

C **Non-Approval of Payment**. If the Funding Agency fails to approve release of payment to the GESA Contractor within forty-five (45) days after receipt of an acceptable Application for Progress Payment, the GESA Contractor may file a claim for interest. The GESA Contractor is not entitled to stop work in any event, unless the Funding Agency exercises its right to suspend the work, as provided in the Contract Documents.

12.4 If Work Cannot Be Completed Through No Fault of Contractor. If, after Final Inspection, items of Work cannot be completed because of any of the following conditions:

A Unseasonable considerations, such as bituminous paving, landscaping, etc.; or

B Funding Agency agrees that particular items need not be completed until a subsequent date; or

C Funding Agency delays the approval of the Final Application for Payment for any unreasonable length of time;

1. Then the Funding Agency may agree to release payment to the GESA Contractor. The payment shall be deducted by one and one-half (1-1/2) times the dollar value of items on the punch list.

ARTICLE 13: PROJECT CLOSEOUT

The following is in addition to any ITQ language on the matter. Where there are discrepancies between the ITQ and these General Conditions, these General Conditions take precedence.

13.1 Project Closeout consists of a Final Inspection, through which DGS, the Funding Agency, and/or the DGS Energy Consultant (if applicable) will determine whether the Project is substantially complete.

A It shall be the GESA Contractor's responsibility to request Final Inspection for a Project. The Final Inspection should be completed within 15 days of request by the GESA Contractor. Final Inspection shall be conducted by the DGS Energy Consultant, DGS, and/or the Funding Agency. The GESA Contractor or its authorized representative must be present throughout the duration of the Final Inspection. The DGS Energy Consultant or DGS has the sole authority to determine whether parts or the whole of the Project are ready for a Final Inspection.

B DGS, the Funding Agency, and/or the DGS Energy Consultant (if applicable) have the sole authority to determine whether the Project is ready for Final Inspection and will conduct the Final Inspection. The GESA Contractor or an authorized representative must be present throughout the duration of the Final Inspection.

C The GESA Contractor shall be required to obtain required occupancy permits from L&I prior to Final Inspection

D If DGS, the Funding Agency, and/or the DGS Energy Consultant (if applicable) all concur that the Project is at substantial completion, a certificate of completion and final certificate for payment shall be issued to the GESA Contractor. In such case DGS, the Funding Agency, and/or the Consultant shall provide the GESA Contractor at the Final Inspection with a list of uncompleted items, referred to herein as a Punch List.

E The GESA Contractor shall complete all Punch List items within 30 calendar days of the Final Inspection.

F The Funding Agency will approve release of payment in full within 45 days of the submission of the final application. Payment of any amount withheld for the completion of the Punch List shall be paid upon completion of the items.

G The GESA Contractor shall verify at Final Inspection that a complete set of As-Built Record Documents have been provided as described in Part II, Section 2, Item G above.

H If the GESA Contractor does not complete all Punch List items or show just cause to the satisfaction of the Funding Agency why they cannot be completed, the Funding Agency may take action, including but not limited to correcting items and deducting the cost of completion from the amount retained or default the Contractor and pursue its surety for completion of the Work.

I If work is completed in accordance with the Contract Documents, a report of the Final Inspection shall be prepared by the DGS Energy Consultant, DGS, or the Funding Agency in accordance with the Administrative Procedures. After successful Final Inspection, the Funding Agency may utilize the project and the warranty period shall commence.

ARTICLE 14: DISPUTES

The following is in addition to any ITQ language on the matter. Where there are discrepancies between the ITQ and these General Conditions, these General Conditions take precedence.

14.1 Contractor Must Carry on Work During the Dispute Process. In the event of a controversy/dispute or claim arising from this Contract, the GESA Contractor may note its performance of the Work under protest and may keep records of costs during the below dispute resolution process, but the GESA Contractor shall not refuse to perform as directed by the Commonwealth. The GESA Contractor must maintain the Project Schedule unless otherwise agreed to by the Energy Consultant, DGS and/or the Funding Agency. If the GESA Contractor fails or refuses to perform as directed, this action will constitute a breach of contract and the Commonwealth may default the GESA Contractor and/or proceed to suspend and/or debar the GESA Contractor.

14.2 Dispute Resolution is a 3-Step Process. The GESA Contractor, the Funding Agency and DGS agree that any and all disputes arising out of this Contract are subject to a 3-step resolution process described in this Article. The Contractor, The Funding Agency and DGS agree that participation in each preceding step is a condition precedent to the GESA Contractor's right to pursue any and all unresolved disputes to the next step.

14.3 Step 1: Field Dispute Review Meetings. The Field Dispute Review Meeting is the initial step in identifying and attempting to reach a timely and equitable resolution of the variety of issues that arise on any construction project. The nature and structure of each Field Dispute Review Meeting shall be flexible and consist of an informal, good-faith discussion of the current status of the Project, and identification of potential and actual disputes.

A Project Intervals: A Field Dispute Review Meeting ("FDR Meeting") will be scheduled by the Energy Consultant/DGS to discuss issues arising as of the following intervals of the Project:

1. 50% of the Contract Duration has elapsed; and
2. 100% of the Contract Duration has elapsed; or
3. At any time deemed necessary by DGS or Funding Agency.

B Location: The Energy Consultant/DGS will schedule a mutually convenient date and time for each FDR Meeting. If possible, the FDR Meeting should be convened at the Project site.

C Attendees: The Contractor and Funding Agency shall attend each Field Dispute Review Meeting. The DGS Energy and Resource Management Office shall attend each Field Dispute Review Meeting. The Energy Consultant/DGS will chair the Meeting.

D Procedure: As the Project progresses and the time for a FDR Meeting approaches, the Energy Consultant/DGS should establish the date for the meeting during the discussion at a bi-weekly Job Conference.

1. The Contractor must fill out a Field Dispute Review Meeting Form, a sample of which appears in the Disputes Administrative Procedure. This Form should be submitted to the Energy Consultant/DGS approximately 1 week prior to the FDR meeting. The information on this Form should provide sufficient information to allow attendees to research potential disputes, review the Contract Documents, review the Project Schedule and examine site conditions prior to the Meeting. In all cases of misunderstanding and disputes, allegations that verbal instruction was given will not be considered. The Contractor must produce written documentation in support of its contentions and shall advance no claim in the absence of such written

documentation, or use or attempt to use any conversation with any parties against DGS or Funding Agency in prosecuting any claim.

2. The Energy Consultant/DGS shall convene the Field Dispute Review Meeting.
   a The FDR Meeting shall not be subject to 2 Pa. C.S. (relating to administrative law and procedure).
   b Neither audio recording nor videotaping will be allowed during the FDR Meeting.
   c No transcripts will be taken but attendees are free to take their own notes.
   d The Meeting may be moved out to the field for visual inspection of the condition if necessary to understand and resolve the issue.
   e The Energy Consultant/DGS will allow all parties a reasonable time to present and discuss the disputes raised in the Contractors' FDR Meeting Form.
3. The Contractor's representative (an employee in the field familiar with the day-to-day work on this Contract) shall present a description of:
   a The Work performed since the last Field Dispute Review Meeting; and
   b The Work to be performed in the near future; and
   c The status of disputes raised at the previous FDR Meeting; and
   d New disputes that have arisen since the previous FDR Meeting. For each new dispute:
      (1) Set forth the schedule impacts, which may only be presented using the current Project Schedule; and
      (2) Set forth a proposed solution to the dispute, including:
         (i) Days needed in any Extension of Time; and/or
         (ii) Damages attributed to the dispute.
4. The Energy Consultant's/DGS representative shall present a description of:
   a their understanding of the Work performed since the last FDR Meetings; and
   b the Work to be performed in the near future; and
   c status of disputes raised at the previous FDR Meeting; and
   d a response to the new dispute(s) raised by the Contractor
5. Within two weeks of the FDR Meeting, the Energy Consultant/DGS will render a written decision on the issues raised during the FDR Meeting. The decision will be issued to all attendees. The decision is not binding upon any party.
6. If any party is dissatisfied with the decision reached at the FDR Meeting, they may appeal the decision to the second step in the dispute process.
7. **Any issue or dispute arising on the Project must be presented at the first FDR Meeting after the dispute arose. If the Contractor fails to raise an issue at the appropriate FDR Meeting then the Contractor is deemed to have waived the issue (e.g., an issue arising during first 25% of contract duration must be presented at the 25% FDR Meeting and may not be presented at any subsequent FDR Meeting).**
8. **Only claims raised during an FDR Meeting may be appealed to the Claim Settlement Conference stage.**

14.4 Step 2: Claim Settlement Conference. The second step in the dispute resolution process is a Claim Settlement Conference, which is a more formal step in the process and is described in general in §1712.1 of the Commonwealth Procurement Code.

A Time to File a Claim: Under this second step of the process, the Contractor may appeal the FDR Meeting decision by submitting a written claim to the Deputy Secretary for Property and Asset Management, 401 North Street Room 414, Harrisburg, PA 17125.

1. **Any issue or dispute arising on the Project that is not mutually resolved at the FDR Meeting stage may only be appealed to the Claim Settlement Conference stage. If the Contractor fails to pursue any unresolved FDR Meeting issue to a Claim Settlement Conference within the 6-month time frame set forth below, then the Contractor is deemed to have waived the issue.**

2. **A claim accrues upon the date of Energy Consultant's/DGS written decision in Step 1. If the Contractor decides to appeal the decision reached at the FDR Meeting, the Contractor must file an appeal of the decision to the Deputy Secretary within six months of the date of the Energy Consultant's/DGS written decision. If the Contractor fails to file a written request within this time period, the Contractor is deemed to have waived its right to assert the claim in any forum. The Deputy Secretary will disregard untimely claims.**

B Contents of the Claim: The claim filed by the Contractor with the Deputy Secretary shall state all grounds upon which the Contractor asserts a controversy exists. The claim must contain, at a minimum:

1. The Claim Settlement Conference request form set forth in the Disputes Administrative Procedure; and
2. The documentation submitted by the Contractor to the Energy Consultant/DGS during the FDR Meeting to substantiate the Contractor's view of the issue; and
3. The Energy Consultant's/DGS decision.

C Date of the Claim Settlement Conference: The Deputy Secretary or a designee will schedule a mutually convenient date and time for the Claim Settlement Conference.

D Attendees: All parties identified in the Claim Packet or deemed necessary by DGS shall attend the Claim Settlement Conference. At a minimum, the Contractor, Funding Agency and a representative from DGS' Energy and Resource Management Office shall attend the Claim Settlement Conference.

E Procedure: The Deputy Secretary or a designee will convene the Claim Settlement Conference.

1. The Claim Settlement Conference shall not be subject to 2 Pa.C.S. (relating to administrative law and procedure).
2. Neither audio recording nor videotaping will be allowed during the Claim Settlement Conference.
3. No transcripts will be taken but attendees are free to take their own notes.
4. The Deputy Secretary or a designee will allow all parties a reasonable time to present and discuss the issues.
5. The Contractor's representative shall present a description of the issue, including:
   a the factual background of the issue;
   b the schedule impacts, which may only be presented using the current Project Schedule; and
   c the proposed solution to the dispute, including:

(1) days needed in any Extension of Time; and/or

(2) damages attributed to the dispute.

6. The Energy Consultant/DGS shall present a description of:

   a a response to the dispute(s) raised by the Contractor, including:

   b the view of the schedule impact, which may only be presented using the current Project Schedule; and

   c the Contractor's proposed solution; and

   d the identity of the party the Energy Consultant/DGS believes is responsible for creating the dispute.

7. The Deputy Secretary will render a final determination on the issue(s) raised during the Claim Settlement Conference within 120 days of the receipt of the claim. The parties may, during the 120 day period, mutually agree to extend the 120-day deadline. If extended, the DGS will issue written confirmation of the extension. If no decision is rendered within the 120 days, the claim is deemed to be denied on the 120th day. The determination of the Deputy Secretary shall be the final order of DGS with regard to the issue(s).

14.5 Step 3: Filing a Claim at the Board of Claims. The third step in the dispute resolution process is filing a Statement of Claim with the Board of Claims, which is a more formal step in the process and is described in general in §1712.1 and §1721 et seq. of the Commonwealth Procurement Code.

A Time to File a Statement of Claim. Within fifteen (15) days of:

1. The mailing date of the Deputy Secretary's final determination denying a claim; or

2. Within 135 days of the date the Contractor files a claim with the Deputy Secretary if no final determination has been rendered and no extension has been agreed to, whichever occurs first, the Contractor may proceed to the third stage of the dispute resolution process by filing a claim with the Board of Claims in Harrisburg.

B Only claims that were raised during a FDR Meeting and a Claim Settlement Conference may proceed to the Board of Claims.

ARTICLE 15: MISCELLANEOUS CONDITIONS

The following is in addition to any ITQ language on the matter. Where there are discrepancies between the ITQ and these General Conditions, these General Conditions take precedence.

15.1 Project Sign. No signs of any kind shall be placed anywhere on the project site without the explicit written permission of the Funding Agency. Signs for safety instruction, direction of traffic, instruction of visitors to the site and site restrictions shall be fabricated, erected and maintained by the Contractor as required at no additional cost to the Funding Agency. Upon Completion of the work, or when directed by the Funding Agency, the Contractor shall remove signs.

15.2 Foundations for Mechanical Equipment. The Contractor shall furnish and install foundations and supports for all equipment installed under the GESA Contract. Foundations and supports shall include isolation mounting for noisy and vibrating equipment.

15.3 Sanitary Facilities. The Contractor shall, at its cost, provide and maintain in a clean and sanitary condition adequate and approved sanitary facilities in accordance with O.S.H.A. requirements. All facilities shall be screened against insects. Portable chemical toilets approved by the Pennsylvania Department of Health are acceptable. Under temporary field conditions, provisions shall be made to assure not less than one toilet facility is available.

15.4 Hoisting Facilities. The Contractor shall erect, maintain and operate at its cost, hoisting facilities. All hoisting facilities must comply with the safety regulations of the Department of Labor and Industry.

15.5 Temporary Ventilation. The Contractor shall provide temporary ventilation to remove from the structure any excessive heat and/or humidity in enclosed portions of the Work, resulting from its construction operations so that the Work may be carried on without interruption and under correct conditions, including required dryness for installation of the various materials. Removing any dangerous or noxious fumes or particles suspended in the air is the responsibility of the Contractor. Temporary equipment used for this temporary ventilation shall produce no hazard to the Work or to any person in or near it. The Contractor shall furnish all such temporary equipment; pay all costs for it and for its operation, including fuel and power supplies during operation both in and out of normal working hours. The Contractor shall remove the equipment when it is no longer required, or when so directed by DGS.

15.6 Work Beyond Limit of Contract. For purposes of performing the Work, the site is defined by the Limit of Contract lines shown on the drawings. The Contractor is responsible for any work performed beyond the limit of Contract.

15.7 Advertising. No advertising is permitted within the Work area or adjacent area. This does not apply to corporate vehicles or attire.

15.8 Federal and A.S.T.M. and Other Specifications. Reference to Federal, A.S.T.M. and other standard specifications references and designations means those in effect at the date of bid. Basic codes and regulations incorporated by reference, standard regulations and codes refer to editions in effect at the date of Quotes, including current addenda or errata. The most stringent section of each code applies.

15.9 Storage and Stockpiling on Roofs. No materials of any type may be stored or stockpiled overnight on roofs.

15.10 Reduction of Noise. The Contractor must take reasonable steps to minimize noise and shall perform work in accordance with local noise ordinances. The Contractor shall perform

noise-producing work in less sensitive hours of the day or week as directed by Funding Agency, DGS or the Energy Consultant. The Contractor shall maintain noise-producing work at or below the decibel levels and within the time periods specified and shall perform construction activities involving repetitive, high-level impact noise only between 8:00 a.m. and 6:00 p.m. unless otherwise permitted by Funding Agency and permissible by local ordinance.

15.11 Visible Dust Emissions. No person shall perform any construction, demolition, excavation, extraction, or other earthmoving activities unless appropriate measures are sufficiently implemented to limit Visible Dust Emissions (VDE) to 20% opacity and comply with the conditions for a stabilized surface area when applicable. The Contractor shall apply sufficient water to building exterior surfaces, and/or unpaved surface areas where equipment will operate to limit VDE to 20% opacity throughout the duration of razing and demolition activities or handling, storage, and transport of bulk materials on-site or off-site. The Contractor shall apply sufficient dust suppressants to unpaved surface areas within 100 feet where materials from razing or demolition activities will fall in order to limit VDE to 20% opacity. The Contractor shall also apply sufficient dust suppressants to unpaved surface areas where wrecking or hauling equipment will be operated in order to limit VDE to 20% opacity.

ARTICLE 16: LEGAL MATTERS

The following is in addition to any ITQ language on the matter. Where there are discrepancies between the ITQ and these General Conditions, these General Conditions take precedence.

16.1 No Estoppel or Waiver of Legal Rights. DGS is not precluded or estopped by the measurements or the release of Applications for Payment made or given by DGS from showing the true and correct amount and character of the Work performed and materials and equipment furnished by the Contractor. DGS may show, at any time, that any such measurements or approvals of release of Applications for Payment are untrue or incorrectly made in any particular, or that the Work or materials, equipment or any parts thereof do not conform to the specifications and the Contract. DGS may reject the whole or any part of the aforesaid Work or materials and equipment if the measurements or approval of release of Applications for Payment are found or become known to be inconsistent with the terms of the Contract, or otherwise improperly given. DGS may, notwithstanding any such measurements or approval of release of Applications for Payment, demand and recover from the Contractor, its surety, or both, such damages as DGS may sustain by reason of the Contractor's failure to comply with the terms of the specifications and the Contract, or on account of any overpayments made on any approved for release Application for Payment. Neither the acceptance by DGS nor any certificate accepted for payment of money, nor any approval for release of payments, nor acceptance of the whole or any part of the Work by DGS nor any Extension of Time, nor any position taken by DGS operates as a waiver of any portion of the Contract or any power herein reserved by DGS or any right to damages. A waiver of any breach of the Contract will not be held to be a waiver of any other or subsequent breach.

16.2 Law of the Place. The GESA Contract shall be governed by the Laws of the Commonwealth of Pennsylvania.

16.3 Successors and Assigns. This GESA Contract shall be binding on the parties hereto, their heirs, executors, administrators, successors and assigns. No part of this GESA Contract may be assigned by the Contractor without the prior written consent of DGS.

16.4 Written Notice. Written notice is duly served if delivered in person to the individual or member of the firm or to an officer of the corporation for whom it was intended, or mailed to its post office box address, if any, or addressed to the Contractor at its place of business as set forth in the GESA Contract. Wherever the term "notice" is used, such notices, to be effective, shall be in writing and, if to DGS, shall be mailed by Certified or Registered mail, postage and fees prepaid, or shall be delivered, in person, to the Deputy Secretary for Facilities Management, Department of General Services.

16.5 Claims for Damages: Legal Relations and Responsibilities. The GESA Contract covered by these General Conditions is not to be construed as being made for the benefit of any person or political subdivision not a party to this GESA Contract, nor shall this GESA Contract be construed to authorize any person or political subdivision, not a party to this GESA Contract, to maintain any lawsuit hereunder, nor shall this GESA Contract be construed to constitute the basis for the maintenance of any lawsuit by any person, or political subdivision not a party hereto.

16.6 Tobacco Use on Project Site. Use of tobacco products (smoke and smokeless) shall be restricted on site after the building has been enclosed (with permanent or temporary enclosures). Personnel found in noncompliance with this directive may be removed from the site upon discovery of this noncompliance.

16.7 Right-to-Know Law.

A The Pennsylvania Right-to-Know Law, 65 P.S. §§ 67.101-3104, ("RTKL") applies to this Contract. For the purpose of these provisions, the term "the Commonwealth" shall refer to the contracting Commonwealth agency.

B If the Commonwealth needs the Contractor's assistance in any matter arising out of the RTKL related to this Contract, it shall notify the Contractor using the legal contact information provided in this Contract. The Contractor, at any time, may designate a different contact for such purpose upon reasonable prior written notice to the Commonwealth.

C Upon written notification from the Commonwealth that it requires the Contractor's assistance in responding to a request under the RTKL for information related to this Contract that may be in the Contractor's possession, constituting, or alleged to constitute, a public record in accordance with the RTKL ("Requested Information"), the Contractor shall:

1. Provide the Commonwealth, within ten (10) calendar days after receipt of written notification, access to, and copies of, any document or information in the Contractor's possession arising out of this Contract that the Commonwealth reasonably believes is Requested Information and may be a public record under the RTKL; and

2. Provide such other assistance as the Commonwealth may reasonably request, in order to comply with the RTKL with respect to this Contract.

D If the Contractor considers the Requested Information to include a request for a Trade Secret or Confidential Proprietary Information, as those terms are defined by the RTKL, or other information that the Contractor considers exempt from production under the RTKL, the Contractor must notify the Commonwealth and provide, within seven (7) calendar days of receiving the written notification, a written statement signed by a representative of the Contractor explaining why the requested material is exempt from public disclosure under the RTKL.

E The Commonwealth will rely upon the written statement from the Contractor in denying a RTKL request for the Requested Information unless the Commonwealth determines that the Requested Information is clearly not protected from disclosure under the RTKL. Should the Commonwealth determine that the Requested Information is clearly not exempt from disclosure, the Contractor shall provide the Requested Information within five (5) business days of receipt of written notification of the Commonwealth's determination.

F If the Contractor fails to provide the Requested Information within the time period required by these provisions, the Contractor shall indemnify and hold the Commonwealth harmless for any damages, penalties, costs, detriment or harm that the Commonwealth may incur as a result of the Contractor's failure, including any statutory damages assessed against the Commonwealth.

G The Commonwealth will reimburse the Contractor for any costs associated with complying with these provisions only to the extent allowed under the fee schedule established by the Office of Open Records or as otherwise provided by the RTKL if the fee schedule is inapplicable.

H The Contractor may file a legal challenge to any Commonwealth decision to release a record to the public with the Office of Open Records, or in the Pennsylvania Courts, however, the Contractor shall indemnify the Commonwealth for any legal expenses incurred by the Commonwealth as a result of such a challenge and shall hold the Commonwealth harmless for any damages, penalties, costs, detriment or harm that the Commonwealth may incur as a result of the Contractor's failure, including any statutory damages assessed against the Commonwealth, regardless of the outcome of such legal challenge. As between the parties, the Contractor agrees to waive all rights or remedies

that may be available to it as a result of the Commonwealth's disclosure of Requested Information pursuant to the RTKL.

- The Contractor's duties relating to the RTKL are continuing duties that survive the expiration of this Contract and shall continue as long as the Contractor has Requested Information in its possession.

16.8 Non-Appropriation Clause. The Commonwealth's obligation to make payments during any Commonwealth fiscal year succeeding the current fiscal year shall be subject to availability and appropriation of funds. When funds (state and/or federal) are not appropriated or otherwise made available to support continuation of performance in a subsequent fiscal year period, the Commonwealth shall have the right to terminate the Contract or a Purchase Order. The Contractor shall be reimbursed for the reasonable value of any nonrecurring costs incurred but not amortized in the price of the supplies or services delivered under the Contract. Such reimbursement shall not include loss of profit, loss of use of money, or administrative or overhead costs. The reimbursement amount may be paid for any appropriations available for that purpose.

APPENDIX N

Administrative Procedures for

GESA Contract

pennsylvania
DEPARTMENT OF GENERAL SERVICES

ADMINISTRATIVE PROCEDURES FOR GESA CONTRACTS

May 2017 EDITION

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DEPARTMENT OF GENERAL SERVICES

ENERGY AND RESOURCE MANAGEMENT OFFICE

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ADMINISTRATIVE PROCEDURE #1

CORRESPONDENCE

1.1 Identification of Correspondence

A. The term “correspondence” includes letters, transmittals, and memoranda, but does not include forms.

B. All correspondence must be identified by the GESA Project Number, including Name of Facility, Project Description and Project Location.

C. Following is an example of proper identification:
Project #GESA- XXXX-X (R)
Dormitory
Grand University
Grand City, PA

1.2 Addressing and Distribution of Correspondence

A. Correspondence shall be addressed to the following in the following manner with the minimum distribution as indicated: If agreed to send by electronic methods, the following entities shall all be included

<u>If to the DGS Energy and Resource Management Office Director:</u>

Director of Energy and Resource Management Office
403 North Office Building
Harrisburg, PA 17120

cc: Energy Consultant
GESA Contractor
GESA Contractor’s Professional,
Funding Agency, as required

<u>If to the Energy Consultant</u>

cc: Director, Energy and Resource Management Office
Funding Agency, as required
GESA Contractor
GESA Contractor Professional

<u>If to the GESA Contractor:</u>

cc: Director, Energy and Resource Management Office
Energy Consultant
GESA Contractor Professional
Funding Agency, as required

ADMINISTRATIVE PROCEDURE #2

ORIENTATION MEETING

2.1 Scheduling of Orientation Meeting

A. The Energy Consultant and/or DGS will contact the GESA Contractor by letter within ten days after the GESA Contractor's contract effective date to schedule the meeting. The purpose of the Orientation Meeting is to familiarize the GESA Contractor with DGS' procedures and forms to be used during design and construction and to review the Department's requirements for design services, design progress meetings, submissions, regulatory and other approvals, construction phase meetings, and other items including the project schedule. Personnel from the GESA Contractor's office, such as the principal of the firm, Project manager and Project superintendent, the GESA Contractor's Professional and its consultants, and the GESA Contractor's HVAC, plumbing and electrical subcontractors must attend since instructions will be given on completion of forms. DGS will provide copies of required forms either with the scheduling letter for the meeting or at the meeting.

B. During the Orientation Meeting, the Energy Consultant and/or DGS shall conduct the order of business and discuss specific requirements and particulars of Project.

C. The Energy Consultant and/or DGS shall appoint a person to take minutes of the Job Conferences. Prior to the next Job Conference, the appointed individual shall distribute a copy of the minutes, known as the Conference Report, to each addressee listed on the record.

2.2 Agenda for Orientation Meeting

A. Introduction of personnel by the Energy Consultant and/or DGS.

B. Explanation of DGS Administrative Procedures and forms.

C. Overview of the Project Scope and Schedule.

D. Review of design, submission and approval requirements.

E. Question and answer period.

ADMINISTRATIVE PROCEDURE #3

DESIGN PROGRESS MEETINGS AND JOB CONFERENCES

3.1 General Information Regarding Job Conferences and Design Progress Meetings

A. Design Progress Meetings are held to address and document Design Phase activities and progress on the Project.

B. Job Conferences are held to address and document Construction Phase activities and the progress on the Project.

C. The Initial Job Conference will be held prior to the Initial Design Progress Meeting. The subsequent Job Conferences will be scheduled by the Energy Consultant and/or DGS subsequent to the commencement of on-site work by the GESA Contractor.

D. In the event that site development construction work begins prior to the completion of the Design Phase, both Job Conferences and Design Progress Meetings will be scheduled as required. The GESA Contractor's Professional and the Energy Consultant and/or DGS may elect to schedule these meetings on the same date.

3.2 General Information Concerning Job Conferences

A. The following persons are required to attend Initial, Regular, and Special Job Conferences:

GESA Contractor's Project Manager or equivalent
GESA Contractor's Professional
Energy Consultant,
Funding Agency representatives
Energy and Resource Management Office or designee

B. The Energy and Resource Management Office or Energy Consultant in its discretion schedules Special Job Conferences and will specify the required attendees.

C. The following representatives are permitted, but not required, to attend any Job Conference:

Funding Agency representatives
Facility representatives
Testing Laboratory Technicians
Other representatives, as appropriate (determined by DGS)

D. The Energy Consultant and/or DGS shall appoint a person to take minutes of the Job Conferences. Prior to the next Job Conference, the appointed individual shall distribute a copy of the minutes, known as the Conference Report, to each addressee listed on the record.

E. Failure of any required GESA Contractor representative to attend any Job Conference is a violation of the GESA Contract.

3.3 Initial Job Conference

A. **Notice and attendance**

1. The Energy Consultant and/or DGS will set a time, date, and place for the Initial Job Conference (IJC), which will be no later than the fifteenth day following the effective date of the contract.

2. The Notice initiating the IJC shall be addressed to the GESA Contractor with copies of the notice to the following:

   GESA Contractor's Professional
   Director of Energy and Resource Management Office
   Funding Agency
   Facility
   DGS Contract Compliance Officer
   DGS GESA Project File

3. The date of the Initial Job Conference is the Contract Start Date for purposes of calculating the Contract Completion Date.
4. During the IJC, the Energy Consultant and/or DGS shall conduct the order of business and discuss specific requirements and particulars of Project design and construction.
5. The Energy Consultant shall attach a separate sheet to the IJC Report, indicating the names, addresses and telephone numbers of the GESA Contractor, the GESA Contractor's Professional, the DGS Director of Energy and Resource Management Office and the Energy Consultant.
6. The Energy Consultant and/or DGS will distribute (email) the IJC Report as follows:

   DGS Director of Energy and Resource Management Office
   GESA Contractor
   GESA Contractor Energy Consultant
   Funding Agency
   All in attendance

7. Agenda for Initial Job Conference
   a. Introduction of attendees.
   b. Permits, Notices
   c. Establishment of date, time and location of the Initial Design Progress Meeting
   d. Establishment of GESA Contractor's projected start of on-site construction work.
   e. Establishment of date, time and location of the first Regular Job Conference
   f. Review of GESA Contractor contract General Conditions
   g. General Comments

B. **Design Meetings**

1. General Information Concerning Design Progress Meetings
   a. The following persons are required to attend Design Progress Meetings:

      GESA Contractor's Project Manager or equivalent
      GESA Contractor's Professional and its consultants
      Energy Consultant
      Funding Agency representatives
      Facility representatives

   b. The GESA Contractor schedules Design Progress Meetings in accordance with the requirements of the RFQ and will specify additional required attendees.

c. The GESA Contractor's Professional shall take the minutes of Design Progress Meetings. Within ten days of the meeting or not less than two days prior to the next Design Progress Meeting, whichever occurs first, the appointed individual shall distribute a copy of the minutes to each addressee listed on the record and to others as required by the RFQ.

2. Initial Design Progress Meeting

   a. At the Initial Job Conference, the GESA Contractorshall set a time, date, and place for the Initial Design Progress Meeting, which will be no later than the tenth day following the Initial Job Conference.

   b. The Notice initiating the Design Progress Meeting shall be addressed to the Energy Consultant with copies of the notice to the following:

      GESA Contractor
      GESA Contractor's Professional
      Energy and Resource Management Office
      Funding Agency
      Facility
      Energy Consultant
      Project Manager / Coordinator
      DGS Project Coordinator

   c. During the Design Progress Meeting, the GESA Contractor's Professional or its designee shall conduct the order of business.

   d. Agenda for Initial Design Progress Meeting

      (1). Introduction of attendees.

      (2). A website link to the GESA Project Design Manual will be provided at the meeting.

         (a). Meeting minutes and correspondence

         (b). Project schedule, submissions and reviews

         (c). Project scope and changes

         (d). Required Funding Agency and Department approvals

         (e). Pre-design activities

            (i). Site visit and existing conditions verification

            (ii). Available existing documents acquisition and review

            (iii). Code analysis verification

            (iv). Proprietary and restricted products

   e. Preliminary and Final Submission requirements

   f. Drawing, specification and design standards to be met.

3. Review and verification of materials included with the RFQ, as applicable:

   a. Scope of work and technical requirements

   b. Site drawings, utilities and interferences

   c. Environmental, archaeological and related impacts

   d. Facility prototype drawings

   e. Identified adjustments or corrections required to prototype

f. Structural criteria including geotechnical report impacts

g. HVAC, plumbing, fire protection and electrical criteria

h. Telecommunications and data criteria

i. Security criteria

j. Outline, and other, specifications

k. Codes, regulatory approvals and permits

l. Summarize determinations regarding site and facility criteria.

4. Other discussion

5. Establishment of date, time and location of the next Design Progress Meeting

C. **Regular Design Progress Meetings**

1. The GESA Contractor will hold Regular Design Progress Meetings as often as deemed necessary, however, in no case less than bi-weekly unless a longer interval is approved, in writing, by the Energy Consultant.

2. The GESA Contractor Professional, or designee, shall determine the required agenda, notify all required participants and conduct the meeting among all those concerned with Project design

3. The agenda of a Regular Design Progress Meeting shall include the following:

a. General Review of minutes of the previous Design Progress Meeting

b. Progress on Action Items, as noted on previous Design Progress Meeting minutes, must be noted. The manner in which the item was addressed should also be noted. Action Items will be included in each report until resolved.

c. Presentation of current drawings and specifications

d. Discussion of progress and identification of new Action Items

e. Review of Design Progress Schedule

f. Special attention will be given to items that are behind schedule.

g. Projected work for the next bi-weekly period

h. Delays

i. The GESA Contractor should pay special attention to identifying any outstanding Action Item that may delay the completion of the construction documents.

j. Information to be incorporated into completed minutes should include percentage of elapsed design time and estimated percentage contract document completion; date, time and place of the next Design Progress Meeting; and the name of the person who prepared the minutes.

4. The GESA Contractor Professional or designee will distribute Design Progress Meeting minutes to the following:

GESA Contractor
GESA Contractor's Professional
Energy and Resource Management Office
Funding Agency
Facility
Energy Consultant
Project Manager / Coordinator
DGS Project Coordinator

D. **Construction Job Conference**

1. The GESA Contractor will hold bi-weekly Job Conferences unless DGS agrees to a longer interval. If needed DGS may direct for these meeting to be held weekly.
2. The agenda of a Regular Job Conference shall include the following:
    a. General Review of Previous Report
        (1). Unsatisfactory conditions and/or workmanship, as noted on previous Job Conference Reports, must be noted when corrected and accepted on first report following correction. The manner in which the correction was made should also be noted. The unsatisfactory item will be included in each report until correction is made.
    b. General discussion of Job Conditions
    c. Review of past due Shop Drawings
    d. Review of outstanding Change Orders
    e. Review of Progress Schedule
    f. Special attention will be given to items that are behind schedule.
    g. Projected work for the next bi-weekly period
    h. Delays
        (1). The GESA Contractor should pay special attention to ensure that any delays are documented on the Job Conference Reports, since Extensions of Time will be determined from the information provided at the Job Conference.
    i. Information to be incorporated into completed Job Conference Reports may include, but is not limited to, percentage of elapsed Project time; percentage of Project payment; percentage of Project job completion (based upon physical inspection); date, time and place of the next Project job conference; and the name of the person who prepared the report.
3. The Energy Consultant will distribute Regular Job Conference Reports to the following:

    GESA Contractor
    GESA Contractor's Professional
    Energy and Resource Management Office
    Funding Agency
    Facility
    Energy Consultant
    Project Manager / Coordinator
    DGS Project Coordinator

E. **Special Job Conferences**

1. The Energy and Resource Management Office or Energy Consultant may call a Special Job Conference to consider any emergency or unusual job condition. Only the subject(s) mentioned in the notice of the Special Job Conference shall be discussed.

ADMINISTRATIVE PROCEDURE #4

CONTRACT BREAKDOWN SHEET

4.1 The GESA Contractor shall prepare and submit, the Contract Breakdown Sheet to DGS for its approval within 45 days of the effective date of the contract and prior to submission of the GESA Contractor's first Application for Release of Payment. The GESA Contractor will use the Cost Quote form completed in response to the RFQ as the basis for the Contract Breakdown Sheet. DGS will require at least ten working days to review and approve the breakdown sheet or any Supplemental breakdowns.

4.2 The GESA Contractor may request a meeting with the Energy and Resource Management Office or Energy Consultant, for the purpose of reviewing a work copy of the Contract Breakdown Sheet. The GESA Contractor shall prepare the Contract Breakdown Sheet work copy prior to the requested meeting.

4.3 Following review of the Contract Breakdown Sheet work copy, the GESA Contractor shall transmit the original and one copy of the final Contract Breakdown Sheet by letter to the Energy and Resource Management Office and Energy Consultant.

4.4 The Energy Consultant shall, within five days of receipt, review and recommend approval or disapproval of the Contract Breakdown Sheet based on items indicated in this Administrative Procedure and the reasonableness of costs. The Energy Consultant should then sign and date the Contract Breakdown Sheet and forward it to the Director of Energy and Resource Management Office, by letter of transmittal, along with any comments or discrepancies noted. The Contract Breakdown Sheet is not to be returned to the GESA Contractor for correction.

4.5 The Energy Consultant shall not approve any Application for Release of Payment until DGS has approved the Contract Breakdown Sheet.

4.6 The DGS-approved Contract Breakdown Sheet will be the basis for the GESA Contractor's Applications for Release of Payment. DGS may also use the Contract Breakdown Sheet to determine the cost or credit to DGS resulting from changes in the work.

4.7 General Information

A. The GESA Contractor shall show the Contract Bond as the first item. The bond cost shall not exceed two percent of the contract award amount.

B. If a Roof Bond/Guarantee is required, it must be listed separately as the second item.

C. Temporary heat is required to maintain a minimum temperature. All cost and equipment will be the responsibility of the ESCO contractor

D. The GESA Contractor must list items according to Energy Conservation Measures and break the ECMs into buildings or floors.

E. The GESA Contractor shall not show temporary services and/or equipment furnished at the GESA Contractor's cost. The GESA Contractor must pro-rate the cost of these items (with the exception of temporary heat) throughout the items of work, material and/or equipment to which the cost pertains.

F. The GESA Contractor shall include a single line item for mobilization in its Contract Breakdown Sheet, limited to include only those items listed in the General Conditions of the GESA Contract. The total for mobilization shall not exceed 1.5 % of the contract

award amount, nor shall it exceed $90,000 for contracts where the total contract amount is $6,000,000 or less. For contracts exceeding $6,000,000, mobilization costs will be determined by negotiation prior to submission of the Contract Breakdown Sheet.

G. The GESA Contractor shall show excavation and backfill as separate items. If hand excavation is required, it must also be separately listed. All excavation and backfill quantities shall be indicated in cubic yard units. If there is no backfill, an explanation must be provided.

H. Concrete for structures is to be indicated in cubic yard units. Concrete sidewalk and concrete paving may be indicated as square yard units. All unit prices for concrete work shall include forming. Forming may not be indicated as a separate line item.

I. Painting must be a separate item, listed in square feet. DGS will not accept lump sum painting costs.

J. The GESA Contractor shall not use the terms “furnish” or “install” as part of the description of a line item. Procurement and installation costs must be included in the line item of work. The only exception shall be in cases where materials or equipment are furnished by the Department, the Funding Agency or another Commonwealth of Pennsylvania entity for the GESA Contractor’s use in the Project.

K. “Demolition” shall include, in parentheses, the specific item(s) to be demolished.

L. The GESA Contractor shall include scaffolding in the item with which it is associated, not as a separate line item.

M. The GESA Contractor may show sheet metal work as two items, i.e., (a) Sheet metal shop drawings and (b) Sheet metal fabrication and installation. Shop drawings must be shown at actual cost, as a “lump sum” item. The GESA Contractor shall obtain DGS’s approval of the shop drawings prior to Application for Release of Payment. If a subcontractor is used for shop drawings, a copy of the subcontractor’s invoice must be attached to the Application for Release of Payment when the GESA Contractor requests payment for the shop drawings.

N. When balancing of heating and ventilating systems is required by the specifications, the GESA Contractor shall show it as a separate item.

O. Lump Sum items cannot be released for payment until the item is completely finished, inspected, and accepted by DGS.

P. The GESA Contractor may submit a supplemental breakdown for those items listed as Lump Sum on the original approved Contract Breakdown Sheet at a later date, indicating quantity, unit price and extensions for all items to be furnished and installed under each Lump Sum item. Lump Sum items should be kept to a minimum. Supplemental breakdowns are not permitted for items where partial payment has been made.

Q. The GESA Contractor’s initial Contract Breakdown Sheet must designate any work to be subcontracted by noting such in parenthesis after the scope of work, such as “Painting (subcontracted)”. The line item for subcontract work may be broken into as many sub-items as necessary, including building, area or floor.

R. A separate line item is required for each purchase order or subcontract issued to a Small Diverse Business Supplier. The line item for the purchase order or subcontract may be broken into as many sub-items as necessary, including building, area or floor. The value for the purchase order or subcontract line item (or the sum of the sub-items) shall be identical to the value of the purchase order or subcontract.

S. Descriptions shall be clear and concise for each item of work, material or equipment, using the same designation as the specifications. The GESA Contractor shall list all items (examples: concrete masonry units, conduit, pipe fittings, wire, cable, etc.) by type and size to be installed.

T. The GESA Contractor shall list operation and maintenance manuals as one line item. The value shall be not less than 1% of the contract award amount and is subject to the approval of the DGS Director of Energy and Resource Management Office or Energy Consultant.

U. The GESA Contractor shall list Record Drawings (as-built dwgs.) as one line item. The value, which is subject to the approval of the Director of Energy and Resource Management Office or Energy Consultant, shall be at least 2% of the contract award amount.

ADMINISTRATIVE PROCEDURE #5

PROJECT SCHEDULE

5.1 Project Schedule

The Project Schedule shall be developed using the Critical Path Method. The schedule shall be developed, prepared, and submitted in accordance with the same requirements and time frames as required by the General Conditions of the GESA Contract and the requirements of this Administrative Procedure, in addition to the following:

A. The CPM Schedule is to be created by the GESA Contractor, utilizing current version of Primavera.

B. The GESA Contractor shall complete all work in accordance with the accepted Project Schedule. The Project Schedule will reflect the decisions of the GESA Contractor as to sequence, duration, construction logic and all means and methods of construction.

C. The Project Schedule shall be reviewed at the Initial Job Conference. No Application for Release of Payment beyond #1 will be approved by DGS until the Project Schedule is submitted by the GESA Contractor and accepted by DGS.

D. DGS will not automatically grant an extension of time due to activity time delays. As a contract modification or delay may result in only absorbing a part of the available total float that may exist within an activity or chain of activities, the modification or delay may not affect existing critical activities or interim milestone dates or cause non-critical activities to become critical.

E. Total float is defined as the amount of time between the early start date and the late start date, or the early finish date and the late finish date, for each and every activity in the Project Schedule. Float is not for the exclusive use or benefit of either DGS or the GESA Contractor. DGS will consider extensions of time to interim milestone dates or the Contract Completion Date only to the extent that equitable time adjustments to the activity or activities affected by the contract modification or delay exceeds the total float of the affected or subsequent paths and extends any interim milestone date or the Contract Completion Date.

F. If the time limits set for preparation and submission of the Project Schedule are not met, DGS will prepare the schedule which the GESA Contractor must adhere to. The costs DGS incurs in preparing the schedule will be assessed to the GESA Contractor by credit change order.

G. General Information

1. The GESA Contractor shall list design activities, indicating Required Submissions dates and required review time.

2. The GESA Contractor shall list items of construction as they will be installed, listing each ECM separately The GESA Contractor shall also include in its schedule submissions of shop drawings for approval, approval of shop drawings, placing of material orders, and delivery of materials.

3. The GESA Contractor is responsible for assuring that any/all subcontract work as well as work performed by its own forces, is included in the schedule.

4. The Project Schedule shall reflect Early Start/Early Finish Dates, Late Start/Late Finish Dates, and available float or slack time for each and every activity.

5. The GESA Contractor shall identify and incorporate construction progress milestones into the Project Schedule in accordance with the General Conditions of the GESA Contract. The milestones shall signify the start date or completion date of a specific activity that is critical to the completion of the project on schedule. The GESA

Contractor must show at least one milestone in each month of the scheduled construction period.

ADMINISTRATIVE PROCEDURE #6

REQUEST FOR APPROVAL OF MATERIALS AND/OR SUBCONTRACTORS

6.1 The GESA Contractor shall prepare and submit the submissions as required by the General Conditions of the GESA Contract, and this Administrative Procedure.

6.2 The GESA Contractor shall number each submission and each page within each submission consecutively and shall give resubmissions the same number as the original submission.

6.3 The GESA Contractor shall submit a copy of the Certification for Welders and a copy of the License for Blasters.

6.4 If the GESA Contractor has a financial interest in a Subcontractor, Sub-subcontractor or Supplier, it must disclose its relationship to the Subcontractor, Sub-subcontractor or Supplier in accordance with the General Conditions of the GESA Contract.

6.5 Prior to the commencement of work by any Subcontractor, Sub-subcontractor or Supplier, the GESA Contractor must submit a copy of the Subcontractor/Supplier Agreement, in accordance with the General Conditions of the GESA Contract to the Energy Consultant. The Energy Consultant shall retain this copy for the Field Office files The GESA Contractor shall also submit a copy of every Agreement with a Small Diverse Business (MBE, WBE, VBE, or SDVBE) to the Department's Bureau of Small Business Opportunities.

6.6 The GESA Contractor shall specifically identify the Subcontractor, Sub-subcontractor or Supplier on a separate line on the Contract Breakdown Sheet (if known prior to approval), or on the Application for Release of Payment as described more completely elsewhere in the Administrative Procedures.

6.7 The Energy Consultant will review the submission for compliance with the RFQ and notify the Energy and Resource Management Office of his/her findings. If any discrepancies are found, the Energy Consultant shall notify the GESA Contractor's Professional in writing.

6.8 It is the GESA Contractor's Professional's responsibility to check each item for conformity with the requirements of the specifications and design performance. The GESA Contractor's Professional will indicate by stamp whether each item is approved, disapproved (with the reason), or that approval is withheld, pending submission of additional qualifying material or information (catalog cuts, engineering data, test data, etc.) from the GESA Contractor.

6.9 The GESA Contractor's Professional will make distribution of the approved submission as follows:

A. Original to the DGS Director of Energy and Resource Management Office

B. One copy to the GESA Contractor

C. One copy to the Energy Consultant

ADMINISTRATIVE PROCEDURE #7

MATERIALS TESTING AND BALANCING

7.1 Materials and Concrete Testing (General Requirements)

A. The GESA Contractor shall:

1. Give the funding agency timely notice of its readiness and of the date arranged, so Energy Consultant/Funding Agency may observe such inspection or testing.

2. Bear all costs of inspections and tests, unless otherwise specified. All expenses incurred in the collecting, packing, and delivering of samples of materials or equipment to or from the Project site or laboratory will be paid by the GESA Contractor, unless otherwise noted in the General Conditions, Specifications, or Contract Drawings.

3. The contractor shall inform the Energy Consultant, Funding agency and/or DGS of test a minimum od 7 days before test.

4. For concrete cylinders, each cylinder shall be numbered consecutively and prefaced for design mix tests, precast concrete, and prestressed concrete. The type of cylinder shall be noted on the form as follows:

DM - Design Mix
PC - Precast Concrete
PS - Prestressed Concrete

5. Cylinders for concrete other than these types will not be prefaced. Approved samples to be incorporated into the work shall be returned to the site by the Testing Laboratory.

B. The GESA Contractor's Professional shall:

1. Secure from the Testing Laboratory an original and four copies of the test reports and distribute as follows:

2. The Original must be sent to the DGS Director of Energy and Resource Management Office, with copies to the, Energy Consultant and Funding Agency.

3. Any reports showing deficiencies in test results will be immediately communicated by the GESA Contractor's Retained Professional to the GESA Contractor, Energy and Resource Management Office, Funding Agency and Energy Consultant.

7.2 Concrete Testing (Approval of Mix Computations)

A. The GESA Contractor (or testing laboratory) shall prepare Form GSC-26, Concrete Mix Computation, in an original and four copies for each type of design mix to be used. Forms shall be forwarded to the GESA Contractor's Professional for review and approval. All information required by the form must be provided.

B. The GESA Contractor's Professional shall review the Form GSC-26 for compliance with the Contract Documents, and approve/disapprove as appropriate. It shall forward all copies to the Energy Consultant for review and distribution.

C. Upon receipt of the approved GSC-26 from the Energy Consultant, the GESA Contractor shall instruct the testing laboratory to pick up samples for mix design testing from either the batch plant or the site. An original of Form GSC-22/33, Laboratory Sample or Field Test Identification, must accompany each sample to be tested. A separate form must be submitted for each test. These forms may be obtained from the Energy Consultant.

7.3 Manufacturer's High Voltage Cable Test Report (Birth Certificate)

A. The GESA Contractor will ensure the Cable Test Report (Birth Certificate) complies with the Contract Documents. The GESA Contractor shall submit a copy of this report to the GESA Contractor's Professional, with copies to the Energy Consultant.

B. The GESA Contractor's Professional will review the report for compliance with the Contract Documents, affix a stamp of approval directly to each copy of the report, and forward all copies to the Energy Consultant. Only a stamp as indicated in the sample provided in Administrative Procedure #8 will be accepted.

C. High Voltage Cable may not be installed until DGS approves the Manufacturer's Cable Test Reports.

D. If the GESA Contractor's Professional disapproves the report, the GESA Contractor's Professional shall return all copies to the GESA Contractor with a letter of explanation. Copies of this correspondence must be sent to the Energy and Resource Management Office and Energy Consultant.

7.4 High Voltage Cable Field Test Report

A. The GESA Contractor shall, by letter of transmittal, submit an original of the report to the GESA Contractor's Professional, with a copy of the transmittal letter and report to be sent to the Energy and Resource Management Office and Energy Consultant. .

B. The GESA Contractor's Professional shall, upon receipt from the GESA Contractor, review the Field Test Report for compliance with testing procedures and Contract Documents. If the report is approved, the GESA Contractor's Professional will affix its stamp of approval directly to each copy of the report and forward all copies to the DGS Director of Energy and Resource Management Office and Energy Consultant.

C. DGS will consider approving the release of payment for High Voltage Cable only after (a) the Manufacturer's Test Report is approved, and (b) the cable is installed, and (c) the Field Test Report is approved by the GESA Contractor's Professional and (d) reviewed by DGS.

D. If it disapproves the report, the GESA Contractor's Professional shall advise the GESA Contractor of the appropriate corrective action to assure compliance with the Contract Documents. When it approves the Field Test Report, the GESA Contractor's Professional will distribute the report in accordance with Paragraph "B" of this section.

7.5 HVAC Systems Balancing Report

A. The GESA Contractor shall submit an original of the HVAC Systems Balancing Report to the GESA Contractor's Professional. The Energy and Resource Management Office and Energy Consultant must be copied on the transmittal letter and the Report.

B. The GESA Contractor's Professional shall review the Balancing Report for compliance with balancing procedures and the Contract Documents. If approved, the GESA Contractor's Professional shall affix its stamp of approval directly to each copy of the report and forward all copies to the Energy Consultant and/or DGS. Only a stamp as

indicated in the sample provided in Administrative Procedure #8 will be accepted. The Director of Energy and Resource Management Office must be copied on the transmittal letter.

C. If the report is disapproved, the GESA Contractor's Professional shall advise the GESA Contractor of the appropriate corrective action to assure compliance with the Contract Documents. The GESA Contractor's Professional must notify the Energy Consultant that the report has been disapproved and state the proposed method of correction. When the report is approved the GESA Contractor's Professional shall proceed in accordance with Paragraph "B" of this section.

D. If the Energy Consultant and/or DGS disapproves any report or concurs with a "qualified" approval by the GESA Contractor's Professional, the GESA Contractor's Professional shall verify that the GESA Contractor has completed any required remedial action. The GESA Contractor's Professional shall notify the Director of Energy and Resource Management Office and Energy Consultant, in writing, that the GESA Contractor has completed the required remedial action. The GESA Contractor shall be responsible for the retesting and rebalancing of any and all zones affected by the corrective action. The GESA Contractor shall then resubmit a Balancing Report for these areas to the GESA Contractor's Professional in accordance with paragraph "A" of this section. The GESA Contractor's Professional shall review, approve, and distribute this Balancing Report in accordance with the requirements of paragraph "B" of this section.

E. Payment for test and balancing will not be made until the report(s) are approved by the DGS.

ADMINISTRATIVE PROCEDURE #8

SUBMITTALS

8.1 The GESA Contractor's Professional, Energy Consultant and/or DGS will review and approve all submittals in accordance with the applicable paragraph of the GESA General Conditions by stamping with an approval stamp. Only a stamp as indicated in the sample provided at the end of this section will be accepted.

8.2 The GESA Contractor shall make any corrections the GESA Contractor's Professional, Energy Consultant and/or DGS may require and resubmit the required number of corrected copies of shop drawings or new samples until approved. The GESA Contractor's Professional, Energy Consultant and/or DGS shall act on the resubmission within ten (10) days of its receipt, unless DGS approves a different period of time. The resubmission of submittals by the GESA Contractor and the subsequent review shall be in accordance the General Conditions of the GESA Contract.

8.3 The GESA Contractor shall distribute the Final Shop Drawings or Catalog Data by Email as follows:

A. GESA Contractor

B. Energy Consultant

C. Energy and Resource Management Office or Energy Consultant

D. Using Agency

8.4 The GESA Contractor must maintain at the Project site one copy of all Project drawings, updated daily to indicate as-built conditions.

8.5 Any work commenced by the GESA Contractor prior to final approval of the submittals is performed at the GESA Contractor's own risk.

8.6 The box below is a sample of the "Approval Stamp" to be utilized by the GESA Contractor's Professional in the review and approval process of all submissions. **Only a stamp with the language as indicated in this sample will be accepted**.

☐ APPROVED	☐ NOT APPROVED
☐ APPROVED AS NOTED	☐ REVISE AND RESUBMIT

SIGNATURE/TITLE DATE

A note may be added to: Advise the GESA Contractor that quantities have not been verified.
Advise the GESA Contractor that all materials must meet the requirements of the specifications.

ADMINISTRATIVE PROCEDURE #9

APPLICATION FOR PAYMENTS

9.1 General Information

A. The GESA Contractor's Applications for Release of Payment shall be prepared, submitted, and processed in accordance with the General Conditions of the GESA Contract and this Administrative Procedure.

B. DGS will not process an Application for Release of Payment until the Contract Breakdown Sheet, has been approved.

C. If the GESA Contractor submits an incorrect Application for Release of Payment, DGS will authorize release of payment for all items which are correct and notify the GESA Contractor, within fifteen days of the submittal, of the deficiencies in the Application. DGS will return Applications for Release of Payment to the GESA Contractor only if there is missing or incomplete paperwork.

D. When DGS receives an Application for Release of Payment, the Energy Consultant shall date and initial the Form GSC-17 in the upper right corner. The Energy Consultant has three days, from the date of receipt to review, correct, and approve the Application for Release of Payment and forward the Application to the Energy and Resource Management Office.

E. The Energy and Resource Management Office shall review the copy of the Application for Release of Payment and notify the Energy Consultant of any required adjustments or changes within seven calendar days of receipt, with a written copy of any comments sent to the GESA Contractor.

F. The GESA Contractor will make any adjustments or changes required as a result of the DGS' review on the next Application for Release of Payment submitted after receipt of the Energy Consultant comments.

9.2 Prevailing Minimum Wage Certificate - Form GSC-16

A. The GESA Contractor must attach a completed Form GSC-16 to each Application for Release of Payment to certify compliance with the payment of Prevailing Minimum Wages as required by the Contract Documents.

B. The GESA Contractor and its subcontractors are required to submit Form LLC-25 (formerly LIPW-128) or, if Davis-Bacon Wage Act applies to the contract, Form WH-347, to the Energy Consultant on a weekly basis.

9.3 Recapitulation of GESA Contractor's Application for Release of Payment - Form GSC-17

A. The GESA Contractor must number each application consecutively and complete the heading information.

B. The GESA Contractor must check the "Final" block when requesting release of final payment of the contract amount. If the GESA Contractor is revising a request for release of the final payment application, the "Post Final" block must be checked.

C. The Amended Contract Amount is the Total Contract Award, plus or minus all DGS-approved change orders (debit or credit).

9.4 Application for Release of Payment of Labor, Materials/Equipment Incorporated – Form GSC-18

A. The GESA Contractor must provide a true and correct list, according to the item number(s) on the approved GSC-30, of the Project work performed for each pay period.

B. The GESA Contractor shall list all items in numerical sequence, as shown on the GSC-30, and carry all items on each and every Application for Release of Payment, Form GSC-18.

C. The GESA Contractor shall individually list all completed debit and/or credit change order work previously approved by DGS under the heading “Executed Change Orders” on the Form GSC-18.

D. DGS may authorize payment of an approved change order on a percentage basis as the work is completed, upon the request of the GESA Contractor.

E. The GESA Contractor shall individually list all pending debit and/or credit change orders, which have received DGS scope authorization under the heading “Pending Change Orders” on the Form GSC-18.

F. The GESA Contractor shall refer to the Administrative Procedures for information concerning the processing of Change Orders.

9.5 Stored Materials – Form GSC-43

A. The GESA Contractor may invoice stored materials when materials are ordered in advance and stored at the Project site pending their installation. Material scheduled for installation in fewer than forty-five days from the date of procurement is not eligible for payment as stored material.

B. The GESA Contractor must submit a completed GSC-43 Form with the Application for Release of Payment.

C. Prior DGS approval to store materials is not required. The signatures of the GESA Contractor and the Energy Consultant will signify that the forms have been reviewed and are correct.

D. The GESA Contractor is responsible for proper storage of the materials at the Project site. Materials shall be stored off the ground and properly protected from the elements.

E. The GESA Contractor shall submit a separate GSC-43 Form for each Supplier.

F. The description of line items on the GESA Contractor’s Supplier invoice should be identical to the description on the GESA Contractor’s GSC-43 Form and the GSC-30. If an item description on the Supplier’s invoice is not identical to the items on the GSC-43 and GSC-30, the GESA Contractor must clearly describe, either on the invoice or an attachment, how the invoiced item(s) relate to the items on the GSC-43 and GSC-30.

G. The GESA Contractor’s Supplier invoice must also show the Unit Wholesale Price and the Extended Unit Wholesale Price. The GESA Contractor may add information to the Supplier’s invoice for the purpose of clarity.

H. If items that are being submitted as stored material are combined with other items on a GESA Contractor's Supplier invoice, the claimed stored items must be clearly identified.

I. The GESA Contractor's requests for release of payment may not exceed eighty-five percent of the price of the item as indicated on the approved GSC-30.

J. When a Supplier's invoice lists two or more separate items that are component parts of a previously submitted single line item on the GSC-30, a "Supplemental Cost Breakdown Sheet" must be submitted and approved prior to payment for the individual items. Line items with differing unit prices must be shown as separate items on the Supplemental Cost Breakdown Sheet. Each component part must be shown as an individual item.

K. The GESA Contractor's completed GSC-43 Form, submitted with each Application for Release of Payment, must also have the following documents attached:

1. Supplier's Invoice

2. Fire and theft insurance policy rider for the materials

3. Evidence of payment, or when payment has not been made, a letter on the GESA Contractor's letterhead authorizing payment to be made jointly to the GESA Contractor and the Supplier.

4. Power of Attorney (from bonding company)

9.6 Payroll Affidavit, GESA Contractor's Affidavit and Statement of Surety Company. Power of Attorney-Form GSC-24

A. The GESA Contractor must submit a completed Form GSC-24 with its Final Application for Release of Payment. If the GESA Contractor does not submit Form GSC-24 with the Final Application for Release of Payment, DGS will withhold approval of the release of the sum of $500 until the form is submitted.

B. The GESA Contractor need not complete the Payroll Affidavit section of the form if the prevailing minimum wage scale does not apply. However, the GESA Contractor must make a statement on the reverse side of the Payroll Affidavit indicating that the prevailing minimum wage scale does not apply.

C. The GESA Contractor should retain a copy of Form GSC-24 and forward an original and two copies with the Application for Release of Payment, with a copy of the Power of Attorney attached to each.

9.7 For Each Application for Release of Payment

A. Prior to the Energy Consultant's submission and distribution of the Application for Release of Payment packets, they shall be assembled in the following order:

1. GSC-17

2. GSC-18

3. GSC-16

4. GSC-43 (if stored materials)

   a. Power of Attorney (from bonding company)
   b. Supplier's Invoice

c. Fire and theft insurance policy rider
d. Evidence of payment, or when payment has not been made a letter on the GESA Contractor's letterhead authorizing payment to be made jointly to the GESA Contractor and the supplier

5. GSC-24 (if Final Invoice)

6. Notarized LLC-25 (formerly LIPW-128) or WH-347 for federal funded projects (if Final Invoice)

B. Upon completion of the Energy Consultant's assembly of the Application for Release of Payment packets, the Energy Consultant will submit the original and two complete copies to the Energy and Resource Management Office. The Energy Consultant will complete the entire "Invoice Transmittal" and place it on top of the entire submission to the Energy and Resource Management Office. It is not necessary to attach a transmittal to other copies. The Energy Consultant will attach two additional copies of the GSC-17 Form, without attachments, followed by the Invoice Correction Letter, to the back of the entire submission.

C. Upon Final Inspection, DGS will adjust the retainage to reflect the actual amounts withheld as set out in the General Conditions of the GESA Contract. The Application for Release of Payment packet will include the pertinent pages of the Final Inspection Report, including DGS's certificate detailing the incomplete items and value, pending credit change orders, liquidated damages, claims, and other pertinent information. To receive payment, the GESA Contractor must have completed or settled the open items listed on DGS's certificate. As individual paperwork items are completed, DGS may approve proportionately reduced retainage amount. The Energy Consultant shall attach the pertinent pages of the Final Inspection Report to the Application for Release of Payment noting items which have been resolved and shall calculate, insert, and highlight the adjusted retained amount on each copy of the Final Inspection Report attached to the Application for Release of Payment packets.

ADMINISTRATIVE PROCEDURE #10

Changes in Contract Work

10.1 General Information - Any change to the GESA Contract must be documented by either a Field Order or a Change Order according to the conditions for each as defined below.

A. Field Order - this condition can be defined as any change to the Contract which meets both of the following criteria:

1. The GESA Contractor and Energy Consultant and/or DGS agree that the change constitutes neither a net additional nor deductible cost to the Contract; and

2. The change consists of a minor relocation, substitution, or revision to quantity of contract items which does not constitute a significant design change and does not need to be documented by revision to Project Drawings and/or Specifications.

3. Field Orders are issued by the Energy Consultant and/or DGS. The GESA Contractor shall request a Field Order in writing to the Energy Consultant and/or DGS.

B. **Change Order** - this condition can be defined as any change to the Contract which does not meet all of the Field Order criteria. A change order may only be requested by GESA Contractor or Funding Agency.

4. **The Funding Agency will only issue a debit change order for unforeseen conditions. No change order other than unforeseen conditions will be issued unless it is for a credit.**

a. An unforeseen condition is defined as a site condition discovered that could not have been determined by the GESA Contractor during the site investigation or a condition that did not occur until after the project was awarded.

C. Emergency situation - If a change order condition is an emergency, it is essential that the Funding Agency issue the Change Order and authorize the GESA Contractor to begin work as soon as possible.

10.2 Step By Step Instructions - The following table lists actions comprising the total beginning to end route for a Change Order. All actions are to be performed chronologically.

STEP NO.	RESPONSIBLE FOR ACTION	ACTION
1	Funding Agency or GESA Contractor	Identify Unforeseen Condition.
2	GESA CONTRACTOR	Complete SECTION 1 of GSC-1 with cost and scope and signed by Professional and DBC. Attach itemized cost breakdown for review and verify that costs are within remaining project contingency. Forward to DGS Region.
3	Energy Consultant and/or DGS	Review to verify unforeseen condition. If cause correct, review breakdown for completeness and arithmetic accuracy. If correct, forward to the Energy Consultant.
4	Energy Consultant and/or DGS	Provide computer data entry of GSC-1 dates upon receipt of GSC-1. Type all Change Order and Project information onto

		header section of GSC-1.
5	Energy Consultant and/or DGS	Review Change Order Packet for cause, accuracy and completeness. Complete Section 2 of the GSC-1, sign and send to DGS with copy to GESA Contractor.
6	DGS	Review completed Change Order Packet for accuracy and completeness.
7	Funding Agency	Review C/O for accuracy and validity. Sign GSC-1. Forward to Energy Consultant and/or DGS for final review.
8	ENERGY CONSULTANT AND/OR DGS	Review packet for validity and impact, if any, upon ECMs. Also verify costs within project contingency. If acceptable, sign and forward to Funding Agency for signature.
9	Funding Agency	Review and approve.
10	GESA Contractor	Perform Change Order work upon receipt of GSC-1. Upon completion of work, the GESA Contractor may invoice for work performed in an amount equal to the final determined cost. If the final determined cost is a disputed cost not acceptable to the GESA Contractor, the GESA Contractor may pursue additional compensation for this work through Field Dispute process.

10.3 General Comments as to Processing C/O.

A. **GESA Contractor and Professional** - The GESA Contractor shall describe in detail the unforeseen condition that constitutes a change from original contract. The description should include all reference drawings, sketches, specification sections, GESA Contractor's Professional scoping letters necessary to define the scope of work. GESA Contractor must provide a detailed cost breakdown of the actual costs. DGS will consider this cost to be the final binding cost for this Change Order unless an unforeseen change in scope occurs during the performance of the Change Order work. If any new work is being requested in lieu of specified contract work, the GESA Contractor should clearly define both the requested (new) and the superseded (specified) work. The description should also make reference to any Energy Conservation Measure impacted by the proposed change order.

B. **Cost Breakdown** - The Energy Consultant and/or DGS shall check the detailed cost breakdown and verify its accuracy. Any inaccurate information discovered in the cost breakdown that may be corrected by the Energy Consultant and/or DGS (such as math errors, incorrect application of overhead and profit, burden, and/or bond rate adjustment) should be adjusted in lieu of returning it to the GESA Contractor for correction by marking up a detailed breakdown and generating a cost to support the revised cost. Any missing, incomplete, or improper information that cannot be corrected t should be referred back to the GESA Contractor for correction. The resulting alternate cost basis should be forwarded to the Energy and Resource Management Office with copies to the GESA Contractor.

C. **Director Energy and Resource Management Office** - The Director of Energy and Resource Management Office shall review all components of the Change Order packet for completeness and accuracy. If the Energy Consultant's/DGS recommended cost is different from the GESA Contractor's, the Energy Consultant and/or DGS must include an alternate cost basis and listed in SECTION 4 of the GSC-1 Form.

10.4 Change Order Breakdown

A. The breakdown shall contain separate sections detailing materials, labor, equipment, subcontractors and a total cost.

1. **Material** - The Cost Breakdown shall list, as a minimum for each material item used, the material description, the unit and the quantity. The Cost Breakdown shall then

include the total of all the individual cost totals which is defined as the pre-mark-up cost total. Any freight charges for specific materials listed must be included in the unit cost for the particular material. The Funding Facility will not authorize payment of any separate line items in the Cost Breakdown for such freight charges. The GESA Contractor may claim 5% mark-up for material.

2. **Labor** - The Cost Breakdown shall include for each labor classification listed, the number of workers, duration of work for each worker, the total labor hours, the classification description, the hourly base wage rate paid (BR), the total hourly wage rate paid (WR), the base rate individual cost (H x BR) and the wage rate individual cost (H x WR). The Cost Breakdown shall then include the total of all the individual base rate costs (TBR) and the total of all the individual wage rate costs (TWR). The hourly base wage rate (BR) is defined as the rate of wages paid by the employer directly to the employee. The total hourly wage rate (WR) is defined as the total rate of wages paid by the employer including wages paid directly to the employee (BR) plus any employer participation or contribution to employee benefits paid on behalf of the employee. The GESA Contractor may claim 5% mark-up for labor. The Funding Facility will not authorize reimbursement of line items in the GESA Contractor's or Subcontractor's Cost Breakdown for items such as travel, lodging and per-diem.

3. **Equipment** - The Cost Breakdown shall include for each piece of equipment used to perform the work, the description of the piece of equipment used, the quantity of that particular piece used, the duration the piece of equipment was used, the rental rate for the duration used and the total rental cost. DGS expects the GESA Contractor to procure/provide the most economical rental rate available over the duration of the work performed. For example, if the piece of equipment was used over a four-week period, DGS will expect a monthly rate in lieu of a daily or weekly rate, if the monthly rate is more economical than the other two rates. The Funding Facility will not authorize payment of equipment costs for any piece of equipment not specifically identified, or for any tools such as hand tools used in the everyday performance of contract work. The GESA Contractor may claim sales tax paid for any piece of equipment rented from an outside (non-GESA Contractor owned) rental agency provided that a receipt showing the sales tax paid amount accompanies the cost breakdown. DGS will disallow sales tax for any rental item without such proper verification. The GESA Contractor may claim mark-up for overhead, general support and profit equal to 5% times the sum of the total rental costs plus the total applicable sales tax. The total rental costs are the sum of all the individual rental costs. The total applicable sales tax is the sum of all the individual verified sales taxes.

4. **Subcontractors** – A detailed cost breakdown from the Subcontractor is required from the GESA Contractor showing any Change Order work being performed by a Subcontractor. Include any costs for the GESA Contractor's Professional as subcontract work. For those breakdowns containing work performed by one or more Subcontractors, the GESA Contractor is responsible for clarifying somewhere in the breakdown, the exact scope of work being performed by each Subcontractor. The GESA Contractor may claim mark-up for overhead, general support and profit equal to 5% times the sum of the total costs realized by the GESA Contractor's Subcontractor in performance of the work.

5. **Summary** - At the end of the detailed cost breakdown, the GESA Contractor shall list individually the total costs of material, labor, equipment, sub-contracts and deductions. The GESA Contractor shall then apply the adjustment to contract bond which is equal to the GESA Contractor's bond rate times the Change Order cost subtotal. DGS considers the appropriate bond adjustment rate to be equal to the percentage rate used by the GESA Contractor to establish the contract bond amount shown on the GESA Contractor's original cost breakdown GSC-30 previously approved by DGS.

6. **Change Order Approval Letter** (see example format provided in this manual section) will be issued to the GESA Contractor by the Funding Agency upon review and approval of every Change Order not disputed by DGS. This letter authorizes the GESA Contractor to perform the subject work, and upon completion of work, invoice for that work in a cost amount equal to the final determined cost which has been agreed to by the GESA Contractor and the Funding Agency.

7. **Disputed Change Order** - A Disputed Change Order Approval Letter (see example format provided in this manual section) will be issued to the GESA Contractor by the Funding Agency on any Change Order which contains a GESA Contractor's cost quote being disputed. The letter authorizes the GESA Contractor to perform the work, and upon completion of work, invoice for that work in a cost amount equal to the final cost as determined by the Funding Agency and in conflict with the GESA Contractor's proposed cost. The letter will establish DGS' determined cost and the GESA Contractor's rejected proposed cost. If the GESA Contractor disputed the Funding Agency's cost, additional compensation may be pursued after completion of the Change Order work by pursuing a Field Dispute Resolution.

pennsylvania
DEPARTMENT OF GENERAL SERVICES

GESA CHANGE ORDER

Project: G – _____
Agency: _____
Locale: _____

GESA Contractor: _____

CHANGE ORDER #: _____

FINAL DGS APPROVED C/O COST $ _____ **(To be filled out only by DGS)**

SECTION 1 GESA Contractor's Professional's Scope of Work (Complete and forward to DGS)

The description of this construction change (including reference to drawings/sketches to define scope) is as follows:

GESA Contractor agrees to furnish and or delete labor and materials in order to complete the construction included within the scope of this Change Order to contract plans and specifications for the net additional or deductible cost amount of :$_____ in accordance with the attached cost breakdown. GESA Contractor further agrees that the completion date for construction as contained in the contract shall not be changed by approval of this Change Order without the submission of a request for an extension of time to the DGS of General Services on forms provided for such purposes.

GESA Professional Signature: _____ **Date**_____

GESA Contractor Signature: _____ **Date**_____

SECTION 2-RECOMMENDATION OF Energy Consultant and/or DGS

Check one box only:

☐ GESA Contractor's breakdown costs have been checked and are recommended.

☐ GESA Contractor's breakdown costs are not recommended. Energy Consultant and/or DGS

cost of $ _____ . I have enclosed a separate breakdown.

Approval of this Change Order is ☐ is not rec☐mended.

APPROVAL OF FUNDING AGENCY and ENERGY CONSULTANT:

Signature _____ Date _____
Funding Agency

APPROVAL OF ENERGY CONSULTANT:

Signature _____ Date _____
Energy Consultant

APPROVAL OF DEPUTY SECRETARY FOR FUNDING AGENCY

Signature _____ Date _____
Deputy Secretary of Funding Agency

APPROVAL OF SECRETARY OF FUNDING AGENCY

Signature _____ Date _____
Secretary of Funding Agency

EXAMPLE COMPLETED COST BREAKDOWN

GESA Contractor'S NAME

MATERIAL

QTY. (Q)	UNIT (U)	DESCRIPTION	UNIT COST (MU)	COST TOTAL (Q x MU)	LABOR HOURS (OPTIONAL) HOURS/UNIT (HU)	TOTAL HOURS (Q x HU)
8000	S.F.	1/2" GYPSUM WALL BOARD	$0.15	$1,200.00	.008	64
15	EACH	DOUBLE HUNG WINDOWS	$120.00	$1,800.00	.800	12
		PRE-MARK-UP MAT'L. COST TOTAL		$3,000.00	TOTAL LABOR HRS.	76
		6% SALES TAX		$180.00		
		SUBTOTAL		$3,180.00		
		10% OVERHEAD, GEN. SUPT. & PROFIT(ON SUBTOTAL)		$318.00		
		TOTAL MATERIAL COST		$3,498.00		

LABOR

NUMBER OF WORKERS	DURATION	HOURS (H)	CLASSIFICATION	HOURLY BASE RATE (BR)	TOTAL HOURLY WAGE RATE (WR)	BASE RATE COSTS (H x BR)	WAGE RATE COST (H x WR)
2	38	76	CARPENTER	$20.27	$30.59	$1,540.52	$2,324.84
TOTAL LABOR HOURS		76		TOTAL BASE RATE COST (TBR)		$1,540.52	
					TOTAL WAGE RATE COST (TWR)		$2,324.84

RATE	MANDATED BURDEN		
7.65%	SOCIAL SECURITY (ON TOTAL TBR)	$117.85	
12.39%	UNEMPLOYMENT TAXES (ON TOTAL TBR)	$190.87	
8.90%	WORKMEN'S COMP. INS. (ON TOTAL TBR)	$137.11	
2.46%	PUBLIC LIABILITY INS. (ON TOTAL TBR)	$37.90	
	TOTAL MANDATED BURDEN (TMB)	$483.73	$483.73
	SUBTOTAL LABOR COSTS (TWR + TMB)		$2,808.57
	15% OVERHEAD, GEN. SUPT. & PROFIT(ON SUBTOTAL)		$421.29
	TOTAL LABOR COST		$3,229.86

EQUIPMENT

DURATION	QTY.	EQUIPMENT	RENTAL RATE FOR DURATION	RENTAL COST
N/A	1	N/A	N/A	N/A
			% SALES TAX (IF RENTED)	
			SUBTOTAL EQUIPMENT COST	
			10% OVERHEAD, GEN. SUPT. & PROFIT(ON SUBTOTAL)	
			TOTAL EQUIPMENT COST	$0

SUBCONTRACTORS (IF APPLICABLE)

COMPANY	*Total Cost From Attached Subcontractor's Detailed Breakdown	*TOTAL COST
XYZ Paving		$31,973.26
	SUBTOTAL	$31,973.26
	10% OVERHEAD, GEN. SUPT. & PROFIT(ON SUBTOTAL)	$3,197.33
	TOTAL SUBCONTRACTS	$35,170.59

SUMMARY

TOTAL MATERIAL		$3,498.00
TOTAL LABOR		$3,229.86
TOTAL EQUIPMENT		N/A
TOTAL SUBCONTRACTS		$35,170.59
LESS DEDUCTS (Explain Separately)		N/A
	SUBTOTAL	$41,898.45
2.0% BOND COST ADJUSTMENT(ON SUBTOTAL)		$837.97
	TOTAL QUOTE	$42,736.42

GESA Contractor's Signature

XYZ PAVING (SUBCONTRACTOR)

MATERIAL

QTY. (Q)	UNIT (U)	DESCRIPTION	UNIT COST (MU)	COST TOTAL (Q x MU)	LABOR HOURS (OPTIONAL) HOURS/UNIT (HU)	TOTAL HOURS (Q x HU)
4900	S.Y.	3" BITUM. ASPHALT PAVING	$4.50	$22,050.00	.0196	96
		PRE-MARK-UP MAT'L. COST TOTAL		$22,050.00	TOTAL LABOR HRS.	96
		6% SALES TAX		$1,323.00		
		SUBTOTAL		$23,373.00		
		10% OVERHEAD, GEN. SUPT. & PROFIT(ON SUBTOTAL)		$2,337.30		
		TOTAL MATERIAL COST		$25,710.30		

LABOR

NUMBER OF WORKERS	DURATION	HOURS (H)	CLASSIFICATION	HOURLY BASE RATE (BR)	TOTAL HOURLY WAGE RATE (WR)	BASE RATE COSTS (H x BR)	WAGE RATE COST (H x WR)
1	8	8	LAB. FOREMAN	$16.91	$24.80	$135.28	$198.40
7	8	56	LABORER	$16.16	$24.05	$904.96	$1,346.80
4	8	32	OPERATOR	$21.03	$31.69	$672.96	$1,014.08
TOTAL LABOR HOURS		96			TOTAL BASE RATE COST (TBR)	$1,713.20	
					TOTAL WAGE RATE COST (TWR)		$2,559.28

RATE	MANDATED BURDEN		
7.65%	SOCIAL SECURITY (ON TOTAL TBR)	$131.06	
11.91%	UNEMPLOYMENT TAXES (ON TOTAL TBR)	$204.04	
10.23%	WORKMEN'S COMP. INS. (ON TOTAL TBR)	$175.26	
3.17%	PUBLIC LIABILITY INS. (ON TOTAL TBR)	$54.31	
	TOTAL MANDATED BURDEN (TMB)	$564.67	$564.67
	SUBTOTAL LABOR COSTS (TWR + TMB)		$3,123.95
	15% OVERHEAD, GEN. SUPT. & PROFIT(ON SUBTOTAL)		$468.59
	TOTAL LABOR COST		$3,592.54

EQUIPMENT

DURATION	QTY.	EQUIPMENT	RENTAL RATE FOR DURATION	RENTAL COST
1 DAY	1	ASPHALT PAVER 130 H.P.	$1200.00/DAY	$1,200.00
1 DAY	2	STEEL WHEEL ROLLERS	$230.00/DAY (EACH)	$460.00
1 DAY	1	PNEUMATIC WHEEL ROLLER	$225.00/DAY	$225.00
			6% SALES TAX (IF RENTED)	$113.10
			SUBTOTAL EQUIPMENT COST	$1,998.10
			10% OVERHEAD, GEN. SUPT. & PROFIT(ON SUBTOTAL)	$199.81
			TOTAL EQUIPMENT COST	$2,197.91

SUMMARY

TOTAL MATERIAL		$25,710.30
TOTAL LABOR		$3,592.54
TOTAL EQUIPMENT		$2,197.91
LESS DEDUCTS (Explain Separately)		N/A
	SUBTOTAL	$31,500.75
1.5% BOND COST ADJUSTMENT(ON SUBTOTAL)		$472.51
	TOTAL QUOTE	$31,973.26

CHANGE ORDER APPROVAL LETTER

Date: _____

GESA Contractor Name
GESA Contractor Address

Re: Change Order No._____
Project GESA - _____
Title_____
Location_____

Gentlemen:

The [FUNDING AGENCY] has issued the subject Change Order to your firm in the approved debit/credit amount of $_____ to perform the following work scope:

This letter serves as the formal authorization and approval to perform the subject work and invoice for payment upon completion of the work. Enclosed is a copy of the approved Form GSC-1.

Sincerely.

[TITLE OF FUNDING AGENCY GESA

PROJECT

COORDINATOR/PERSONNEL]

cc: Director of Energy and Resource Management Office
Energy Consultant
Funding Agency

DISPUTED CHANGE ORDER APPROVAL LETTER (EXAMPLE FORMAT)

Date: _____

GESA Contractor Name
GESA Contractor Address

Re: Change Order No._____
Project GESA -_____
Title_____
Location_____

Gentlemen:

The Department of General Services has issued the subject Change Order to your firm in the approved debit/credit amount of $_____ to perform the following work scope:

DGS determined that your original cost breakdown amount of $_____ is too high. The discrepancy in cost is due to _____.

This letter serves as the formal authorization and approval to perform the subject work and invoice for payment upon completion of the work. Enclosed is a copy of the approved Form GSC-1.

If you disagree with this assessment and feel that the work involved is worth more than $_____, you may pursue a claim through the Field Dispute Review process.

Sincerely.

[TITLE OF FUNDING AGENCY GESA
PROJECT COORDINATOR/PERSONNEL]

cc: Director of Energy and Resource Management Office
Energy Consultant
Funding Agency

ADMINISTRATIVE PROCEDURE #11

REQUEST FOR EXTENSION OF TIME

All Requests for an Extension of Time shall be prepared and processed by the GESA Contractor and DGS in accordance with the General Conditions of the Contract, and this Administrative Procedure.

11.1 General Information

A. The DGS will furnish to the GESA Contractor the Request for Extension of Time form if requested. The GESA Contractor may copy the form if it needs more of them.

B. The GESA Contractor must verbally inform the DGS at the first Job Conference after any alleged delay it has encountered. No forms or correspondence are required at this time, however, the GESA Contractor should verify that the verbal notification of the alleged delay has been noted in the Job Conference Report. Within ten (10) days after the end of the alleged delay, the GESA Contractor must submit the form to the Energy Consultant and/or DGS. Failure to submit the form within ten days may result in the denial of the request.

C. The front of the form is for the GESA Contractor's use. The GESA Contractor must enter all required information and answer all questions to the best of its ability. Omission of data or failure to answer any of the questions will result in the form being returned to the GESA Contractor for completion (Please note that the Request Number will be assigned by the Energy Consultant and/or DGS). The GESA Contractor or its authorized representative is required to sign the Form in attestation of the submitted facts.

D. Only one delay shall be submitted on a Form, multiple delays must be submitted on separate forms.

E. If explanation of the delay is lengthy and/or the GESA Contractor wishes to attach additional documentation, it is permissible to indicate "see attached" in any appropriate area of the form. It is mandatory, however, that as much of a factual synopsis as possible be included on the form itself.

F. Claims for weather related delays must be substantiated by Weather Data, which may be secured from local weather records and/or the National Oceanic & Atmospheric Administration, National Climatic Center, Asheville, North Carolina 28801.

G. The GESA Contractor will keep one (1) copy of the Form, and forward the original to the Energy Consultant and/or DGS.

H. Upon receipt of the Form, the Energy Consultant and/or DGS will review the form to assure the GESA Contractor has provided the required information, answered all questions and signed the form. If the information is incomplete the Energy Consultant and/or DGS will return the original form, with an appropriate explanation, to the GESA Contractor for correction and resubmission. If the form is in order the Energy Consultant and/or DGS will assign a sequential number, enter the received date and acknowledged date and return a copy to the GESA Contractor for its files. A request number will not be assigned until a properly completed form is received.

I. Within five days of receipt, the Energy Consultant and/or DGS shall review the extension request, GESA Contractor's supporting documentation, field documentation and all other sources of information required for evaluation by the DGS. Energy Consultants'/DGS

recommendation shall be appended directly to the form in the appropriate area. Additional sheets may be attached as required. The Energy Consultant and/or DGS shall also attach all pertinent information and documentation required to justify and support the recommendation. The form shall then be signed and dated by the Energy Consultant and/or DGS. A complete copy of the Form and all supporting documentation should be retained by the Energy Consultant and/or DGS. A copy of the transmittal letter only, shall be provided to the GESA Contractor and the Director of Energy and Resource Management Office.

ADMINISTRATIVE PROCEDURE #12

SUBMISSION GUIDELINES FOR STEEL CERTIFICATIONS

Pursuant to *the steel products procurement act*

12.1 GENERAL INFORMATION CONCERNING THE STEEL PRODUCTS PROCUREMENT ACT AND STEEL CERTIFICATIONS

A. The GESA Contractor shall submit Steel Certification forms to the Department. Only one fully-executed certification form for each product must be submitted to the Department.

B. According to Section 1886 of the Steel Products Procurement Act (the Act), cast iron products are considered to be steel products. The appropriate certification form, therefore, is required to be submitted for cast iron products.

C. Aluminum and brass products are not steel products; therefore, steel certification forms are not required for such items.

D. Pursuant to Section 1884(b)(2) of the Act, DGS has created a list of exempt machinery and equipment steel products, which is posted on the DGS website at www.dgs.state.pa.us If a product to be utilized on the project appears on the exemption list, steel certification forms are not required.

E. Modification or alteration of the Steel Certification forms is strictly prohibited.

F. If the entity executing an ST form has a corporate seal, that seal should be impressed in the signature area of the form. The signatures on the ST forms do not have to be notarized, but they must be original signatures. Signature stamps are not acceptable; a form submitted with such a stamp will be rejected.

G. Questions regarding steel certification submissions and/or compliance with the Act shall be submitted in writing to the DGS Energy and Resource Management Office as soon as possible after the Initial Job Conference. DGS will investigate and render a written response in a timely fashion.

H. **Nothing in this Administrative Procedure should be construed as relieving the GESA Contractor, Subcontractor, supplier or fabricator from complying with the requirements of the Act. Steel Certification forms must be submitted and approved by DGS personnel before a steel product arrives on site. If the GESA Contractor enters into a purchase order for a "steel product" prior to submitting acceptable steel certification, the GESA Contractor does so at its own risk and faces penalties which include, but are not limited to, nonpayment, and/or replacement costs, and/or debarment. If steel products are incorporated into the Project prior to the submission of proper certification, the GESA Contractor assumes the full risk of nonpayment, replacement costs and/or debarment if the products are not certifiable.**

I. No Application for Release of Payment containing steel products will be processed until the appropriate steel certification form(s) has been approved by the DGS.

J. **Domestic availability will be determined as of the date the ST-4 form is submitted to DGS for approval.**

K. The forms that follow ST-1 through ST-4 – have been developed by the DGS of General Services for use on the DGS's projects alone. The DGS assumes no responsibility or liability for any use of these forms on the public works projects of any other entity subject to the Act.

L. The North American Free Trade Agreement (NAFTA) does not supersede or preempt the Act.

ST-1

This form must be filled out for each "steel product" on a DGS project unless otherwise noted.

Section A

Line #1 This is the GESA Contractor's formal business name. If a sub's name appears on this form, the form must be rejected and resubmitted.

Line #2 This is the GESA Contractor's business address.

Line #3 This is the GESA Contractor's business phone number.

Line #4 This is the date the ST form is submitted to DGS.

Line #5 This is the DGS contract number for the Project.

Line #6 This is the DGS Project description.

Line #7 This is the "steel product" being certified, such as an I-beam, angle, bolt, channel, etc. The GESA Contractor may not fill in the line with a description like "structural steel", "heating unit" or "air conditioning system".

LINE #7 IS THE MOST CRITICAL PART OF THE FORM. FAILURE TO PROPERLY FILL OUT LINE #7 ON EACH ST FORM MAKES THE ENTIRE FORM INVALID AND A NEW FORM MUST BE SUBMITTED.

NOTE: The GESA Contractor does not have to submit a form for each **piece** of steel which is being put into the Project. The GESA Contractor only has to submit an ST form for each **type** of steel product. For example, if the Project needs 56 I-Beams of varying lengths, the GESA Contractor must submit **1 ST form** for "steel I-Beams" with a listing of the various sizes covered by that ST form. The GESA Contractor **does not** submit 56 ST-1 forms. If, on the other hand, only 30 of the I-Beams are identifiable (stamped) structural steel, the GESA Contractor submits an ST-1 form with Section B(1) marked off. The other 26 I-Beams are non-identifiable structural steel, so the GESA Contractor must also submit an ST-1 with Section B(2) marked off and attach the appropriate supporting documentation.

If the GESA Contractor is using different suppliers, each supplier must submit the appropriate steel form.

Line #8 - This refers to the corresponding GSC-23 submittal number.

Line #9 - This is the fabricator or supplier of the product listed on Line #7.

SECTION B

ONLY ONE OF THESE ITEMS CAN BE CHECKED AS APPLICABLE

_____ **1. Identifiable Steel Product**

This type of steel product is limited to products which are stamped "made in the USA" or otherwise identifiable as U.S. steel.
a) supporting documentation: GESA Contractor only needs to submit the ST-1 form. DGS field personnel will verify the markings when product arrives on-site.

_____ **2. Non-identifiable Structural Steel Product**

This type of steel product is limited to items of structural steel which are not marked as made in USA.

a) supporting documentation: GESA Contractor must also submit, attached to the ST-1 form, bills of lading, invoices and mill certificates.

_____ **3. Non-identifiable, Non-structural Steel Product**

This type of steel product is every product which is non-structural steel, including, but not limited to, doors, doorframes, windows, machinery and equipment.

a) supporting documentation: Fully executed ST-2

b) NOTE: A steel product may not appear on any Application for Release of Payment until such time as the ST-1 and ST-2 are accepted by DGS.

SECTION C

1. Language - **No modifications, cross-outs or alterations of any type may be made to the language of this certification paragraph.**

2. Signature - Two signatures are required on the ST-2 form. The GESA Contractor's President/Vice President must sign on one line and the Secretary or Treasurer must sign as a witness. The names should be typed or printed beneath the signature lines. Failure to type in the names **does not** invalidate the ST form.

ST-2

This form must be filled out for non-identifiable, non-structural steel products.

SECTION A **To be filled out by the Purchaser, the firm that pays the Fabricator.**

Line #1 This is the name of the firm that is dealing directly with the Fabricator.

Line #2 This is the purchaser's mailing address.

Line #3 This is the purchaser's business phone.

Line #4 This is the date the ST-2 form is sent to the fabricator.

Line #5 This is the DGS contract number for the Project.

Line #6 This is the DGS Project description.

Line #7 **This is the "steel product" being certified, such as a chiller, condenser, hollow metal doors. The GESA Contractor may not fill in the line with a description like "structural steel", "heating unit" or "air conditioning unit". The model number, if any, of the steel product must be listed as indicated.**

**LINE #7 IS THE MOST CRITICAL PART OF THE FORM.
FAILURE TO PROPERLY FILL OUT LINE #7 ON EACH ST FORM
MAKES THE ENTIRE FORM INVALID AND A NEW FORM MUST BE
SUBMITTED.**

Line #8 This refers to the corresponding GSC-23 submittal number.

SECTION B **To be filled out by the Fabricator, the firm that assembles the product listed on Line #7.**

Line #9 This is the Fabricator's name.

Line #10 This is the Fabricator's mailing address.

Line #11 This is the Fabricator's business phone.

Line #12 This is the date the Fabricator receives the ST-2 from the Purchaser.

Line #13 This is the Fabricator's Federal I.D. number.

SECTION C

1. Language - **No modifications, cross-outs or alterations of any type may be made to the language of this certification paragraph.**

2. Signature - Two signatures are required on the ST-2 form. The GESA Contractor's President/Vice President must sign on one line and the Secretary or Treasurer must sign as a witness. The names should be typed or printed beneath the signature lines. Failure to type in the names **does not** invalidate the ST form.

2-STEP ELIGIBILITY ANALYSIS:

**BEFORE A GESA Contractor CAN SUBMIT AN ST-3,
THE FOLLOWING ANALYSIS MUST BE SATISFIED:**

STEP #1: The GESA Contractor must establish that the "product" **contains BOTH:**

• Steel melted in the USA

AND

• Foreign Steel

Note: Step #1 focuses upon the **content** of the "product".

Note: The % need not be close; it can be 99-1, so long as there is **both** foreign and domestic steel in the "product".

STEP #2: The GESA Contractor must establish that 75% of the **cost** of the "product" has been mined, produced or manufactured in the USA.

Note: Step #2 focuses upon the **cost** of the entire "product", not just the steel within it.

SECTION A

Line #1 This is the GESA Contractor's name.

Line #2 This is the GESA Contractor's business address.

Line #3 This is the GESA Contractor's phone number.

Line #4 This is the date the ST-3 is submitted to the fabricator.

Line #5 This is the DGS contract number for the Project.

Line #6 This is the DGS Project description.

Line #7 **This is the "steel product" being certified, such as a chiller, condenser, hollow metal doors. The GESA Contractor may not fill in the line with a description like "structural steel", "heating unit" or "air conditioning unit". The model number, if any, of the steel product must be listed as indicated.**

**LINE #7 IS THE MOST CRITICAL PART OF THE FORM.
FAILURE TO PROPERLY FILL OUT LINE #7 ON EACH ST FORM
MAKES THE ENTIRE FORM INVALID AND A NEW FORM MUST BE
SUBMITTED**

Line #8 This refers to the corresponding GSC-23 submittal number.

SECTION B **To be filled out by the Fabricator/Manufacturer, the firm that fabricates the product listed on Line #7.**

Line #9 This is the Fabricator's name.

Line #10 This is the Fabricator's business address.

Line #11 This is the Fabricator's business phone.

Line #12 This is the date the Fabricator receives the ST-3 from the purchaser.

Line #13 This is the Fabricator's Federal I.D. number.

Line #14 The Fabricator must insert the percentage of the cost of the articles, materials and supplies which have been mined, produced or manufactured in the U.S. for the product listed on Line #7.

SECTION C

1. Language - **No modifications, cross-outs or alterations of any type may be made to the language of this certification paragraph.**

2. Signature - Two signatures are required on the ST-3 form. The Fabricator's President/Vice President must sign on one line **and** the Secretary or Treasurer must sign as a witness. The names should be typed or printed beneath the signature lines. Failure to type in the names **does not** invalidate the ST form.

NOTES on ST-3 Forms:

- It is not necessary to submit an ST-1 with the ST-3.

- **DGS reserves the right to request additional documentation to support the percentage specified on Line 14. If the Fabricator/manufacturer refuses to produce such documentation and/or DGS deems it to be in the Commonwealth's best interests, DGS may request the Office of Inspector General to investigate the submission of the ST-3 form.**

ST-4

This form may be submitted in circumstances where the GESA Contractor believes that the "product" on Line #7 is not made in sufficient quantities to satisfy the requirements of the contract.

The information submitted by a GESA Contractor is subject to verification by the DGS. Any GESA Contractor who executes a Purchase Order or other type of purchase agreement encompassing a "steel product" prior to receiving the DGS's written determination that the "steel product" listed on Line #7 of the ST-4 form is not manufactured in sufficient quantity to meet the requirements of the Project does so at its own risk and faces penalties including, but not limited to, non-payment for the product; removal and replacement of the product at its own costs; and/or an Office of Inspector General investigation which may lead to debarment.

☞ **Domestic availability will be determined as of the date the ST-4 form is submitted to DGS for approval.**

Line #1 This is the GESA Contractor's formal business name.

Line #2 This is the GESA Contractor's business address.

Line #3 This is the GESA Contractor's business phone.

Line #4 This is the date the ST-4 form is submitted to DGS.

Line #5 This is the DGS contract number for the Project.

Line #6 This is the DGS Project description.

Line #7 **This is the "steel product" being certified, such as a chiller, condenser, hollow metal doors. The GESA Contractor may not fill in the line with a description like "structural steel", "heating unit" or "air conditioning unit".**

LINE #7 IS THE MOST CRITICAL PART OF THE FORM. FAILURE TO PROPERLY FILL OUT LINE #7 ON EACH ST FORM MAKES THE ENTIRE FORM INVALID AND A NEW FORM MUST BE SUBMITTED FOR APPROVAL.

Line #8 This refers to the corresponding GSC-23 submittal number.

Line #9 These four lines, (a) through (d), are to be filled out completely by the GESA Contractor. At least four suppliers/manufacturers must be contacted by the GESA Contractor to ascertain if the "product" on Line #7 is manufactured with domestic steel.

CERTIFICATION

1. Language - **No modifications, cross-outs or alterations of any type may be made to the language of this certification paragraph.**

2. Signature - Two signatures are required on the ST-4 form. The GESA Contractor's President/Vice President must sign on one line **and** the Secretary or Treasurer must sign as a witness. The names should be typed or printed beneath the signature lines. Failure to type in the names **does not** invalidate the ST form.

NOTE ON ST-4 FORMS:

- It is not necessary to submit an ST-1 form with an ST-4 form.

ADMINISTRATIVE PROCEDURE #13

Inspections

13.1 Occupancy/Utilization Inspection

A. The DGS may use or permit the Funding Agency to use or occupy any completed or partially completed portion(s) of the work in accordance with the General Conditions of the GESA Contract and this Administrative Procedure.

B. The request by the Funding Agency must be made, in writing, to the Director of Energy and Resource Management Office. If permission is granted, the Energy Consultant and/or DGS will establish the date and time for an Occupancy/Utilization Inspection and will notify the following:

1. Director of Energy and Resource Management Office
2. Energy Consultant
3. GESA Contractor
4. GESA Contractor's Professional
5. Funding Agency
6. Facility

C. The inspection will be conducted to evaluate the area(s) to be occupied or equipment to be utilized for conformity to the Contract Documents. The use and/or occupancy of the work does not constitute acceptance of any portion so taken or used. The Occupancy/Utilization Inspection must be attended by the DGS, the GESA Contractor's Professional, the GESA Contractor and a representative of the Funding Agency.

D. The GESA Contractor's Professional shall conduct the inspection, unless another party is designated by the DGS. A report of the Occupancy/Utilization Inspection shall be prepared and distributed in accordance with Administrative Procedure No.1, by the GESA Professional or Energy Consultant within five work days of the inspection, and shall include the following information:

1. Project Number
2. Name of Facility
3. Project Description
4. Project Location
5. Area(s) and/or equipment to be occupied/utilized
6. Attendees along with their respective title and organization
7. The responsibilities of the GESA Contractor for maintenance, heat and utilities

8. A list of all items remaining to be completed or corrected in the area(s) to be occupied or equipment to be used

9. Form GSC-46, "Certificate of Occupancy/Utilization"

13.2 Form GSC-46, "Certificate of Occupancy/Utilization"

A. The Energy Consultant and/or DGS will provide a copy of the Form GSC-46 to the GESA Contractor. The form must be prepared by the GESA Contractor's Professional and submitted in an original and four copies to the Energy Consultant and/or DGS.

B. At the conclusion of the Occupancy/Utilization Inspection, the attendees shall review the responsibilities of the GESA Contractor for maintenance, heat and utilities, the remaining items to be completed or corrected and shall sign Form GSC-46 to indicate their concurrence with the items.

C. The work list, prepared by the GESA Contractor's Professional, DGS and the Funding Agency shall be appended directly to the Form GSC-46, additional sheets may be attached as required. The work list shall indicate, in detail, all items requiring completion or correction. The failure to include an item on the work list will not relieve the GESA Contractor of its responsibility to complete all work in accordance with the Contract Documents.

D. The Energy Consultant and/or DGS shall, within five working days after receipt, review the Certificate of Occupancy/Utilization for completeness. If properly completed, the Energy Consultant/DGS shall sign, date and distribute the Form GSC-46, with any attachments, in accordance with Administrative Procedure #1.

E. The Funding Agency shall not be permitted to occupy nor utilize any portion of the work until a fully executed copy of the Form GSC-46 has been received from the Energy Consultant and/or DGS.

F. The date of the fully executed Form GSC-46 shall be the start date of any warranties or guarantees associated with the occupied area(s) or utilized equipment.

G. Any damage subsequent to the inspection due solely to the use and/or occupancy of the completed or partially completed portion of the work shall not be the responsibility of the GESA Contractor.

13.3 Final Completion Inspection

A. The Final Inspection shall be requested and conducted in accordance with the General Conditions of the GESA Contract, and this Administrative Procedure. The GESA Contractor's request for a Final Inspection must be submitted, in writing, to the Energy Consultant and/or DGS.

B. Within thirty days of receipt of the request, the Energy Consultant and/or DGS shall establish a date and time for the Final Completion Inspection and will notify the following:

1. Director of Energy and Resource Management Office or Energy Consultant

2. GESA Contractor

3. GESA Contractor's Professional

4. Project Site

5. Funding Agency

6. Facility

C. The Final Inspection must be attended by the Energy Consultant, DGS, the GESA Contractor's Professional, the GESA Contractor and a representative of the Funding Agency.

D. The GESA Contractor shall submit, at the Final Inspection, a final Application for Release of Payment to the Energy Consultant and/or DGS. The final Application for Release of Payment should be completed and submitted in its entirety and in accordance with Administrative Procedure.

E. Line numbers 9, 10, 12 and 14 of the Form GSC-17, "Recapitulation of GESA Contractor Application for Release of Payment," should not be completed until the conclusion of the Final Inspection and all items requiring funds to be retained, as provided in the General Conditions of the Contract, Article 11, have been determined. At that time the GESA Contractor and the Energy Consultant and/or DGS shall review the total amount to be retained, if any, and complete the applicable portions of the Form GSC-17. The Energy Consultant and/or DGS shall then prepare and submit the final Application for Release of Payment to the Fiscal Division in accordance with Administrative Procedure #9.

F. The Energy and Resource Management Office and Energy Consultant shall conduct the Final Inspection. The inspection shall include all aspects of the Contract(s), including any areas or equipment previously occupied or utilized by the Funding Agency or DGS. If the work is "substantially complete", in accordance with the General Conditions of the Contract, Article 1, Section 1.45, a report of the Final Inspection shall be prepared and distributed in accordance with Administrative Procedure #1, by the Energy Consultant within five work days of the inspection, and shall include the following information:

1. Project Number and Contract Number(s)

2. Name of Facility

3. Project Description

4. Project Location

5. Attendees along with their respective title and organization

6. A detailed list of all remaining work to be completed or corrected with a reasonable cost to complete each item and a statement that all items shall be completed within thirty days from the date of Final Inspection

7. The status of any pending change orders and the status of the associated work

8. The status of payment of approved change orders to include CO#, approval date, debit/credit and amount to be released for payment.

9. The status of claims, if any, to include the request date and position within the DGS system

10. The status of Requests for Extension of Time, if any, to include request date, number and position within the DGS system

11. Liquidated damages, if any, to include the number of days overrun, amount per day and total amount to be withheld

12. Recapitulation of retained amounts to include the following:

    a. Punch List Items, plus one and one-half times the aggregate value of the items

    b. Credit Change Orders

    c. Pending Claims

    d. Liquidated Damages

13. The status of Small Diverse Business Commitments

14. The status of Bonds, Guarantees, Warranties, Tests and Instructions still required, to include page and paragraph of the specifications

15. The status of the as-built drawings

16. The status of GESA Contractor's papers, Form GSC-24 ($500.00 shall be retained until properly submitted)

17. General comments, if any

18. Statement regarding the start date of all warranties and guarantees

19. Statement that the Contract has been completed in accordance with the plans and specifications

20. Statement that the GESA Contractor shall continue insurance coverage pending written permission to terminate by the DGS

21. Statement that the Report as written shall be deemed acceptable to all parties in receipt, unless written notification of objections is received by the Energy Consultant within seven days of receipt of the Final Inspection Report

22. Form GSC-47, "Certificate of Final Completion and Final Payment"

G. If through the course of the inspection, it is determined by the GESA Contractor's Professional, Energy Consultant, DGS and Funding Agency that the work is not "substantially complete", in accordance with the General Conditions of the Contract, Article 1, Section 1.45, the GESA Contractor's Professional and Funding Agency shall not issue the Certificate of Final Completion and Final Payment.

13.4 <u>Form GSC-47, "Certificate of Final Completion and Final Payment"</u>

A. The Energy Consultant and/or DGS will provide a copy of the Form GSC-47 to the GESA Contractor's Professional. The form must be prepared by the GESA Contractor's Professional and submitted in an original and four copies to the Energy Consultant and/or DGS.

B. At the conclusion of the Final Inspection, the attendees shall review all of the remaining responsibilities of the GESA Contractor, the remaining responsibilities of the GESA Contractor's Professional, the status of all pending change orders, the status of all pending Requests for Extension of Time, the status of any pending claims against the DGS and any other obligations of any party necessary to fulfill the requirements of the Contract Documents. Upon completion of this review the GESA Contractor, GESA Contractor's Professional and the Energy Consultant shall affix their signatures to the

Form GSC-47, Certificate of Final Completion to indicate their concurrence with the remaining responsibilities of each party.

C. The Final Punch List, prepared by the GESA Contractor's Professional shall be appended directly to the Form GSC-47, additional sheets may be attached as required. The punch list shall indicate, in detail, all items requiring completion or correction and a reasonable cost of completion plus one and one-half times the aggregate value of the items.

D. The Energy Consultant and/or DGS shall, within five working days after receipt, review the Certificate of Final Completion and Final Payment for completeness and attach the Form GSC-47 to the Final Inspection Report, as indicated in Final Completion Inspection, paragraph "E" above.

ADMINISTRATIVE PROCEDURE NO. 14

FIELD DISPUTES

14.1 General Information on Dispute Process

A. The Dispute Process is set forth in detail in the Disputes Article of the General Conditions.

B. The GESA Contractor shall use the Field Dispute Resolution Form attached to and incorporated by reference to this Administrative Procedure.

DGS Project GESA _____ _____ _____ Page _1__of _____	**Field Dispute Review** **Meeting Form**	This Section for DGS Use Only Contract No. . _____ Project %: 25 50 75 100 Other Date of FDR Meeting: _____/_____/_____ Date Received

SECTION 1 TO BE FILED OUT BY GESA CONTRACTOR:

A. General Description of Work Performed Since the Last FDR Meeting:

B. General Description of Work To Be Performed in the Near Future:

C. Status of Disputes Raised at Previous FDR Meetings:

D. New Disputes Arising Since the Previous FDR Meeting (for each, set forth the schedule impacts based upon the current Master Project Schedule and a proposed solution to the dispute, including days needed in an EOT, damages and the identity of the party the DBC believes is responsible for creating the dispute):

Field Dispute Review

Meeting Form

D. New Disputes Arising Since the Previous FDR Meeting (continued):

(For additional space to continue dispute identification, attach additional sheets as necessary, which will be incorporated by reference.)

CERTIFICATION BY GESA CONTRACTOR:

I hereby certify that this dispute is made in good faith; that the supporting documentation and data are accurate and complete to the best of my knowledge and belief; that the amount requested accurately reflects the contract adjustment for which the GESA CONTRACTOR believes the Department is liable; and that I am duly authorized to certify the dispute on behalf of the GESA CONTRACTOR.

_____ _____
Signature **Date**

_____
Name Printed Legibly

ADMINISTRATIVE PROCEDURE NO. 15

SMALL DIVERSE BUSINESS and SMALL BUSINESS PARTICIPATION

15.1 General Information: The GESA Contractor must meet or exceed the participation percentages per ECM provided in the Small Diverse Business Submittal for Minority Business Enterprises (MBE), Women Business Enterprises (WBE), Veteran Business Enterprises (VBEs), Service-Disabled Veteran Business Enterprises (SDVBEs), Disability-Owned Business Enterprises (DOBE), and LGBT Business Enterprises (LGBTBE) (together referred to hereinafter as Small Diverse Businesses) on the Project as follows:

A. The participation level for each ECM shall apply to that specific ECM total value.

B. The Small Diverse Business participation for each ECM may include all tiers of design and/or construction.

15.2 GESA Contractor's Duty for Each ECM Included in the GESA Contract.

A. The participation percentage for each ECM provided in the Small Diverse Business Submittal is to be maintained throughout the term of the Contract and shall apply to the ECM value.

B. The GESA Contractor shall submit a Small Diverse Business Utilization Report with each Application for Release of Payment (See section C below).

C. The GESA Contractor has until the date of the Final Inspection to meet or exceed the participation percentage for the ECM. This will be tracked through the Small Diverse Business Utilization Report.

15.3 Small Diverse Business Utilization Report

A. This report must be submitted with each Application for Release of Payment.

B. Starting with either the first full month after the Initial Job Conference or the first Application for Release of Payment (whichever is earlier), the GESA Contractor must submit a Small Diverse Business Utilization Report. Thereafter, an updated Small Diverse Business Utilization Report shall be submitted with each Application for Release of Payment.

C. Each Small Diverse Business Utilization Report must have current data (totals to date) identifying at least each element as follows:

1. Detailed information including, but not limited to, any subcontracts and purchase orders documenting the dollar value commitments to Small Diverse Business firms to be used toward the satisfaction of the ECM participation percentages provided in the Small Diverse Business Submittal. All Small Diverse Businesses identified on the Utilization Report shall be retained on the Utilization Report throughout the duration of the Project.

2. Detailed information regarding any work that is claimed to be self-performed by the GESA Contractor and therefore allegedly not eligible for subcontracting to a Small Diverse Business.

3. **Construction Subcontracts and Purchase Orders**:

a. Dollar value of all subcontracts and/or Purchase Orders awarded to date.

b. Total value of commitment to Small Diverse Businesses, indicated as both dollars and as a percentage of the total contract value.

c. For each subcontract and purchase order awarded since the previous Application for Release of Payment the:

(1). Identity and status of the Small Diverse Business as a MBE/WBE/VBE/SDVBE that will be performing the work; and

(2). The ECM for which the work will be performed; and

(3). The type of work/service/material to be performed/supplied; and

(4). The amount paid to date on each Small Diverse Business subcontract/purchase order this month.

(5). The designation of Small Diverse Business Stocking Suppliers as either a MEP (i.e., mechanical, electrical, and plumbing) Stocking Suppliers or a General Construction Stocking Supplier.

(6). The fee or commission paid to the Non-stocking Supplier. No credit will be given if the fee or commission is not listed and, the maximum credit shall not exceed 10 percent of the purchase order cost.

D. Failure to submit a Small Diverse Business Utilization Report with each Application for Release of Payment will result in an incomplete Application for Release of Payment. Such incomplete Application will be returned to the GESA Contractor and no payment will be processed until a complete Application is submitted.

E. **The GESA Contractor's Commitments to Small Diverse Businesses per ECM will be Calculated and Credited as follows:**

F. Only DGS-verified Small Diverse Businesses can be credited toward satisfying the Small Diverse Business commitments provided in the Small Diverse Business Submittal.

G. Small Diverse Business subcontractors performing at least sixty percent (60%) of the subcontract with their own employees will be credited toward the submitted percentage at 100 percent of the total dollar value of the subcontract/supply contract. Any Small Diverse Business subcontract, where the subcontractor performs less than 60% of the subcontract, will not be credited toward the submitted percentage.

H. Small Diverse Business stocking suppliers are credited at 60 percent of the total cost of the materials or supplies purchased. A stocking supplier is a regular dealer that owns, operates, or maintains a store, warehouse, or other establishment, in which the materials or supplies of the general character described by the specifications and required under the contract are bought, kept in stock, and regularly sold or leased to the public in the usual course of business.

I. Small Diverse Business non-stocking suppliers are credited at only the amount of the fee or commission charged by the Small Diverse Business non-stocking supplier for assistance in the procurement of the materials and supplies provided the fees are reasonable and not excessive as compared with fees customarily allowed for similar services and under no circumstances shall the credit, for a Small Diverse Business non-stocking supplier, exceed 10% of the purchase order cost. A non-stocking supplier does not carry inventory but orders materials from a manufacturer, manufacturer's

representative or a stocking supplier. In order for a non-stocking supplier to receive credit, it must perform a useful business function by engaging in meaningful work (i.e., negotiating price; AND determining quality and quantity; AND ordering materials; AND paying for the materials) and the fee or commission must be provided with the purchase order and the Small Diverse Business Utilization Report. Industry practices and other relevant factors will be considered.

J. Small Diverse Business manufacturers are credited at 100 percent of the total cost of the materials or supplies purchased.

K. The GESA Contractor is allowed to use contract amounts at any tier of supply or subcontracting; however the dollar value of any commitment to a Small Diverse Business cannot be counted twice.

1. If the GESA Contractor or any of its non-Small Diverse Business Subcontractors or Suppliers makes a commitment to a Small Diverse Business, the credit for the subcontract/purchase order commitment, regardless of the level or tier, shall be calculated as indicated in this Section D and credited toward the percentage provided in the Small Diverse Business Submittal.

2. In the event that the Small Diverse Business whose entire subcontract value is counted towards an ECM percentage and then subcontracts a portion of the work or supplies associated with this subcontract to another Small Diverse Business, the dollar value of the subcontract with/to this lower tier Small Diverse Business is NOT counted in the ECM commitment in order to prevent the duplicate counting of Small Diverse Business commitment dollars. In this case, the dollar value of this subsequent Small Diverse Business subcontract has already been included within the scope of work and dollar value of the Small Diverse Business commitment already counted as a part of the GESA Contractor's ECM commitment.

L. All Small Diverse Businesses must present a photocopy of their current Small Diverse Business certificate from DGS to the GESA Contractor. **The certificate must be current as of the subcontract / purchase order execution date, not revoked, lapsed or pending, in order to obtain credit for the commitment.**

M. A GESA Contractor's Small Diverse Business commitment per ECM is calculated by adding all or a percentage of the dollar commitments (as described in this Section D) to DGS-verified Small Diverse Business subcontractor s of all tiers, DGS- verified Small Diverse Business manufacturers, DGS-verified Small Diverse Business stocking suppliers, and the fee or commission paid to the DGS-verified non-stocking supplier and dividing that total amount by the total ECM price.

N. Upon receipt of the GESA Contractor Small Diverse Business Utilization Report, DGS will verify the certification status of the subcontractor, manufacturer, stocking supplier, or non-stocking supplier. Once reviewed by DGS, the dollar value of the subcontract or purchase order, or a percentage thereof, shall be calculated as part of the total dollar value of the Small Diverse Business commitment level for the ECM.

15.4 Remedies

A. The DGS may, in accordance with the General Conditions for the GESA Contract (Payments Withheld), decline to approve an Application for Release of Payment in whole or in part if the Small Diverse Business Utilization Report is not included and return the incomplete Application for Release of Payment.

B. If after the first three months following Contract execution, the GESA Contractor fails to progress in achieving the participation percentage provided in the Small Diverse Business Submittal (based upon the data supplied in the Small Diverse Business Utilization Report), the Funding Agency may withhold payments until the GESA Contractor and the Funding Agency discuss the reasons for lack of progress and achieve a resolution. The GESA Contractor is not entitled to interest on any funds withheld due to their failure to submit a properly completed Small Diverse Business Utilization Report or their failure to progress in achieving the ECM commitment levels.

C. The GESA Contractor's compliance with requirements of the Small Diverse Business participation component, including the fulfillment of any Small Diverse Business commitments in all subcontracts and purchase orders is material to the contract between the GESA Contractor and the Funding Agency. Any failure to comply with these requirements constitutes a substantial breach of the Contract. It is further understood and agreed that in the event the Funding Agency determines that the GESA Contractor has failed to comply with these requirements, the Funding Agency may, in addition to any other rights and remedies the Funding Agency may have under the contract, any bond filed in connection therewith, or at law or in equity, impose remedies as applicable on the GESA Contractor. Remedies for breach of this component may include entry into the CRP, termination, suspension, default, penalties, and/or debarment from future contracting opportunities with the Commonwealth of Pennsylvania. The remedies enumerated herein are for the sole benefit of the Funding Agency and the Funding Agency's enforcement of any provision or the Funding Agency's indulgence of any non-compliance with any provision hereunder shall not operate as a waiver of any of the Funding Agency's rights in connection with the Contract, nor shall it give rise to actions by any third parties, including any Small Diverse Business enterprises.

APPENDIX O

GESA Project Design Manual

pennsylvania

DEPARTMENT OF GENERAL SERVICES

Guaranteed Energy Savings Project Design Manual

April 2016 Edition

DGS GESA PROJECT DESIGN MANUAL

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EXHIBIT

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CHAPTER 1

PROJECT ADMINISTRATION

SECTION 100 - INTRODUCTION

100.1 PURPOSE. This Manual provides the GESA Contractor with a guideline of procedures and standards for the design and construction stages of the Department of General Services' GESA projects. The Manual's organization reflects the sequence in which services and submissions will normally occur. The Department of General Services is also referred to throughout this Manual as "DGS". The GESA Contractor will seal the drawings.

The term "Professional" used hereinafter is synonymous with the term "GESA Contractor".

100.2 EXCEPTIONS. It is not the purpose of the Manual to establish inflexible rules that hinder practical performance. If a specific situation appears to justify a deviation from the guidelines, it should be brought to the attention of Project Coordinator.

SECTION 101 - REFERENCE AND STANDARD DOCUMENTS

101.1 MANUAL INCORPORATED INTO GESA PROJECT DOCUMENTS. This Project Procedure Manual is incorporated into the GESA Contract documents and is complimentary to that Contract and documents incorporated therein.

SECTION 102 - MEETINGS, MINUTES AND REPORTS

102.1 MINUTES. The Professional is to furnish minutes of all meetings to DGS and the Funding Agency. The minutes are to be sent to the DGS Project Coordinator within one (1) week following the meeting. Minutes shall be emailed as set forth in the Administrative Procedures.

102.2 PROGRESS REPORTS. The Professional is to email DGS a Monthly Progress Report during the Design Stages as part of its monthly invoice. The Monthly Progress Report must be submitted to DGS and the Funding Agency even if an invoice is not submitted for that month. The Report must include at least the following information:

A. Percentage of design/document completion

B. Significant actions taken during the period

C. Anticipated circumstances that may affect schedule or cost

103.3 INSURANCE. No payment for any services will be made without a current certificate of Professional Liability Insurance and a current certificate of General Liability Insurance on file with the DGS Energy and Resource Management Office. It is the Professional's responsibility to provide current certificates as soon as the previous certificates expire.

SECTION 103 - APPROVALS AND COMPLIANCES

104.1 DGS APPROVAL. The Department may choose to Approve / Conditionally Accept / or Reject a Design Submission.

104.2 FUNDING AGENCY APPROVAL. The design submissions must, be approved by the Funding Agency at, or following, the Review Conference. The Professional is to secure the Funding

Agency Head's approval in the form of a letter, prior to the Construction Documents Stage approval by DGS.

104.3 REGULATORY AGENCIES. The Professional must obtain the design approval of all Local, State, Federal and other regulatory agencies having jurisdiction over the Work of the Project. Permits and approvals required at various stages are covered in more detail in subsequent chapters of this manual. The Project costs shall include the cost of permits, filing fees or similar approvals obtained during the Design Stages. The Professional shall obtain the necessary Building Permit from Pa. Department of Labor and Industry under the PA UCC Code. Commonwealth projects are exempted from the local building permit approval. Where other permit applications are part of the codes approval process, the Professional shall make application and obtain permits.

A. 'Furnish': To supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

B. 'Install': Operations at the Project site, including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations.

C. 'Funding Agency': The particular facility at which the work of the Project is located.

D. 'Provide': To furnish and install, complete and ready for the intended use.

E. 'Quality Assurance': Testing and inspection services provided by the Professional as additional services, and performed by an independent Consultant, retained by the Professional and acting on behalf of the Department, to ensure a quality project.

F. 'Quality Control': Testing services required by the specifications, and performed by an agent of the Contractor.

CHAPTER 2

ENERGY AUDIT ACTIVITIES

SECTION 200 – SITE VISIT

200.1 The Professional shall visit the site during the project-specific RFQ process and as needed during the investigation and preparation of the Investment Grade Audit (IGA). These visits should provide the Professional the opportunity to review with the Funding Agency's and Funding Agency's representatives the Project Description, the Funding Agency's purpose, the Project feasibility, site location, special design or construction considerations and any available program information.

SECTION 201 - SURVEY OF EXISTING CONDITIONS

201.1 SITE VERIFICATION. The Professional shall investigate existing site conditions visually and by measurement, as well as by examining available records and drawings, to determine the location and nature of utility lines and all other manmade conditions as well as natural conditions, that may influence the project. As-Built records and any existing survey cannot be relied upon to adequately disclose the pertinent information.

201.2 EXISTING BUILDING CONDITIONS VERIFICATION. The Professional is to survey the existing conditions as needed to determine all existing conditions affecting the GESA project ECMs. The survey shall include HVAC, Plumbing, Electrical, and all other conditions necessary for the IGA and appropriate recommendations for ECMs. As-Built drawings, if available, are only intended as a guide. DGS assumes no responsibility for the accuracy of any As-Built drawings. Surveys of existing conditions include reasonable cutting of exploratory holes and other investigations to determine the location of existing elements as necessary for coordinating the design. The Funding Agency shall determine if the exploratory hole location is acceptable, considering the facility's operation and shall assist with relocation of property and personnel, if possible and reasonable. The Funding Agency is responsible for actual cutting and patching of the holes.

201.3 AS-BUILT RECORD DRAWINGS. DGS may have access to As-Built Record Drawings for some of the projects constructed by the Department and the Former General State Authority (GSA). The Professional should review the documents available at the Facility and determine their need for as-built drawings. If they exist, As-Built record drawings will be made available.

SECTION 202 - CODES AND PERMITS

202.1 PROFESSIONAL'S RESPONSIBILITY. The Professional shall design the GESA Project in compliance with all applicable Federal, State and Local Codes, ordinances, laws, and regulations.

202.2 VARIANCES. Variances to codes and ordinances are to be avoided unless absolutely necessary for the project. If a variance must be obtained, the issue must be presented and reviewed with DGS prior to submission of the variance. In no case is a variance application to be made without prior approval of DGS.

202.3 BUILDING CODES. The Project design and construction must conform to the Pennsylvania Uniform Construction Code (UCC) adopted under Act No. 45 of 1999, as amended (35 P.S. §§ 7210.101 – 7210.1103).

A. The UCC adopts various standards and codes, including the International Building Code (IBC) for use throughout the Commonwealth of Pennsylvania. The Pa. Department of Labor and Industry will perform code enforcement and enforce the UCC. State-owned

buildings are exempt from local (Municipal, Township) review of projects for a building permit.

1. The PA Uniform Construction Code (UCC) is administered by the PA Department of Labor and Industry.
2. All Commonwealth projects are exempted from fees for plan review and building permit application.

B. Other Building Codes and Standards (Local, State and Federal) not listed may also apply.

202.4 ZONING. DGS is required to comply with local land use, setback, height and other local zoning restrictions. The scope of work for the Professional includes making application and obtaining zoning approval and variances prior to Construction Documents Submission at no additional cost to the project.

202.5 SUBDIVISION AND LAND DEVELOPMENT APPROVAL. DGS will comply with local subdivision and land development ordinances. The scope of work for the Professional includes making application and obtaining those approvals if necessary.

202.6 PERMITS. Professional shall obtain all other design approval permits, such as those issued by DEP, PHMC, Highway Occupancy permits, and permission to connect to utility systems.

SECTION 203 - LAND SURVEY

203.1 INITIAL INFORMATION. If necessary for the GESA Project, the Professional shall collect all available topographic and other site information available from the Funding Agency and DGS at the time of the initial site visit or shortly thereafter and review, analyze and determine completeness of Project Information.

203.2 OBTAINING A LAND SURVEY. An existing Property/Topographic survey, if within DGS' possession will be provided by DGS. If necessary for the GESA Project, the Professional should obtain confirmation from public records that all existing easements are shown on the land survey.

SECTION 204 - SUBSURFACE AND RELATED SITE INVESTIGATION

204.1 INTENT. If necessary for the GESA Project, the Professional, with a Civil/Structural Engineer, is to obtain data that will yield sufficient information for an accurate evaluation of the existing subsurface and related conditions for the following purposes:

A. Analysis, design and construction of foundation and substructure.

B. Analysis, design and construction of site work such as embankment, slopes, retaining structures, site and subsurface drainage, roads and pavements.

C. Soil Erosion and Sedimentation Control.

D. Analysis and cost estimation of rock and soil excavation and fill.

E. Wetlands and other land use evaluation.

F. Archaeological studies.

204.2 OBTAINING SUBSURFACE AND RELATED INFORMATION. The Professional, in collaboration with a Civil/Structural Engineer, is to gather available information from any previous studies or reports and by observing the site.

204.3 SUBSURFACE FUEL TANK INVESTIGATIONS. There are specific regulations regarding existing and new fuel storage systems. Unforeseen fuel systems, whether discovered during design or

construction, shall be addressed by the Professional in the most appropriate manner so as not to impede the project. The Professional shall use due diligence to determine the presence of or lack of underground tank systems.

204.4 SUBSURFACE UTILITY INVESTIGATIONS. When it is necessary to locate unobservable utility lines, tanks or other objects due to complexity or special circumstances of the Project, the Professional may obtain the necessary information through the use of geophysical prospecting techniques.

204.5 SOILS ENVIRONMENTAL ASSESSMENT. The Funding Agency shall alert DGS and the Professional of any previous activity which could have created soil contamination problems. Where the likelihood of contamination is real, the Department and the Professional shall jointly determine if a soils environmental assessment is appropriate. Installing improvements on top of contaminated soil is to be avoided.

SECTION 205 - DESIGN RESTRICTIONS

205.1 STEEL PRODUCTS. Pursuant to the Steel Products Procurement Act (73 P.S. §§ 1881 – 1887), steel products including approved proprietary products must be composed of steel manufactured in the U.S. Products containing foreign steel are permitted only if 75% of the cost of the product is composed of articles or materials mined, produced or manufactured in the U.S. DGS may grant an exception to the prohibition if DGS determines that the product is not manufactured of U.S. steel in sufficient quantity for the Project. The Professional shall not knowingly specify a prohibited product.

205.2 ENERGY SOURCE FOR SPACE HEATING. Heating systems or heating units installed in a facility owned by the Commonwealth shall be fueled by coal, consistent with Act 1990-28 (71 P.S. §650).

A. When an alternate fuel source is proposed, justification for not using coal is required. Information for the type of fuel proposed for this Project supporting the justification must be submitted to DGS for review.

B. The Professional's written justification to use an alternative fuel source should include such considerations as:

1. Heating system first costs, and life cycle analysis.
2. Space considerations for handling and storage.
3. Space considerations for equipment.
4. Manpower requirements for operation and maintenance of a coal system.
5. State and Federal Air Quality considerations.
6. Aesthetic appeal of the site, building and/or facility.
7. Other information you consider appropriate.
8. Using natural gas from wells located in PA may be an appropriate justification.

C. Information must be specific enough to present a provable argument for using the proposed fuel in place of coal. An extensive report is not required; information can be presented in letter form addressing items listed above.

205.3 DEVIATION FROM CONSTRUCTION CONTRACT GENERAL CONDITIONS. DGS uses our standard General Conditions to the Construction Contract for all projects. The Professional may not deviate from the standard practices and procedures established in the General Conditions without specific prior written approval from DGS.

CHAPTER 3

SCHEMATIC SUBMISSION

SECTION 300 - GENERAL

300.1 PURPOSE. The Schematic Design shall illustrate the concept, scope, scale and relationship of the project components. When the Funding Agency has accepted the IGA, the Professional shall begin to prepare the Schematic Design documents. The Design is to present the general type of construction proposed, the basic HVAC, plumbing and electrical system concepts and the relationship of the facility to the site.

300.2 SUBMISSION TO THE DGS Energy and Resource Management Office**.** Applicable Schematic Submission documents are to be delivered to Energy and Resource Management Office on or before the date established in the GESA Contract, unless another date has been approved by DGS.

300.3 SUBMISSION TO FUNDING AGENCY. The Professional is to furnish the Funding Agency with one complete set of the Schematic Submission documents to the Funding Agency main office and one complete set to the Funding Agency personnel at the Facility on the same date they are delivered to DGS.

300.4 REVIEW CONFERENCE. A conference to review the Schematic Submission with the Professional, the Funding Agency and the Energy and Resource Management Office will be scheduled by Energy and Resource Management Office. The conference will normally occur approximately one (1) week after the submission and is held at a location identified by Energy and Resource Management Office. The GESA Contractor and the Professional must attend.

300.5 Energy Consultant (EC). When the Department has engaged an Energy Consultant, the Professional is to provide one (1) set of Schematic Submission documents to the EC, on the same day the submission is delivered to DGS.

SECTION 301 - SCHEMATIC SUBMISSION DOCUMENTS

301.1 SCHEMATIC SUBMISSION PACKAGE. On the scheduled date of the Schematic Submission the Professional shall deliver a disc(s) containing the following information to the Energy and Resource Management Office: **Supply if applicable:**

A. Code Review and Analysis.

B. Design Drawings, including Cover Sheet in the appropriate format.

C. Estimated loads, telephone call reports, and Notification Letters to all Utility Companies (Electric, Gas, Water, Sewer, Telephone, etc. as applicable). Include utility reply letters confirming service, should be included if available.

D. Fuel Feasibility Study (with Coal Non-Use Justification).

E. Structural Engineers' Initial Subsurface and Related Site Investigation Reports.

F. Initial Report on Site Restrictions, including zoning, land development, flood plains, wetlands, hazardous materials, water table, sinkholes, endangered species, easements required, etc.

G. List of Regulatory Approvals/Permits – Status Report that the Professional recognizes as necessary for the Project.

H. Initial contact letter to Pennsylvania Historical and Museum Commission.

I. Additional Items, as applicable:

   a. Initial project report for flood control and/or water resources projects.

b. Initial report of water supply facilities.

c. Initial report on sewerage facilities.

d. Copy of other additional items requested by the DGS, or otherwise determined by the Professional to be required for the Project.

301.2 SITE PLANS. Site plans must include the following information:

A. A small scale Overall Site Plan showing the Project's relationship to surrounding improvements and conditions.

B. Plans of adequate scale to show the work, showing site boundaries, Limit of Contract line, existing and proposed topographic contours, at maximum two (2) foot intervals.

C. Plans should show all existing and proposed underground and aboveground utility lines, points of attachment to utility lines and point of entrance into buildings (Gas, Water, Sewerage, Steam, Electric Power, Telephone, etc.).

301.3 FLOOR PLANS. Plans are to be minimum 1/8" = 1'-0" scale, showing each floor and roof if modified. Renovations or alterations may be single line drawings superimposed on existing drawings. Floor plans shall show the relative space, size and location of all major mechanical/HVAC, plumbing, electrical, telephone, equipment rooms, as well as all programmed space.

301.4 ELEVATIONS AND SECTIONS. Principle building elevations and sections should be shown for clarification as needed.

301.5 MECHANICAL AND ELECTRICAL SYSTEMS. Drawings shall indicate the general arrangements of HVAC, plumbing and electrical system being provided. Statements of reasoning justifying the selection of the proposed systems shall be provided.

301.6 EXISTING FACILITIES. Where existing facilities are to be retained, altered, or modified, the pertinent information shall be indicated on site plans, floor plans and/or other diagrams.

SECTION 302 - REGULATORY APPROVALS AND PERMITS

302.1 REQUIREMENTS. The Professional should refer to General Conditions of the GESA Contract and this Manual relative to required submittals to applicable agencies in a timely manner.

302.2 DEPARTMENT NOTIFICATION. If any required approval is withheld by any agency, the Professional shall immediately notify the DGS Energy & Resource Office.

302.3 LIST OF REQUIRED PERMITS. With the Schematic Submission, the Professional shall include a list of all required approvals/permits with a schedule of application dates. Information concerning application documents and other requirements for each approval and permit is to accompany the list.

302.4 COAL-FIRED SYSTEMS. If the Project contains Coal-Fired Boilers, and/or Incinerators, the Professional shall discuss the Project with the appropriate regional office of the DEP, Bureau of Air Quality Control. The Professional shall make application for a permit in accordance with the latest rules and regulations. One (1) copy of the approved application must be submitted with the Construction Documents Submission.

SECTION 303 - APPROVALS AND POST-CONFERENCE ACTIVITIES

303.1 FUNDING AGENCY APPROVAL. The Funding Agency's approval must be provided before the Department will approve the Schematic Design.

303.2 DGS APPROVAL. Approval of the Schematic Submission by the Department is contingent upon the Professional making all changes requested or required.

303.3 MINUTES. The Professional shall furnish minutes of the Schematic Review Conference to the Department, Funding Agency and Energy Consultant (if applicable) within five (5) days following the conference. Professional's post-conference comments, included with the meeting minutes, shall be identified as not a part of the meeting minutes.

CHAPTER 4

CONSTRUCTION DOCUMENTS SUBMISSION

SECTION 400 - GENERAL

400.1 PURPOSE. The Construction Documents Submission ("CD") is to provide 100% complete final construction documents including drawings and specifications as required for construction.

400.2 SUBMISSION TO THE DGS ENERGY AND RESOURCE MANAGEMENT OFFICE. The Construction Documents shall be submitted on disc(s) to DGS' Energy and Resource Management Office and the Funding Agency on or before the date established in the GESA Contract, unless another date has been approved by DGS.

400.3 UCC APPLICATION FOR BUILDING PERMIT. If DGS determines that the Construction Documents Submission is adequate for building permit purposes, DGS will direct the Professional i to submit all the Construction Documents to the Pa. Department of Labor and Industry with a completed UCC Application for Building Permit. Commonwealth projects are exempt from UCC Building Permit Application fees.

400.4 REVIEW CONFERENCE. A conference to review the Construction Documents Submission with the Professional, the Funding Agency, Energy and Resource Management Office and Energy Consultant will be scheduled in a location selected by Energy and Resource Management Office, within two (2) weeks after receipt of submission. Professional, the GESA Contractor and any Consultants are required to attend the Conference.

SECTION 401 - CONSTRUCTION DOCUMENTS SUBMISSION

401.1 CONSTRUCTION DOCUMENTS SUBMISSION PACKAGE. On the scheduled date of the Construction Documents Submission, the Professional shall deliver a disc(s) containing the following information:

A. One copy of Project Specifications with the Professional's seal and signature on the Cover Page.

B. One complete set of all Construction Drawings, including the Cover Sheet, with the Professional's seals and signatures on all drawings.

C. One copy of a Report Summarizing the Status of all Utilities required for the Project (Electric, Gas, Water, Sewer, Telephone, etc., as applicable). If applicable, provide a written estimate for the Utility Company's cost to extend service to the building.

D. G. One copy of the List of Regulatory Approvals/Permits – Status Report indicating the status of the submission/review/approval process for all required permits and approvals, with copies of all approvals/permits obtained to date. Completed applications for regulatory approvals/ permits must be submitted to appropriate agencies with copies to DGS prior to Construction Documents Submission.

E. One copy of a CPM Construction Schedule, with recommended number of calendar days of construction and temporary heat requirements

401.2 SPECIFICATIONS. The Professional must submit the 100% complete specifications, including Cover Page, Table of Contents, List of Drawings, General Requirements, and technical specifications of all contracts, describing the type, quality and use of materials, equipment, processes and systems to be incorporated in the work. The Cover Page must bear the Professional's Seal and Signature.

401.3 DRAWINGS. Construction drawings are to be 100% complete dimensioned plans, elevations, sections, details, schedules and diagrams of all architectural, landscaping, civil, structural, HVAC, plumbing, electrical and other miscellaneous contract work. The Professional's seals and signatures must appear on all drawings.

A. The Professional's and respective Consultants' seals and signatures shall be affixed to all drawings.

B. Bind sets as indexed, with Cover Sheet.

C. All approvals from various regulatory agencies shall be noted on Cover Sheet of the drawings.

401.4 SITE PLAN DRAWING. The site development drawing should include the following:

A. General Construction: The CD Submission must include a site plan sheet showing the Limit of Contract line and locate staging areas, trailer locations, and the GESA Contractor parking area. The following information shall also be included as applicable to the project:
   1. Existing conditions plan with site demolition, if any.
   2. New improvements plan with all surface features indicated and detail cuts, if any.
   3. Site details of all conditions.
   4. Layout plan of new improvements with tie to control monuments, locations of easements and property lines near the work, floor elevations and source/date of survey with location/description of benchmarks.
   5. Grading and drainage plan with Stormwater Management system.
   6. Profiles of drainage lines with crossover pipes indicated.
   7. Common utility plan showing interrelationship of all utilities and the POC (Pennsylvania One Call System) Serial Number. Include a 'Utility Contact Table' as required by Act 287.
   8. Landscape plans with details.
   9. Soil erosion and sedimentation plans and details with narrative.

B. After approval of the Construction Documents submission, for purposes of Land Title/Lease Confirmation by DGS Legal Unit, the Professional shall provide an electronic file of an 11" x 17" Site Plan, showing all property lines, easements, ROWs, and Limit of Contract line. Verify exact requirements with the DGS Project Coordinator.

401.5 UTILITY SERVICES. The Professional shall provide a report summarizing the status of all utilities for the Project. The report shall indicate the nominal capacity of each service and confirm that each service is adequately sized to serve the Project. The report shall indicate what documents were provided for the DGS Legal to prepare easement agreements and the dates the documents were provided. The report shall also detail what actions are required to obtain services, when the actions are required, and who is to take the necessary actions.

SECTION 402 - REGULATORY APPROVALS AND PERMITS

402.1 CONSTRUCTION/BUILDING PERMITS. The Professional shall obtain a UCC Building Permit from the Pa/ Department of Labor and Industry. DGS requires the GESA Contractor to obtain and pay for all other necessary permits, licenses and certificates required by law for proper execution and completion of its work.

SECTION 403 - APPROVALS AND POST-CONFERENCE ACTIVITIES

403.1 Funding Agency APPROVAL. The Professional should obtain the Funding Agency's formal approval of the Construction Documents in the form of a letter to the Director of the Energy and Resource Management Office signed by the Funding Agency's Secretary, or designee, with approval authority. This letter is required following the Construction Documents Review Conference, and prior to DGS Final Approval.

403.2 DGS APPROVAL. Approval of the Construction Documents Submission by DGS is contingent on all changes requested or required being incorporated into the Construction Documents and approval of Funding Agency.

403.3 MINUTES. The Professional shall furnish minutes of the Construction Documents Review Conference to the Department and Funding Agency within five (5) days following the conference. Professional's post-conference comments, included with the meeting minutes, shall be identified as not a part of the meeting minutes.

CHAPTER 5

DRAWINGS

SECTION 500 - GENERAL

500.1 PURPOSE. This Chapter presents standards and guidelines for drawings prepared for GESA projects. Generally accepted professional practices are to be used, except where different DGS standards or practices are given.

500.2 WORKING DRAWINGS. Original drawings must be AutoCAD-generated drawings. Lettering must be legible on half-size prints. Except where drawings are diagrammatic, all drawings shall be drawn to scale.

500.3 INFORMATION. Final construction drawings on the disc shall contain adequate information, including schedules, details and pertinent information necessary to perform the work.

500.4 'AS-BUILT' RECORD DRAWINGS. Record drawings of the construction shall adhere to the industry standard for 'As-Built' Record Drawings in AutoCAD and .pdf format drawings.

SECTION 501 - SIZE, FORMAT AND APPROVALS

501.1 COVER SHEET. All projects shall have a Cover Sheet. The Index to Drawings shall list each drawing by name, sheet number and descriptive title. Cover Sheet shall have all pertinent regulatory approval references. List all Consultants, indicating their discipline.

501.2 PROFESSIONAL SEAL AND SIGNATURE. For the Construction Documents Submission, the Professional Seal of the Registrant in charge of the work must appear on all drawings, specifications, plats and reports issued by the Professional. The Architect's Seal must appear on the architectural drawings, the Engineer's Seal must appear on the engineering drawings, etc. An embossed seal, a stamp of a design identical to the seal, or a reproduction of a stamp identical to the seal, may be used with the Registrant's signature applied near or across the seal.

SECTION 502 - SYMBOLS, REFERENCES AND SCHEDULES

502.1 SYMBOLS. A Legend showing all reference symbols and abbreviations with a clear explanation of each must be provided. Symbols utilized in the development of drawings shall be those commonly recognized by Professionals throughout the building industry as being both identifiable and universal in meaning.

502.2 SCHEDULES. Provide accurate and complete schedules. Schedules shall include as applicable to the project:

A. Beam and column, and other structural member schedules with design and construction loads and information.
B. Fixture schedules (all contracts), including design conditions, size of service connections. Fixtures must be identified on the drawings.
C. Equipment schedules (all contracts), including design conditions, size and capacity, motor horsepower and all electrical characteristics.
D. Electrical panel schedules.

SECTION 503 - MISCELLANEOUS

503.1 AS-BUILT CHANGES. At the completion of the Project, the Professional shall prepare and submit record 'As-Built' drawings as further discussed in the General Conditions of the GESA Contract. The Professional shall identify 'As-Built' changes using symbol and description key on the standard title block.

CHAPTER 6

PROJECT SPECIFICATIONS

SECTION 600 - GENERAL

SECTION 601 - PROJECT MANUAL FORMAT

601.1 CONSISTENCY. The preferred format is CSI Master Format/Section Format. The AIA 'Master Spec' or similar formats are acceptable.

601.2 LIST OF DRAWINGS. This document is to be match numbers and names on cover sheet.

SECTION 602 - INSTRUCTIONS ON TECHNICAL SPECIFICATIONS

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602.1 EDITING. Specifications are to be created to suit the requirements of each individual project, editing specs to exclude all non-pertinent information. Procedures specified must not conflict with the GESA's General Conditions.

602.2 QUALITY CONTROL TESTING. Quality control tests to be done by the GESA Contractor are to be included in the Project Specifications.

602.3 BASIC CODES/REGULATIONS. Reference to an edited list of the latest edition of design codes shall be made in each appropriate section of each contract specification, as applicable. The following is a partial list, as a guide:

A. Life Safety Code – NFPA 101

B. Labor & Industry – Uniform Construction Code (UCC)

C. Pennsylvania Code – Department of Health regulations

D. National Electrical Code – NFPA 70

E. National Electrical Safety Code – ANSI C2

F. ASHRAE

G. Pennsylvania Code – Elevators, lifts, escalators, dumbwaiters, hoists and tramways – Labor & Industry 34 Code Chapters 7 and 8

H. Safety Code for Elevators and Escalators – ASME/ANSI A 17.1

I. Accessibility Codes - UCC

J. City or Local Municipal Codes

CHAPTER 7

DGS STANDARD DESIGN PRACTICES

SECTION 700 - GENERAL

700.1 PURPOSE. This Chapter provides information concerning design and drawing standards adopted by DGS as standard for GESA projects. This section in no way limits the responsibilities of the Professional and its Consultants stated or implied elsewhere.

700.2 ACCEPTABLE DGS PRACTICES. The practices included are both those written by DGS and standards referenced from other agencies. It is not the intent of this Manual to furnish a complete and up-to-date list of all acceptable industry standards. Questions should be discussed with the DGS Project Coordinator.

SECTION 701 - ARCHITECTURAL

701.1 ARCHITECTURAL. Architectural design shall be by a Professional Architect, licensed in the Commonwealth of Pennsylvania.

701.2 ROOF DECK. Metal roof decks, new or existing, shall not be used for suspension or support of ductwork, conduit, ceiling systems, lighting fixtures or any other miscellaneous equipment or items.

A. All suspended items shall be supported from the structural members or a suspension system supported by the structural members.

SECTION 702 - CIVIL/STRUCTURAL

702.1 CIVIL. Site design shall be by a Civil Engineer Registered in the Commonwealth of Pennsylvania. Design shall comply with all codes, and federal, state and local regulations and obtain required design approvals. Information shall include but not be limited to:

A. Drawings:

1. Existing site plan with all above ground and underground improvements, property line metes and bounds if the site borders property lines and site demolition, indicated and described in detail. Locate and describe two or preferably three benchmarks and indicate the source and date of the survey. Note PA One Call design notification serial number.
2. Site improvements indicating all visible surface improvements. Provide building layout dimensions from control points. Locate the Contract Limit Line and the Contractor staging and parking areas.
3. Grading and drainage with existing and new contours or point grades to allow construction. Show stormwater management system. Show all drainage structures with invert and top elevations; provide profiles with pipe crossings indicated.
4. Landscaping drawings.
5. Soil erosion and sedimentation drawings, and narrative.
6. Details of all work with section cuts on plans.

702.2 STRUCTURAL. Structural design shall be by a Professional Engineer, licensed in the Commonwealth of Pennsylvania.

A. General: Design all primary and secondary structural elements and comply with all requirements of the Pennsylvania UCC. Commonwealth office buildings are to be

designed for live load of 125 psf. Where renovating an existing building, the structural adequacy shall be analyzed for code compliance.

B. Drawings: Provide design notes with design load criteria and notes on all structural systems. Information shall be provided on drawings, which includes but is not limited to:

1. Foundation Systems: Following the recommendations of the Geotechnical Engineer Consultant, provide a complete design of foundation systems. Fully define the work, providing bearing elevations necessary to establish a clear scope of work for bidding. Consider ground water conditions and accommodate foundation drain and waterproofing systems. Drilled piers requiring inspection are to be a minimum of 30" diameter.
2. Concrete: Design in accordance with applicable current ACI specifications.
3. Structural Steel: Design in accordance with applicable current AISC specifications.
4. Steel Joists: Design in accordance with applicable current SJI specifications.
5. Steel Deck: Design in accordance with applicable current SDI specifications.
6. Cold-Formed Steel Framing: Design in accordance with applicable current AISI specifications.
7. Masonry: Design in accordance with applicable current ACI specifications.
8. Wood framing: Design in accordance with applicable current NDS specifications.
9. Other Systems: Other structural systems shall be designed in accordance with requirements of stated applicable specifications required by Code or, where no code governs, by engineering judgment.

C. Specifications: Specifications, not the drawings, are to contain testing requirements. Tests and inspections to occur are to be listed.

D. Metal Stud Bearing Walls: DGS policy does not allow Commonwealth buildings to be constructed with metal stud bearing walls.

E. Slabs On Grade Within Buildings: Slabs are to be designed to allow removal and replacement, without disturbing exterior walls or the supporting structure, unless specifically authorized.

SECTION 703 - HEATING, VENTILATING AND AIR-CONDITIONING

703.1 STEAM AND HOT WATER HEATING SYSTEMS. All equipment used for steam or hot water heating systems shall be constructed and installed in accordance with requirements of the Department of Labor & Industry, Boiler Division and ASME Boiler and Pressure Vessel Codes.

A. Steam and HWS and HWR pipes shall be steel per ASTM A 53, A 106 or A 120 Schedule 40. Condensate return pipes shall be steel per ASTM A 53, Schedule 80.

B. All valves for hot water boilers, hot water pressure vessels, high and low pressure steam boilers and pressure reducing stations shall be marked in accordance with ASME, Boiler and Pressure Vessel Code indicating type of service, capacity of valve in BTU/hr or lbs. steam per hour and operating pressure. Pressure relief valve rating shall not exceed the maximum allowable working pressure of the boiler.

C. Pipe joints for steel piping shall be threaded up to and including 2" diameter. Pipes 2-1/2" diameter and over shall be joined by welding or flanged fittings. Copper tubing shall be joined by brazing or soldering. For 3" diameter or larger, mechanical couplings may be used for low pressure hot and cold water systems only in accessible locations. Seals for mechanical couplings shall be designed for the specified operating and type service.

D. Piping for branches to baseboard radiation, fan coiled units and such other local heating equipment which may require servicing or replacement shall be provided with a union on each side of the device.

E. Connections to pumps, circulator, hot water heater and all other equipment which may require servicing or replacement shall be provided with a union on each side of the device.

F. When specifying underground pre-insulated conduit systems, all related vaults/pits shall be equipped with sump pits, sump pumps, and high water level alarms. Conduit jackets shall be vented to a location visible to facility staff. Cathodic protection shall be as required by manufacturer.

703.2 INCINERATORS. Incinerators used for burning of trash or medical waste shall conform to the requirements of DEP, and/or the local Health Department. The GESA contractor must file a permit application with DEP and other regulatory agencies prior to the Construction Documents Submission.

703.3 TESTING, ADJUSTING AND BALANCING (TAB) AGENCY. The services of a qualified TAB agency shall be provided by the GESA Contractor. Such agency shall have in its employ a Professional Engineer registered in Pennsylvania. The TAB agency shall have a minimum of five (5) years experience in the testing, adjusting and balancing of all water, hydraulic and air systems.

A. The testing and recording of all dates shall in general conform to standards of AABC or NEBB or as may be approved by the Professional.

B. All TAB reports shall be certified by the testing agent and reviewed and approved by the Professional. The report shall make record of any and all deficiencies found by the testing agent prior to, during and after testing. The Professional, prior to approval, shall provide to the Energy Consultant and Energy and Resource Management Office appropriate comments regarding such deficiencies indicating how such deficiency, if any, was corrected.

SECTION 704 - PLUMBING

704.1 BASIC REQUIREMENTS. The following provides basic requirements for the design and construction of plumbing systems. This guide does not supersede any state, municipal or other governing agency's codes and regulations.

A. Special Temperature Controls: Hot water for baths and showers in all hospitals, health care centers and other such Institutions shall be provided with temperature-pressure controllers, so that the delivered hot water temperature does not exceed 110oF.

B. Materials: Unless otherwise instructed, plumbing fixtures shall conform, as a minimum, to the following indicated standards. All fixtures shall be of a water conservation type and conform to applicable codes.

3. Piping and Fittings:

a) Water Service: Schedule 40 (Type A), galvanized steel per ASTM A 53 or ASTM A 120.

b) Water Distribution: Copper tubing Type A or Type B per ASTM B 88.

4. Sanitary Drainage System and Vents:

a) Aboveground: Type A, Type B or Type D (cast iron ASTM A 74 – service weight)

b) Underground: Type C (cast iron ASTM A 74 – heavy weight) (Type D).

c) Vents: Galvanized steel (per ASTM A 53 or cast iron per ASTM A 74 light weight). Vents through roof shall not be less than 3" diameter.

5. Rainwater Conductors: Type D (cast iron ASTM A 74 light weight).

   NOTE: Downspout and roof gutters are to be within the scope of work of the General Contractor.

6. Pipe Fittings: Malleable iron per ANSI B 16.3.

SECTION 705 - ELECTRICAL

705.1 REQUIREMENTS. Electrical design shall comply with all applicable codes, regulations and good engineering practices.

705.2 MINIMUM DESIGN CRITERIA. Electrical design shall meet or exceed the following:

A. Lighting levels shall use Illuminating Engineering Society (IES) recommendations as maximum and 80% of IES standards as minimum, unless directed otherwise by the UCC or the Department. Construction stage lighting shall meet OSHA, Standards for Light Levels.

B. Voltage drop in feeders shall not exceed 2%.

C. Voltage drop in branch circuits shall not exceed 3%.

D. All conduits, raceways, etc. shall be equipped with a green colored insulated grounding conductor. The conduit system shall not be relied upon as the only grounding path.

E. Provide 15% provisions for installation of future breakers (not just space) in all panels.

F. Panelboard schedules shall include raceway and wire size and equipment ratings.

G. Specify methods of controlling spread of fire and smoke. Specify fire-rated sealants and 'poke through' fittings.

SECTION 706 - VERTICAL TRANSPORTATION

706.1 REQUIREMENTS. Elevator, escalator, dumb-waiter, chair lift, etc. design shall comply with all applicable codes, regulations and engineering standards.

706.2 MINIMUM DESIGN CRITERIA. Vertical transportation design shall meet or exceed the following criteria:

CHAPTER 8

CONSTRUCTION CONTRACT ADMINISTRATION

SECTION 800 - GENERAL

800.1 GENERAL. The Professional's activities during the Construction Contract Administration Stage are presented in general terms.

800.2 OVERVIEW OF RESPONSIBILITIES. The Construction Phase commences when DGS issues a Notice to Proceed after accepting the Investment Grade Audit (IGA). After the Project is completed and formally accepted by DGS, the Professional shall execute a Certificate of Completion and revise the original Contract Documents, reflecting all changes recorded during the course of construction. Record As-Builts shall be delivered to DGS and be identified as "As-Built Record Drawings" in .pdf format.

800.3 ADMINISTRATION. The GESA Contractor is the lead project administrator during the Construction Phase. The Energy Consultant/Funding Agency is the prime contact for the GESA Contractor.

800.4 ROLE OF THE ENERGY AND RESOURCE MANAGEMENT OFFICE. The Energy and Resource Management Office should be copied on all design/construction-related correspondence, except shop drawings and product/material submittals unless agreed to receive to assist agency in making recommendations.

800.5 JOB CONFERENCES. The Energy Consultant if on project or GESA Professional chairs regular bi-weekly Job Conferences at the site. Attendance by the GESA Contractor and the Professional is mandatory at all Job Conferences, whether it is a regularly scheduled bi-weekly conference or a special meeting called for by DGS.

SECTION 801 - PROJECT REPRESENTATION

801.1 BASIC SERVICES. The Professional shall visit the project site at least bi-weekly during periods of construction. In addition to bi-weekly visits to project sites, the Professional is required to attend, at the request of DGS, any/all project site conferences that may be necessary to clarify the Contract Documents.

801.2 CONSULTANTS. It shall be the duty of the Professional to have his Consultants visit the project site periodically during their respective disciplines' period of active construction, at least bi-weekly, or at such intervals as required by DGS to insure the progress and quality of the work and to determine if work is proceeding in accordance with the Contract Documents.

801.3 QUALIFICATIONS. The Professional's Representative (full time or not) must be qualified by training and experience to make decisions and interpretations of the Construction Documents. DGS reserves the right to request the replacement of any Project Representative assigned to the Project who is not performing satisfactorily.

SECTION 802 - DOCUMENTS

802.1 SUBMITTALS. The Energy Consultant/Professional must promptly review and accept/reject shop drawings, samples and other submissions of the GESA Contractor.

802.2 SUPPLEMENTAL DRAWINGS. Interpretations of the Contract Drawings and Project Manuals must be reviewed and approved by Energy Consultant/DGS prior to being issued to the GESA Contractor. Drawings issued to clarify the work must be marked as "SUPPLEMENTAL", followed by the date of issue.

SECTION 803 - PROJECT CLOSE-OUT

803.1 DEPARTMENT OF LABOR AND INDUSTRY AS-BUILT RECORD DRAWINGS. The Professional is responsible for submitting to the Pa. Department of Labor and Industry a revised set of Construction Documents for approval for changes made during construction that are not in accordance with the approve Construction Documents. This revised set of Construction Documents shall be referred to as 'L&I As-Built Record Drawings' and shall be submitted in accordance with L&I UCC requirements.

803.2 DGS AS-BUILT RECORD DRAWINGS. Within ninety (90) days from the Final Inspection of the Project, the Professional shall submit Record Drawings on disc(s) showing all changes from the Construction Documents made during the course of construction. The Record Drawing shall indicate the vertical and horizontal alignment of concealed pipes, conduits and similar items. Recorded changes shall be obtained from clearly marked field prints provided by the GESA Contractor and field office. The As-Built Record Drawings shall be on disc(s) in AutoCAD and .pdf format and shall be identified as "Record Drawings", shall be delivered to, and shall become the sole property of, the Department and the Funding Agency.

803.3 OPERATION/MAINTENANCE MANUAL. After Final Inspection the following should be collected from the GESA Contractor: all shop drawings, catalog data, manufacturer's operating and maintenance instructions, warranties, guaranties, certificates, test reports and other material pertinent to operating and maintaining the facility. They must be correlated and indexed, into an organized Operation/Maintenance Manual by the GESA Contractor. The Professional, Energy Consultant and DGS must review the Operation/ Maintenance Manual for completeness and accuracy. If unacceptable, it is to be returned to the GESA Contractor with specific criticisms. If accepted, forward to a copy of all discs to DGS and one copy of all discs to the Funding Agency with all the information in .pdf format.

803.4 CERTIFICATE OF OCCUPANCY. Inspections required by the code enforcement agencies to obtain Certificate of Occupancy must be arranged by the Professional. All permits needed to permit occupancy must be obtained.

CHAPTER 9

MISCELLANEOUS INSTRUCTIONS

SECTION 900 - INTRODUCTION

900.1 INTRODUCTION. This Chapter contains instructions to the Professional on specific topics for which the Department has standards that it wants the Professional to observe, if applicable. Applicability is determined by the nature of the GESA project.

SECTION 901 - QUALITY CONTROL AND QUALITY ASSURANCE TESTING

901.1 GENERAL. The Professional is to adopt the DGS system for specifying Quality Control (by Contractor's Quality Control Agency) and Quality Assurance (by the Professional's Quality Assurance Agency) testing and inspection. The Professional is to adopt DGS terminology and approach, with the end result of ensuring that all materials deemed to require testing are tested or inspected to ensure a quality project and to comply with requirements of the UCC, including Special Inspections in Chapter 17 of the IBC.

A. The Department requires that Professionals follow our strict guidelines regarding testing and inspection in the interest of uniformity of administration. Professional is to include Quality Control Testing Services, and Quality Assurance Testing and Inspection Services for structural-related testing and inspections, adopt the Department's program and Project Manual format and terminology, and assign testing and inspection responsibilities to the recommended parties. Non-structural materials and systems which are to be independently tested or inspected are to have the testing specified within the appropriate technical specifications. The Department does not require shop testing during fabrication of structural components, when an appropriate trade association provides independent QC oversight, such as is provided for structural steel fabricators under the AISC Quality Certification Program. The Department does not ordinarily require testing of materials for which manufacturers can provide Certificates of Compliance from independent testing laboratories. These policies are not in conflict with IBC requirements.

901.2 SCOPE. All testing is to be Quality Control Testing (by the GESA Contractor's QC Agent) with random check testing under Quality Assurance (by Professional's QA Agent). Quality Control tests shall be required by specific type and frequency or quantity of tests. The exception to this is soils testing which is to be Quality Control with no specified quantities. The GESA Contractor is to do whatever testing is required, without limitation, to comply with specification standards. Construction monitoring of earthwork and soils testing is by the Professional's Geotechnical Engineer, who is acting as the QA Agent for soils work.

A. All Special Inspections required by IBC Chapter 17 are to be Quality Assurance (by Professional's QA Agent).

B. When structural Quality Control Testing is required, the technical specification for all testing requirements, where types and frequencies of tests shall be listed in detail. Testing requirements shall not be stated on the Drawings, or in the technical specification sections. Detailed descriptions of testing may be included in the specifications where necessary.

C. When structural Quality Assurance Testing or Inspection is required for all testing and inspection requirements, where types of tests and inspections only shall be listed. Testing and inspection requirements shall not be stated in the technical specification sections.

901.3 WORK ORDER FOR QUALITY ASSURANCE TESTING AND INSPECTION SERVICES

A. If Quality Assurance Testing or Inspection is required, the GESA Contractor Professional is responsible to provide this service. Based upon Project conditions, the GESA Contractor Professional is to authorize check tests and inspection hours during construction as deemed necessary to assure the GESA Contractor Professional of contract compliance and as required to comply with the IBC, including Chapter 17 of the IBC. Tests shall be standard tests that are identified by ASTM or other designation. Include any tests that might be taken in order to establish unit prices.

B. The GESA Contractor Professional is responsible for directing the Quality Assurance program. It shall solicit advice from Consultants as it deems appropriate. It should direct the testing and inspection in accordance with need, based upon minimum documentation, Contractor performance, Quality Control Agent reports, quality of materials furnished, Project conditions and UCC requirements.

C. The Energy Consultant/ Funding Agency shall be consulted prior to implementing any action by the Quality Assurance Agent. The purpose of this consultation shall be to bring areas of concern to everyone's attention and assure that all involved parties are aware of the rationale being used. The inspection staff shall also bring to the attention of the Professional any items that may be of concern that would require further review and supplemental testing. Implementation of the Quality Assurance Agent shall be a collective effort that must be closely coordinated between the Professional and the inspection staff.

D. When unsatisfactory test results occur, the Professional and ensure that appropriate corrective action is initiated.

SECTION 902 - UTILITY REQUIREMENTS

902.1 PURPOSE. The purpose is to outline the procedure for providing utilities on a GESA project.

902.2 CONSTRUCTION DOCUMENTS. As soon as practical during the Construction Documents design phase, the Professional shall contact each utility company and obtain, in writing, a final scope of work for service installation, routing plan (includes right-of-way requirements), meter location, and the utility's cost to install its service. The Professional should forward this information along with the utility company point of contact to the DGS Project Coordinator for initiation of a utility agreement(s), which is reviewed and prepared as needed by DGS lawyers. Service arrangements must be completed prior to final submission of the design to DGS for review. The necessary drawings for DGS Legal to prepare easement documents shall be included.

A. Construction documents shall include any terms and conditions that the GESA Contractor must coordinate including costs to be paid to the utilities that are not incorporated in a utility agreement(s).

902.3 UTILITY EASEMENTS/AGREEMENTS. All information must go through the Project Coordinator for tracking purposes. The Professional shall provide the GESA Project Coordinator with the final utility company information, including a written legal description of each proposed easements, along with a drawing showing the location of each easement, with the metes and bounds, as well as any other information required by DGS Legal Unit. The Project Coordinator informs the DGS Legal Unit that a utility easement/agreement(s) must be developed and discusses details and the project schedule, and transmits to Legal the utility company scope of work, the service routing plan (with right-of-way), utility company cost quote and utility company point of contact. Using this information, Legal develops a utility easement/agreement.

902.4 CONSTRUCTION DOCUMENTS SUBMISSION. The Professional must follow the service requirements of each utility company described in its scope of work. The Professional should show all service work required by the GESA Contractor on the contract documents, as well as work provided by the utility company.

902.5 CONSTRUCTION. Service applications are applied for by the GESA Contractor on behalf of the Department, designating the initial payer of use charges according to requirements of the Construction Contract. The Department will authorize changing the name of the payer at the appropriate time.

SECTION 903 - SUBSURFACE INVESTIGATIONS AND GEOTECHNICAL REPORT

903.1 SCOPE. The Professional shall obtain assistance from its Civil/Structural Engineer as set forth in these instructions and be responsible for obtaining subsurface and related data that will yield sufficient information for an accurate evaluation of the existing subsurface and related conditions for the following purposes:

A. Analysis, design and construction of foundation and substructure.

B. Analysis, design and construction of site work, including embankments, slopes, retaining structures, underground structures, site and subsurface drainage, roads and pavements.

C. Soil erosion and sedimentation control.

D. Cost analysis and estimating of 'Unclassified' excavation.

E. Analysis of excavation and fill conditions.

903.2 CONTRACTING FOR GEOTECHNICAL SERVICES. Geotechnical Services shall include test borings and other subsurface investigation, the Geotechnical Report and Construction Monitoring which shall all be included in the cost of the GESA project.

A. Specifications for Test Borings and the Geotechnical Report shall be based upon best practices, and shall include a test-boring plan based upon the proposed footprint of the work and the expected foundation type to be used.

B. The Geotechnical Report shall include specific recommendations for designing structures, slabs on grade and paving.

C. The Geotechnical Consultant shall be required to submit with the Final submission a sealed statement to the effect that the design drawings and specifications are in accordance with his recommendations.

D. The Geotechnical Report shall not contain a broad disclaimer that excuses the consultant of responsibility.

903.3 SUBMISSION OF DOCUMENTS TO THE DEPARTMENT. The Final Geotechnical Report shall be prepared, signed and sealed by a Registered Pennsylvania Professional Engineer.

A. Upon completion of the boring contract, the Geotechnical Consultant shall submit to the Professional two (2) electronic copies of a complete report, covering the field work and laboratory testing, with complete analysis of each boring and with recommendations for soil and rock bearing capacities. The Professional shall retain one (1) copy, and submit the other copy to DGS.

903.4 CONSTRUCTION DOCUMENTS SUBMISSION. As part of the Construction Documents Submission, the Professional shall submit a letter stating that this Project was designed in accordance with the recommendations of the Geotechnical Consultant. If exceptions are taken, they must be justified.

SECTION 904 - SPECIAL SITE INVESTIGATIONS

904.1 WETLANDS IDENTIFICATION AND DELINEATION. The Professional's responsibility in site selection and site expansion includes the determination of the presence of wetlands by a qualified wetlands delineation specialist, familiar with state and federal criteria and regulations. DGS will accept a letter from the Professional stating that wetlands are not found on the site. If wetlands are present, the Professional shall submit two (2) copies of the completed study to the Department.

904.2 ENVIRONMENTAL IMPACT STUDIES. For all projects, the Professional shall make a preliminary Environmental Assessment (EA) to include any environmental and historic/archeological considerations for the Project. If more extensive investigation is required, then the Professional shall prepare an Environmental Impact Statement (EIS) in accordance with the requirements of NEPA. The Professional shall submit two (2) copies on disc of the completed study to the Department.

SECTION 905 - HAZARDOUS MATERIALS

905.1 PROFESSIONAL'S RESPONSIBILITIES. The GESA Project may encompass some kind of hazardous material (Asbestos, Lead, PCB, Radon, etc.) The GESA Contractors Professional is responsible for addressing hazardous materials to the extent they may impact the Project, as more fully described in the project-specific RFQ for each GESA project.

905.2 ACT 287, UTILITIES. The Professional shall comply with the current Act 287 (amended by Act 187 of 1996), and PA One Call System provisions (73 P.S. §§176 – 186). The Professional shall contact the institutions and utility companies for location and identification of utilities on project site prior to survey. The surveyor shall identify and record PA One-Call paint marks on the survey.

SECTION 906 - SUBSURFACE UTILITY ENGINEERING

906.1 SCOPE. The Professional shall determine if Subsurface Utility Engineering is necessary for development of the GESA Project. If needed, Subsurface Utility Engineering shall be provided by the Professional to precisely locate all underground utilities on the construction drawings.

A. Appropriate geophysical prospecting techniques, including radio frequency electro-magnetic, magnetic, acoustic emission sonics, terrain conductivity and ground penetrating radar, shall be used to provide a comprehensive horizontal map and give an indication of vertical position. Select excavation may be used to determine precise depth when the Project requires.

SECTION 907 - FUEL FEASIBILITY STUDY

907.1 COAL FUEL NON-USE JUSTIFICATION. State Act 1990-28 (73 P.S. §650) requires that any heating system or heating unit installed in a Commonwealth-owned facility must use Pennsylvania coal as a source of fuel. The following should also be addressed and expanded when a fuel other than coal is proposed:

A. Using coal as the fuel for the heating system or heating unit would violate existing or reasonably anticipated environmental laws or regulations.

B. Using coal as the fuel for the heating system or heating unit would not be cost effective when compared to using other forms of energy.

C. Using electricity generated primarily from the combustion of coal would be more cost effective when compared to using coal as the fuel for the heating system or heating unit.

D. The principle fuel for the heating system or heating unit would be natural gas from wells located in Pennsylvania or wood from forests located in Pennsylvania, if such fuels were at least as cost effective as using coal as the fuel.

SECTION 908 - PREPARATION OF STANDARD DRAWINGS AND PROJECT MANUALS

908.1 DRAWING STANDARDS. The Cover Sheet, Approval Blocks, and Title Blocks must have the proper names of the approving authorities, the correct names of the Professional and Consultant and the correct Project Number and Title, etc., entered in the appropriate places. Identify on the Cover Sheet the responsibilities of the Consultants.

908.2 PROJECT MANUAL STANDARDS. The Professional shall use DGS standards for Project Manual Cover Page, Table of Contents, List of Drawings, General Requirements sections.

SECTION 909 - ARCHAEOLOGICAL AND HISTORICAL REQUIREMENTS

910.1 PHMC REVIEW. The Pennsylvania Historical and Museum Commission (PHMC) is required to review all renovation work on State-owned buildings for historical significance and all excavation work for Archaeological significance. All costs associated with this review is to be factored into the project cost. Prior to the Construction Document Submission, the Professional is requested to contact the PHMC for their review of the location and scope of the work.

A. Inquiries shall be directed to:

Bureau of Historic Preservation
Pennsylvania Historical & Museum Commission
400 North Street, Commonwealth Keystone Building, 2nd Floor
Harrisburg, Pennsylvania 17120-0093
Telephone: (717) 783-9926

B. Upon completion of their evaluation, PHMC will provide a response letter to the Professional, either indicating a finding of no significance, or requesting additional information.

910.2 ARCHAEOLOGICAL. For their archaeological review process, PHMC generally needs a map (preferably a portion of a geological survey map) showing the project location and a brief description of any ground-disturbing activity. Even an activity such as parking lot construction can be significant enough to disturb archaeological resources.

A. If PHMC's evaluation indicates a potential for archaeological resources, they may ask for a Phase I survey to identify any archaeological resources at the project location. The survey must be done by a person or persons whose qualifications meet certain requirements. PHMC has a list of some qualified people, but this list is not exclusive.

B. Based on the results of the Phase I survey, PHMC may ask for a more intensive Phase II survey to evaluate the archaeological resources at the project location. In some cases, PHMC may then ask for a Phase III survey to mitigate adverse effects to the site.

910.3 HISTORICAL. After initial contact with the applicant, PHMC checks whether the building is on or is eligible for the National Register. A survey form is used to determine eligibility. The Professional shall complete the form to the best of their ability; a historical analysis or survey is not required for this.

A. If National Registry eligibility is determined, PHMC reviews the Project based on the Secretary of the Interior's Standards for Rehabilitation. Each step in the review process may take up to thirty (30) days.

CHAPTER 10

DGS SPECIFICATIONS REQUIREMENTS

SECTION 1000 – INTRODUCTION

1000.1 PURPOSE. This Chapter contains technical guidelines and requirements documents for reference or use by the Professional. Follow the instructions preceding each document on the specific recommendations or requirements for use of that document.

SECTION 1001 - EARTHWORK SPECIFICATIONS

1001.1 DGS REQUIREMENTS. There is to be only one earthwork specification in the Project Manual. Where Site work or other General Construction specifications require earthwork, it should be specified by requiring compliance to the main earthwork specification. If there are any special earthwork or concrete work requirements not covered by the Earthwork specification, they should add these special requirements to their sections without nullifying the requirements of the Earthwork specification.

A. BASIS OF CONTRACT

1. Excavation for this Project shall be considered unclassified and shall include all types of earth and soil, any pebbles, boulders, and bedrock, municipal trash, rubbish and garbage and all types of debris of the construction industry such as wood, stone, concrete, plaster, brick, mortar, steel and iron shapes, pipe, wire, asphaltic materials, paper and glass. Unclassified excavation does not include unforeseen concrete foundations, walls, or slabs. All such materials encountered which are identified by this paragraph as unclassified shall be removed to the required widths and depths to create a finished product as shown and/or noted on the drawings and as written in the specifications. No additional compensation shall be made to the contractor for this unclassified excavation. The materials defined by this paragraph as unclassified will not be considered to be concealed conditions or unknown physical conditions below the surface of the ground for purposes of interpreting the language in the General Conditions of the Construction Contract.

B. SUBSURFACE INFORMATION

1. Any available data concerning subsurface materials or conditions based on soundings, test pits or test borings, has been obtained by the Department for its own use in designing this Project. The Test Boring logs contained within the Geotechnical Report are incorporated into the construction contract as a Contract Document. The remainder of the Geotechnical Report, with all other exhibits, is available for informational/guidance purposes only.
2. Test Boring logs reflect the conditions at the specific locations of each Test Boring only. The Department will not be responsible in any way for the consequences of failure to conduct such investigation. Excavation for the Project is “Unclassified”, as fully described in the Earthwork Section.

C. APPROVAL OF BEARING STRATA

1. The GESA Contractor shall furnish adequate advance notification to the Professional of times when footing excavations are to be completed, so that the bearing quality of bottoms may be inspected and/or tested and approved. Formwork and concreting shall follow only after this approval.

2. If the bearing at the levels indicated be found by the Professional to be inadequate, they may order the excavation carried down to sound bearing. If suitable bearing is found at a lesser

depth than indicated, the Professional may order the reduction of excavation specified or shown on the drawings.

D. QUALITY CONTROL TESTING

1. The GESA Contractor shall perform all necessary Quality Control tests and procedures for the performance of the work to produce end results specified. The GESA Contractor shall maintain clear and orderly records of such tests and procedures and make them available for field review and approval of the Professional.
2. Quality Control tests shall include tests on fill material, optimum moisture content and maximum density and field density tests of fill layers. The Q.C. Testing agent shall comment on the suitability of all subgrades, and the subgrades shall be acceptable to the Q.A. Agency.
3. Handwritten copies of field test reports shall be provided to the Contractor. They shall be given to the Contractor and inspector within two (2) hours of completion, but in no event shall the technician leave the site without providing the Contractor and inspector with a copy of the test results. This shall include density, % moisture, plan location, elevation, comments and any other relevant data. Comments shall include any condition that might have an adverse effect on the operations, including weather, drainage, etc.
4. The GESA Contractor shall request consultation with the Consulting Geotechnical Engineer on any problems that arise during construction. Copies of the daily in-place soil density tests shall be emailed to the consultant by the Contractor through the testing agency within twenty-four (24) hours of the time the tests are made.
5. The GESA Contractor shall approve each subgrade and each fill layer before proceeding to the next layer. Any area which does not meet density, % moisture or other requirements at any time, shall be suitably reworked and retested by the Contractor at his own expense.
6. The Professional a will perform Quality Assurance tests if deemed necessary for the assurance of the Professional. This does not relieve the Contractor of his responsibilities.

E. Compaction standards are to be based on Modified Proctor standards, as defined by ASTM D1557.

SECTION 1002 - CAST-IN-PLACE CONCRETE SPECIFICATIONS

1002.1 DGS REQUIREMENTS. The cast-in-place concrete specification should be based upon requirements of ACI 301, except samples are to be taken and broken by the Quality Control Agent for each 50 cy. Slump tests and recording of temperature is to occur for each truckload. Air tests are to occur with each sampling that contains air. As with earthwork, there is to be only one Cast-In-Place Concrete specification in the Specifications. Also, we want to include a penalty for accepted under-strength concrete. Include the following language in the cast-in-place concrete specification:

> "If the structural members are accepted on the basis of tests other than the original cylinder tests, the Contractor shall compensate DGS for the Contractor's failure to meet specified strength requirements by paying to DGS one hundred ($100) dollars per cubic yard for each one hundred pounds per square inch below the specified strength. The original laboratory-cured 28 day test cylinder results only shall be used to determine the difference between specified and furnished strengths."

SECTION 1003 - UNIT MASONRY ASSEMBLIES SPECIFICATIONS

1003.1 DGS REQUIREMENTS. In order to avoid the requirement in Chapter 17 – Special Inspections of the IBC for "continuous" inspection of grout placement in CMU cores, the specifications shall require that the GESA Contractor mark in an approved manner the location of filled cores for the QA Agent to verify the presence of reinforcing steel using a rebar locator and the presence of grout using an ultrasound device.

SECTION 1004 - STRUCTURAL STEEL SPECIFICATIONS

1004.1 DGS REQUIREMENTS. In order to avoid the requirement in Chapter 17 – Special Inspections of the IBC for "continuous" inspection of high-strength bolting in slip-critical connections, the Professional shall require the GESA Contractor to use Direct Tension Indicator Washers or Twist-Off bolts or other systems providing visual verification of proper tightening. Require the GESA Contractor's QC Agent to provide field proof of appropriate tightening methods and calibration of the Contractor's equipment as necessary to ensure compliance. This shall be approved by the Professional and its QA Agent.

SECTION 1005 - ARCHITECTURAL SPECIFICATIONS

1005.1 PURPOSE. To specify construction materials, methods and/or contract requirements, required to be included on project. The following provisions are to appear in all specifications, unless obviously inapplicable.

1005.2 ROOFING WARRANTY. The Professional shall include the following paragraphs in the Roofing Section for roofing work.

A. Quality Assurance:

1. Manufacturer Qualifications: The manufacturer shall have a minimum of ten (10) years of experience in the production of the type of roofing herein specified, and shall be able to show experience with projects of similar size and complexity.
2. The Installer Qualifications: The installer shall have a minimum of five (5) years of experience installing the type of roofing herein specified, on projects of similar size and complexity.

B. GESA Contractor's Warranty:

1. GESA Contractor's Responsibility: The Contractor shall take, or cause to have taken, any and all corrective measures necessary to keep the roofing system free of all defects, to the satisfaction of the Department, and to maintain the roofing system in a watertight condition. The Contractor shall have the responsibility for said corrective measures for two (2) years after the date of Final Inspection acceptance. The Contractor shall be responsible for the removal and replacement of the roofing system, to maintain the roofing system in a watertight condition. The Contractor shall also repair, or remove and replace, any part of the building, including the interior, damaged as a result of leaks in the roofing system. The interior of the building includes, but is not limited to, the furnishings and fixtures. There shall be no limit to the Contractor's liability for fulfilling the aforementioned responsibilities.

    a. Final Inspection shall include a statement, supplied by the Contractor and signed by an authorized representative of the roofing manufacturer, attesting to the fact that the roofing installation and finished condition is acceptable for warranty by that manufacturer.

2. Exclusions: The GESA Contractor shall not be responsible for repairs to, or replacement of, the roofing system, if repairs or replacement is necessary due to a natural disaster, such as lightning, flood, tornado or earthquake.

3. Notification: The Department/Funding Agency will notify the GESA Contractor, as soon as reasonably possible, after it has knowledge of defects in the roofing system. Should the Contractor fail to promptly take corrective measures, the Department/Funding Agency may undertake corrective measures. The GESA

Contractor shall be responsible for any and all expenses incurred by the Department/Funding Agency in undertaking the necessary corrective measures. In addition, undertaking of corrective measures shall in no way relieve the Contractor of any of the aforementioned responsibilities.

C. Manufacturer's Warranty:

1. The GESA Contractor shall provide the Funding Agency with a twenty (20) year warranty, furnished by the manufacturer, which shall warrant that the said manufacturer will repair any leaks in the roofing system, not to exceed the original cost of the installed roof over the life of the warranty, installed by an applicator authorized by said manufacturer.

2. Leaks from the following causes shall be covered by the manufacturer's warranty:

   a. Defects in the roofing system material.
   b. Workmanship of the authorized applicator.

3. The following exclusions are permitted in the manufacturer's warranty:

   a. Natural disasters such as lightning, hail, floors, tornadoes or earthquakes.
   b. Damage from traffic or storage of materials on the roof.
   c. Structural failure of roof deck, parapet or coping.
   d. Infiltration of moisture in, through or around walls, coping or building structure.
   e. Movement or deterioration of metal counterflashing or other metal components adjacent to the roof.
   f. Damage to the building (other than roofing and insulation) or its components adjacent to the roof.

4. The warranty shall provide that in the event a leak should occur within the warranty period, and if such leak is within the coverage of the warranty, the warrantor will, at no expense to the Funding Agency, make or have made, all necessary repairs to put the roof membrane, base flashing and roof insulation in a dry and watertight condition, using the same materials and specifications as the original application. There will be no limit to the warrantor's liability for making such repairs over the period of the warranty.

5. The warranty shall provide that if, upon proper notification, the warrantor fails to promptly repair the roof, the Funding Agency may make temporary repairs to avoid damage to the facility. Such action shall not be considered a breach of the provisions of the warranty.

6. The Funding Agency shall be permitted to make alterations, additions and repairs to the roof, within the written approved guidelines of the warrantor without jeopardizing the unexpired portion of the warranty's original term.

7. Metal roofs and exposed fasteners shall be warranted against rust. Also, on metal roofs, the manufacturer, upon completion, inspection and written acceptance of the roof installation, shall furnish a warranty covering paint finish against cracking, checking, blistering, peeling, flaking and chipping for a period of twenty (20) years.

SECTION 1006 - HVAC SPECIFICATIONS

1006.1 PURPOSE. To provide information to assist the Professional in the preparation of contract drawings and specification for the Heating, Ventilating and Air Conditioning systems, and to assure consistency in contract documents to reduce errors of omission and/or commission.

1006.2 GENERAL. The Professional shall follow these general guidelines in designing and documenting the HVAC work for all DGS projects.

A. The Professional shall comply with the latest applicable codes, standards and regulations:

1. ASHRAE Handbooks to be used as Industry Standards
2. ASHRAE Published Standards, as appropriate
3. ASHRAE 62 – Ventilation for Acceptable Indoor Air Quality
4. ASHRAE 15 – Safety Code for Mechanical Refrigeration
5. ASHRAE 34 – Number Designation and Safety Classification of Refrigeration
6. ASHRAE 90.1 – Energy Design New Buildings
7. Life Safety Code – NFPA 101
8. NFPA Published Standards, as appropriate
9. SMACNA Standards for Ductwork
10. International Energy Conservation Code
11. PA Air Quality Act, Title 5 (DEP)
12. Pennsylvania L&I Boiler Code
13. Pennsylvania Code – Health Department
14. PA UCC
15. City and Local Codes, as applicable
16. Other codes and regulations determined to be applicable

B. Vibration and Sound Controls: The Professional is to design HVAC systems with vibration and sound controls as appropriate for the spaces involved. The ASHRAE HVAC Application Manual shall be used as a guide for Vibration and Sound Design Criteria. Use of air-conditioning system condensers, especially air cooled units, are to be discussed with the Funding Agency and the Department relative to sound and vibration criteria. Professional is to monitor design and field changes during construction with the effect of changes on sound and vibration distribution. Contractor shall perform measurements and provide report to Professional for approval.

i. NOTE: The Professional shall consult with the Funding Agency and/or Funding Agency to determine requirements for special usage areas. Special attention shall be taken for such areas as auditoriums, conference rooms, classrooms and hospital patient rooms.

C. Seismic and Wind Restraint Design is required by Code and is to be designed using ASHRAE HVAC Application Manual for guidance.

D. The Professional shall present in his documents flow diagrams for all air systems, indicating hot and chilled water distribution, outside air, exhaust air, supply air and air movement within buildings and spaces. An air flow diagram is to be included in Construction Documents and all subsequent Submissions.

1006.3 HVAC SPECIFICATION GUIDE. Guide information and direction may be distributed to the Professional by the Energy and Resource Management Office during design.

A. A complete HVAC specification outline shall be provided with the Construction Documents Submission.

B. All engineering analysis and computations, drawings, specifications and other documents shall be prepared by a Registered Professional Engineer, or under the responsible supervision of a Professional Engineer, and must bear the Professional seal and signature of the Engineer.

C. The Professional is to design to good engineering practices. The Department reserves the right to direct the Professional to use materials, systems, performance characteristics, or equipment that it determines to be in the best interest of the Funding Agency, Project, and/or Department even if beyond the code requirements.

1006.4 BALANCING AND ADJUSTING HVAC SYSTEMS. The following paragraphs are intended to guide the Professional in preparing the Testing and Balancing (TAB) specifications.

A. The balancing firm's report shall include a section which will provide all information regarding all problems encountered prior to, during and remaining after test and what action should be taken to correct the problem(s).

B. The Professional must review and approve the final test report. Should problems remain to be resolved, the Professional shall submit the reports for Funding Agency/DGS review, with comments as to the nature of the problem and acceptability of the system(s) and/or action which may need to be taken.

C. No Final Reports shall be submitted which indicate that the system(s) is incomplete, inoperative or that unresolved problems exist.

D. Specification for the testing shall include:

1. The GESA Contractor shall provide as part of this contract the services of an independent testing and balancing firm as listed by the Associated Air Balance Council (AABC), NEBB or a qualified firm as approved by the Department or the Professional. The GESA Contractor will be responsible for all balancing work.
2. The GESA Contractor and its selected and approved balancing firm shall report to and review the work required with the Professional prior to beginning of work. At least two (2) 1-day inspections of the Hydronic and Air Systems at appropriate times during construction shall be made by the balancing firm and it shall report its findings to the Professional and DGS in a written report. The Professional shall impose upon the GESA Contractor that all openings, pressure taps, wells and closures required, over and above those shown on the drawings, to perform the required test and adjustments shall be installed during or after construction at no additional cost to the Funding Agency.
3. The GESA Contractor shall furnish all services for a minimum of two (2) complete adjustments of water systems and air handling and exhaust systems, water and air distribution and controls, for the first cooling season and for the first heating season after the job is in complete operation under load conditions.
4. During all tests, it shall be demonstrated that the systems are free from leaks and that all parts of the system will operate correctly. The Balancing Firm shall make final adjustments to all equipment and controls as may be required for proper operation, maintaining correct temperatures in all parts of the building. Controls shall be adjusted by the control manufacturer's mechanics, on the advice of the balancing firm.

5. The final test report shall include appropriate reference to all problems regarding the system(s) encountered prior to, during and after testing and what action should be taken to correct the problem(s), including noise and vibration.
6. The following work shall be included in the project by the GESA Contractor:
    a. Supervise the balancing of all water circulation systems and parts thereof installed under this contract to obtain the water quantities and temperature drops in all parts of the system specified in the plans and in the specifications.
    b. Supervise the balancing of the air conditioning and ventilating systems to achieve the air quantities specified at each air inlet, outlet and damper shown on the plans at the proper conditions of static pressure and temperature differential. Conduct all leakage tests on ductwork in a manner acceptable to the Professional and the Department. Leakages shall not exceed 3% of total air to be delivered.
    c. Study and report on noise and vibration problems, which may develop in the course of system balancing.
    d. Submit reports on the cooling and heating water circulating systems, ATC system, and heating and ventilating systems. These reports shall certify test methods and instruments used, all readings obtained, temperature and pressure drops, rpm of equipment, amperage of all motors, air quantities at each outlet supply, return and air balancing problems encountered and suggestions. Reports to be submitted to the Professional and the Department shall include data on <u>all</u> tests in the form normally used by AABC and NEBB. The reports must however, be varied to suit these specifications. Reports shall include fan and pump curves for the final speeds developed from the fan manufacturer's performance test data for all major equipment, and schematics for ALL systems tested.
    e. Perform tests on heating systems when the outside temperature is averaging less than 30°F and on cooling systems when the outside temperature is above 80°F.
    f. Instruct the building maintenance employees for all shifts as required during the adjusting and balancing period. Obtain signed statements from each employee verifying this instruction has been received by each.
    g. Carry out the 'start-up' of the various systems with the Contractor and with any necessary assistance of the equipment manufacturer's representative.
    h. Furnish all instruments and provide all instrumentations required to perform the above work. The equipment and instrumentations shall remain the property of the balancing Subcontractor; however, all equipment must be first approved by the Professional before being used on the Project.

1006.6 PIPE AND DUCT PENETRATIONS. In compliance with the requirements of NFPA 90A, it is essential that the Professional determine and indicate locations of all horizontal and vertical fire separations and the hourly requirement of the separation on the contract floor plans and building services.

A. The GESA project plans shall show where ducts, pipes and conduits pierce required fire rated separations with standard symbols for:

1. Duct penetration of vertical separation.
2. Duct or shaft penetrations of horizontal separation.
3. Ceiling dampers for opening protection in a floor-ceiling or roof-ceiling assembly.
4. Location of duct fire dampers.
5. Location of duct smoke detectors.

B. A duct access door shall be specified at each fire damper, and ATL sensor location, for inspection and resetting the fire damper. Typical detail(s) shall be shown on the drawings.

C. There may be occasion where ceiling or wall access panels need to be provided to reach duct access doors or above ceiling pipe valves. All access panels shall be shown on the construction drawings and the GESA Contractor shall provide the access panels.

D. Duct smoke detectors shall be furnished, installed and wired by the GESA Contractor.

E. When dampers and detectors are to be controlled by a Central Fire Management System, including sprinkler system monitoring, the GESA Contractor shall install the dampers and detectors.

G. Approved fire and smoke sealant shall be used at all pipe penetrations of fire rated walls, floors and ceilings.

1006.7 ELECTRICAL EQUIPMENT WIRING.

A. Wiring for Heating, Ventilating and Air-Conditioning:

1. All equipment for the heating, ventilating and air conditioning systems shall be furnished and installed under the GESA Contract, including furnishing all labor and materials required for the installation and connection of all electrical power wiring to and for this equipment.
2. In general, all special control equipment required for the heating, ventilating and air conditioning equipment will be furnished and installed under the GESA contract.

B. Temperature Control Wiring:

1. All interlocking control wiring in connection with the temperature control system for all heating and air conditioning systems shall be furnished, installed and connected under the GESA contract, including providing a source of power and making final power connections at each air handling unit and at each apparatus control panel location where noted on the plans.

1006.8 ABOVEGROUND STORAGE TANKS (AST) AND UNDERGROUND STORAGE TANKS (UST). The Pennsylvania Storage Tank and Spill Prevention Act (35 P.S. §§ 6021.101 – 6021.2104) dictates all installation, modification, removal and inspection activities related to regulated aboveground and underground storage systems. Therefore, the Professional shall prepare associated specifications and drawings to assure that such storage tanks comply with this Act.

A. All removal, installation and repair operations shall employ DEP certified Contractors as required.

B. Upon the discovery of fuel contamination, notify The Professional for direction.

C. All utility and regulatory permits, certifications and fees must be addressed and satisfied by the Contractor.

D. Adhere to the following requirements as a minimum:

1. Underground storage tank installation procedures shall in general conform to API recommended practices as well as DEP and PA Labor and Industry codes and regulations.
2. API Recommended Practice No. 1615 – Installation of USTs.
3. API Recommended Practice No. 1604 – Removal and Disposal of USTs.
   a. NOTE: Installation in Philadelphia County and Allegheny County shall further conform to their respective codes and regulations.

4. Provide STAGE I and STAGE II vapor recovery for gasoline.

E. Tank Requirements:

1. USTs shall be double-wall steel, 360° containment meeting the requirements of STI-P3 and UL 58 or double-wall fiberglass conforming to UL 1316, and be provided with a remote emergency shut off switch, corrosion protection of all ferrous components, vehicle protection, spill containment, and overfill protection and impervious surfaces at fill and dispensing ports.
2. All ASTs shall conform to UL 142 as a minimum and be provided with a remote emergency shut off switch, product line anti-siphon valves, vehicle collision protection, spill containment, protection fence, and overfill protection.
3. Steel USTs shall be protected from exterior corrosion with 125 mils of fiberglass reinforced polyester resin meeting the requirements of ACT 100 or ACT 100U.
4. USTs shall be anchored to an adequately sized reinforced concrete hold-down pad.
5. Containment sumps will be utilized on all UST's with submersible pumping systems.
6. Inventory and leak detection for USTs and piping shall be done electronically.
7. All product lines shall be non-metallic, sloped back to the sump and have secondary containment. Include a provision for leak detection and flow restrictors.
8. The UST interstitial space and dispenser sumps shall be monitored for leaks.
9. Provide drop tube overfill protection and spill containment at fill port.

F. Drawing Requirements – As a minimum, the following information shall be indicated:

1. Site Plan:

a. Topographic survey of site must conform to the PA Labor and Industry's area requirement stated in the Application for Approval. The plan must further indicate the location of all physical features and utilities, both aboveground and underground, relevant to the design, installation and demolition of the fuel facility.
b. Indicate all USTs, associated piping/conduit systems and island/site facilities scheduled for removal or demolition.
c. If a site assessment is necessary, develop an Environmental Boring Plan, from a copy of the Site Plan, indicating the location, depth and soil/ground sample tests for each environmental boring around the existing USTs.
d. Adequate vehicle accessibility, stack-up and entrance/egress patterns must be demonstrated for all anticipated truck types, Commonwealth fleet vehicles and the fuel delivery truck.
e. Indicate the location, size and content of each UST/AST and the associated excavation/foundation.
f. Stormwater management must be accommodated with the area affected by excavation or facility construction.
g. Property lines must be clearly represented.
h. Indicate the location of any required existing or desired monitor/recovery wells.
i. UST manholes and sumps should be out of the normal path of vehicle traffic, protected from surface water flooding and designed to be immune from snowplow damage.
j. The extent and characteristics of all paving work shall be exhibited and defined.
k. Identify and label all piping/conduit routes.
l. Indicate all fencing modifications, gate installations and vehicle collision protection features.

m. Identify apron/canopy size and dispenser island equipment. Slope apron to prevent surface water accumulation.
n. Indicate the location of all ancillary equipment and systems required to support the location of the fuel facility.
o. Identify the intended location of Contractor parking, equipment/material storage and excavated soil storage/remediation operations.
p. Indicate a means for isolating escaped product within the stormwater system.

2. Detail Drawings:

a. Provide an elevation detail of pipe/conduit penetration of wall/foundation/sumps; specify cross-over intersection and backfill requirements.
b. Provide an elevation detail of excavation cross-sections indicating all dimensional and shoring/cutback requirements.
c. Provide uniform pea gravel backfill around USTs with a minimum 12" between the UST and the hold-down pad.
d. Provide elevation details of any required monitor/recovery wells.
e. Provide clear and precise details for canopy structure and island foundation.
f. Indicate accommodation for canopy rainwater runoff.
g. Provide elevation details of UST/hold-down pad attachment and pump sumps.
h. Provide an elevation section indicating fill, vent inventory/leak sensor locations, arrangement and interface without the UST/AST.
i. Locate the inventory sensor at the UST/AST midpoint.

3. Site Assessment Program: After accurate topographic and subsurface survey information is gained and integrated onto the Site Plan, the Professional may be asked to perform a site assessment, utilizing the results from laboratory analysis of soil/ground water samples, to determine the extent and constituents of soil/ groundwater fuel contamination. The site assessment program may consist of the following tasks as requested:

a. Development of an Environmental Boring Plan for the Department's review and approval.
b. On-site placement, direction and drilling of the environmental borings to ascertain the extent of soil and ground water contamination.
c. Professional on-site representation during the boring operations with the ability to perform additional discretionary environmental borings and monitor/recovery wells.
d. Applicable laboratory analysis of soil/ground water samples for specific constituents, existing MTBE and lead concentration from former leaded gasoline USTs. Consider full range target pollutant tests at the locations of new USTs.
e. Samples are not to be homogenized or taken at recurrent boring depths.
f. All results are to be recorded and submitted to the Department to serve as a baseline reference for the site.
g. Evaluation of current and seasonal high ground water elevations, gradient and soil recharge rates.
h. Provide a site assessment program summary report to include the results of the environmental tests, the testing methodology and an assurance plan from the testing laboratory.
i. If necessary develop DEP required Site Characterization Report and/or Remedial Action Plan based on contamination after report is complete.
j. Interim remedial actions shall be executed upon the confirmation of reportable contamination.

k. The specifications/drawings will direct the Contractor to dispose or remediate a finite amount of contaminated soil.
l. Dewatering the excavation and proper disposal of any captured water, whether contaminated or not, is the Contractor's responsibility.
m. The removal and disposal of contaminated soil and ground water will be supervised by the Professional.
n. Any contamination of an extensive nature, or from other sources, not covered by the drawings or specifications, shall be considered outside the scope of the project. The Professional shall notify the Department and the Funding Agency of the results.

G. Procedure Information:

1. Requirements:

a. Design Stage Procedure:

1) If applicable the Professional shall have the local or L & I Fire Marshal review and comment on proposed UST design and installation procedure with respect to Fire and Safety requirements. File Form SP-FP2 with Plan.
2) Such reviews and comments shall be filed with DGS.
3) Such comments shall be incorporated into the contract documents.

b. Responsibility:

1) Professional may submit to Labor and Industry for review and comment, the proposed UST/AST design and installation procedure. Include in contract document complete requirement for UST/AST, regarding installation/ removal/registration, etc.
2) Contractor shall file for permit, for the Owner, with the Labor and Industry. The Owner is defined as the Funding Agency on whose property the UST will be installed.
3) Register UST removal, installation and upgrade with DEP and obtain a registration number for each UST.
4) Provide registered certification from tank fabricator.
5) Install/Remove USTs by a certified UST installer/remover.
6) Have inspected, tested and certified by a certified UST Installation Inspector.
7) Submit certified statement regarding compliance with requirements for the proper disposal of tanks required to be removed.

H. Specification Guide Information – The following information shall be incorporated into the UST specifications. The Professional shall review and modify, as necessary, to suit the specific project requirements.

1. The Storage Tank and Spill Prevention Act (35 P.S. §§ 6021.101 – 6021.2104):

a. The Pennsylvania Storage Tank and Spill Prevention Act regulates all installation, modification, removal and inspection activities related to aboveground and underground storage systems.
b. Each Contractor shall comply with the requirements of the Storage Tank and Spill Prevention Act as it applies to this project.
c. Each Contractor, prior to commencement of any work, regulated by the Act, shall provide to the Department proof of certification by the Department of Environmental Protection as a certified installer or remover.

d. Each Contractor, prior to commencement of any work, regulated by the Act, shall provide to the Department proof of certification by the Department of Environmental Protection for the required certified Inspector on this project.

2. Regulatory Submittals:

   a. The certified tank installer shall be responsible for notification and/or submittals required by the Pennsylvania Department of Environmental Protection. All notifications and submittals shall be copied and turned over to the Funding Agency, which shall file copies with project records and forward copies to the Funding Agency for the purpose of record keeping required by DEP regulations.
   b. The Pennsylvania Department of Environmental Protection, Bureau of Water Quality Management Regional Office for this project site is:

3. Soil Testing:

   a. The DEP certified installer shall conduct soil testing after removal of the storage tank(s) and pipe systems to measure for contamination which may have occurred during the operation of the system.
   b. The soil testing shall be conducted in compliance with all DEP and local regulations.
   c. The certified installer shall take separate samples of the soil and test for specific constituents.
   d. Samples shall be tested for presence of specific petroleum hydrocarbons, MTBE and lead at former leaded gas UST.
   e. The certified installer shall submit to DGS the laboratory test results, along with a copy of the methodology of testing, and a quality assurance plan from the testing laboratory.
   f. All analysis shall be conducted by DEP and EPA Methodology when available.

4. Contaminated Materials:

   a. The certified installer shall notify DEP and obtain approval for disposal of contaminated materials. Materials shall be disposed of in accordance with DEP requirements.
   b. The landfill area used for disposal of materials shall be certified to receive and bury materials contaminated by petroleum products. The Contractor shall obtain from DEP, a list of certified landfill sites. The certified installer shall make arrangements with and obtain approval from landfill manager prior to hauling material.
   c. Disposal of contaminated water, sludge, or unusable product (fuel, oil, gasoline) shall be done by a method approved by DEP and the EPA.
   d. The certified installer shall submit copies of all DEP permits, approvals and letters of notification to the Department.

SECTION 1007 - PLUMBING SPECIFICATIONS

1007.1 PURPOSE. The purpose is to provide guide information to assist the Professional in the preparation of contract drawings and specification.

1007.2 GENERAL INFORMATION. The work covered by this specification includes the Plumbing work including all labor, material, equipment and services and performing all operations in connection with the plumbing installation complete, in strict accordance with this specification and the applicable drawings.

A. The Professional shall comply with the latest applicable codes and regulations:

1. PA UCC – Pennsylvania Uniform Construction Code.
2. Fire Protection Systems – NFPA
3. Sprinklers NFPA 13
4. Life Safety Code – NFPA 101
5. Pennsylvania Code – Health Department as applicable
6. Other codes, standards and regulations, as applicable

B. The Professional is to design to good engineering practices. The Department reserves the right to direct the Professional to use materials, systems, or equipment that it determines to be in the best interest of the Funding Agency, Project, and/or Department even if beyond the code requirements.

SECTION 1008 - ELECTRICAL SPECIFICATIONS

1008.1 PURPOSE. To specify construction materials, methods and contract requirements, determined to benefit DGS included in all applicable projects.

1008.2 APPLICABLE CODES AND REGULATIONS. Electrical design shall comply with the latest applicable codes:

A. National Electrical Code – NFPA 70

B. National Electrical Safety Code – ANSI C2

C. Life Safety Code – NFPA 10 1

D. Pennsylvania UCC

E. Pennsylvania Code, Department of Health Regulations - as applicable

F. City or Local Codes, as applicable

G. Other codes, as applicable

1008.3 SPREAD OF FIRE, OR PRODUCTS OF COMBUSTION. The design and specifications shall be developed in accordance with the following.

A. All lighting, power, control and fire alarm wiring shall be run in rigid metal conduit, intermediate electrical conduit, electrical metallic tubing, flexible metallic conduit, liquidtight flexible metal conduit, surface metallic raceways, or metal wireways within the parameters established by the National Electrical Code.

B. Plastic conduit, which may produce toxic smoke or contribute to the spread of fire, shall not be used without permission from DGS. Plastic conduit installed underground or in concrete encasement will be acceptable.

C. Non-metallic sheathed cable or armored cable is not to be used, except with permission.

D. All telephone, television, electronic data processing, sound and other telecommunication cables shall be run in conduit as specified above, except as follows:

1. Data processing cables installed under raised floors shall comply with NEC Article 645.
2. Plenum conductors shall be listed as having adequate fire resistant and low smoke producing characteristics. Conductors insulated with materials that produce toxic smoke are not acceptable. The manufacturer of the cable shall certify that its product complies with the above.

1008.4 SURGE PROTECTION. All electrical systems susceptible to damage by lightning or other surges shall incorporate surge protection to protect the equipment. The equipment shall be protected from surges on the downstream side of the equipment as well as from surges on the incoming lines. Surge protection shall be specified as factory installed on all input and output terminals where the transmitting control panel is interconnected with other buildings for remote annunciation, alarm or data interface.

1008.5 INSTALLATION OF EMERGENCY OR STANDBY GENERATORS. Contract responsibilities for the furnishing and installing of materials and equipment associated with emergency or standby generators shall be broken down as described below. The project design and specifications shall be developed in accordance with the following.

A. Scope shall include:

1. Furnish and install concrete pad (minimum 6" high), vibration isolators and anchor bolts for the engine generator set(s).
2. Furnish and install the engine generator set(s).
3. Furnish and install the automatic transfer switch(s).
4. Provide pressure regulator(s) for natural gas or LP fueled engines.
5. Provide day tank(s) for diesel-fueled generators in place.
6. Provide exhaust mufflers t.
7. Furnish and install all engine exhaust piping.
8. Insulate all muffler and exhaust line piping.
9. Furnish and install drip loop(s) in exhaust line piping.
10. Furnish and install UST or AST diesel fuel tanks with level meters and piping.**

OR

1. Furnish, install all diesel fuel lines, including flexible connectors.**
2. Provide all excavation and backfill required for installation of underground tanks and fuel lines.
3. Provide motorized intake louver(s)* t
4. Provide exhaust air louver(s)*

* Finishes to be coordinated by the Professional.

** GESA Contractor shall comply with the requirements of the Storage Tank and Spill Prevention Act and shall be listed by the Department of Environmental Protection as a certified installer.

1008.6 EMERGENCY AND/OR STANDBY GENERATOR TESTING. Emergency or standby generators shall be tested at full load for four (4) hours using resistance banks.

A. Readings of all pertinent data shall be recorded at ten (10) minute intervals for the first two (2) hours, and at thirty (30) minute intervals for the remainder of the test.

B. In the event that it becomes necessary to abort the test, another full four (4) hour test shall be made after correction of the problem(s).

1008.7 MEDIUM VOLTAGE SHIELDED POWER CABLE AND FUEL TESTING. Following are cable and field testing specifications for XLP and EPR cable. The selection of the cable type will be the responsibility of the Professional in concurrence with the Funding Agency.

A. EPR Cable:

1. General :

   a. Scope – This specification covers single conductor, ethylene propylene rubber insulated, shielded and jacketed power cable for use at 5,000 or 15,000 volts, 133% insulation level. Cable shall be rated at 90ºC for normal operation; 130ºC for short circuit conditions. Cables shall be UL listed and designated MV-90 in accordance with the National Electrical Code.
   b. Standards – The cable shall meet or exceed the industry standards of the latest edition of ICEA-NEMA Standard S-68-516, WC-8 and AEIC Standard CS-6.

2. Cable:

   a. Basic Construction – Cable shall have a single Class 'B' stranded bare copper conductor, extruded semi-conducting conductor screen, ethylene propylene rubber insulation, extruded semi-conducting insulation screen, copper tape shielding and extruded PVC jacket. The cable conductor screen, insulation and the insulation screen shall be manufactured by employing an in-line triple tandem extrusion process.
   b. Conductor – Annealed copper with concentric lay Class 'B' stranding conforming to ASTM B 8 and ICEA S-68-516, Part 2.
   c. Conductor Screen – Extruded layer of semi-conducting ethylene propylene rubber compound shall be applied over the conductor. The DC volume resistivity of the screen shall not exceed 50,000 ohm/cm at 90oC when tested in accordance with AEIC No. CS-6. The conductor screen shall be clean stripping from the conductor and inseparably bound to the overlying insulation.
   d. Insulation – Ethylene propylene rubber with physical and electrical characteristics that comply with the requirements of ICEA Standard S-68-516. The insulation thickness shall be as follows for 133% insulation level.

      5 KV - 115 Mils
      15KV- 220 Mils

      The thickness at any cross-section of the insulation shall not be less than 90% of the specified thickness.

   e. Insulation Screen – Extruded layer of semi-conducting ethylene propylene rubber compound shall be applied over the insulation. The DC volume of resistivity of the screen shall not exceed 50,000 ohm/cm at 90°C when tested in accordance with AEIC No. CS-6. Average thickness shall be in accordance with AEIC.
   f. Metallic Shield – Non-magnetic metallic conducting covering consisting of a 5 mil copper tape helically applied with a minimum overlap of not less than 12.5%.
   g. Cable Jacket – Polyvinylchloride jacket meeting the physical requirements of ICEA. The jacket shall have a minimum average thickness in accordance with ICEA S-68-516.
   h. Identification – The following information shall be permanently printed every 24" on the surface of the jacket.

      1) Manufacturer/Conductor Size
      2) And Type/Insulation Type and
      3) Thickness/% Insulation Level/

4) Rated Voltage/MV-90/Year of Manufacture

3. Factory Testing and Certification:

a. DC Resistance Test – Conductor DC resistance shall meet the requirements of ICEA S-68-516.

b. AC and DC Voltage Tests – Each reel of cable shall be subjected to AC and DC tests in accordance with Part 6 of ICEA per the cable rated voltage for 133% insulation level. The cable shall be given a five (5) minute AC voltage withstand test and fifteen (15) minute DC voltage withstand test.

c. Insulation Resistance – Insulation resistance shall be measured and recorded in megohms per 1,000 ft. and when corrected to 15.6°C the series insulation resistance shall not be less the 50,000 megohms per 1,000 ft.

d. Corona Discharge – Each reel of cable shall be given a corona discharge test. The test shall be in accordance with AEIC No. CS-6, latest edition. An X-Y recording graph shall be furnished showing corona test results. The maximum partial discharge allowed is 5 pico coulombs.

e. Certification – For each reel of cable, a certified and notarized factory test report, reel numbers for cable identification with date of manufacturer and testing shall be submitted. Nine (9) copies of this certification and test report shall be submitted through the Project Inspector for approval.

B. XLP Cable:

1. General:

a. Scope – This specification covers single conductor, cross linked polyethylene insulated, shielded and jacketed power cable for use at 5,000 or 15,000 volts, 133% insulation level. Cable shall be rated at 90°C for normal operation; 130°C for emergency overload conditions; 250°C for short circuit conditions. Cables shall be UL listed and designated MV-90 in accordance with the National Electric Code.
b. Standards – The cable shall meet or exceed the industry standards of the latest edition of ICEA-NEMA Standard S-66-524, WC-7 and AEIC Standard CS-5.

2. Cable:

a. Basic Construction – Cable shall have a single Class ‘B’ stranded bare copper conductor, extruded semi-conducting conductor screen, cross-linked polyethylene insulation, extruded semi-conducting insulation screen, copper drain wire shielding and extruded PVC jacket. The cable conductor screen, insulation and the insulation screen shall be manufactured by employing an in-line triple tandem extrusion process.
b. Conductor – Annealed copper with concentric lay Class ‘B’ stranding conforming to ASTM B 8 and ICEA S-66-524, Part 2.
c. Conductor Screen – Extruded layer of semi-conducting cross-linked polyethylene compound shall be applied over the conductor. The DC volume resistivity of the screen shall not exceed 50,000 ohm/cm at 90°C when tested in accordance with AEIC No. CS-5. The conductor screen shall be clean stripping from the conductor and inseparably bound to the overlying insulation.

d. Insulation – Cross-linked polyethylene with physical and electrical characteristics that comply with the requirements of ICEA Standard S-66-524. The insulation thickness shall be as follows for 133% insulation level.

5 KV -	90 Mils
15KV-	220 Mils

The thickness at any cross-section of the insulation shall not be less than 90% of the specified thickness.

e. Insulation Screen – Extruded layer of semi-conducting cross-linked polyethylene compound shall be applied over the insulation. The DC volume of resistivity of the screen shall not exceed 50,000 ohm/cm at 90oC when tested in accordance with AEIC No. CS-5. Average thickness shall be in accordance AEIC.
f. Metallic Shield – Soft drawn uncoated copper wires helically applied over the insulation shield. The drain wire shield shall meet the requirements of ICEA S-66-524, Part 4 and UL 1072; minimum of 5,000 circular mils per inch of insulated conductor diameter. A non-metallic separator tape shall be helically applied over the metallic wire shield.
g. Cable Jacket – Polyvinylchloride jacket meeting the physical requirements of ICEA. The jacket shall have a minimum average thickness in accordance with ICEA S-66-524.
h. Identification – The following information shall be permanently printed every 24" on the surface of the jacket.

1) Manufacturer/Conductor Size
2) And Type/Insulation Type and
3) Thickness/% Insulation Level/
4) Rated Voltage/MV-90/Year of Manufacture

3. Factory Testing and Certification:

a. DC Resistance Test – Conductor DC resistance shall meet the requirements of ICEA S-66-524.
b. AC and DC Voltage Tests – Each reel of cable shall be subjected to AC and DC tests in accordance with Part 6 of ICEA per the cable rated voltage for 133% insulation level. The cable shall be given a five (5) minute AC voltage withstand test and a fifteen (15) minute DC voltage withstand test.
c. Insulation Resistance – Insulation resistance shall be measured and recorded in megohms per 1,000 ft. and when corrected to 15.6^{o}C the series insulation resistance shall not be less than 50,000 megohms per 1,000 ft.
d. Corona Discharge – Each reel of cable shall be given a corona discharge test. The test shall be in accordance with AEIC No. CS-5, latest edition. An X-Y recording graph shall be furnished showing corona test results. The maximum partial discharge allowed is 5 pico coulombs.
e. Certification – For each real of cable, a certified and notarized factory test report, reel numbers for cable identification with date of manufacture and testing shall be submitted. Nine (9) copies of this certification and test report shall be submitted through the Project Inspector for approval.

C. Field Testing:

1. General:

a. Scope – Field testing cables, splices and terminations shall consist of a non-destructive, direct current, dielectric test for insulation of primary cable system using ICEA standard procedure.
b. The GESA Contractor shall notify the Professional, Department and Funding Agency two (2) weeks prior to the date of tests. Tests must be witnessed by representatives of the Funding Agency.
c. Testing shall be by an independent testing firm acceptable to the Department. Testing is not to be by the GESA Contractor. All tests shall be made by a qualified field technician especially trained for dielectric testing and interpretation of results and regularly engaged in dielectric testing.
d. The GESA Contractor shall be responsible for disconnecting and reconnecting existing equipment as required to make these tests.
e. If at any time during the test procedure, the test is stopped due to excessive readings, the installation shall be checked to locate the problems. Corrective measures shall be taken prior to continuing the test.

2. Cable, Splicing and Termination Testing:

a. Scope – All new cables, including all splices and termination, shall be tested after installation prior to being energized. All cables not under test shall be properly grounded and tied to the shield of the cable under test. If it is necessary to repeat a test, the capacitance and absorption current shall be discharged by grounding the conductor for sufficient time to allow complete drainage. If the cable has been energized prior to testing, the capacitance shall be completely discharged by grounding the conductor in an approved manner.
b. Field Testing – Tests performed and recorded shall be of the following types:
   1) Step Voltage Tests for New Cable Circuits
   2) Step Voltage and Time Resistance (Polarization Index) Tests for Existing Circuits
c. An installation having only new cable, splices and termination shall be tested as follows:
   1) 5 KV System – Test to 25 KV DC
   2) 15 KV System – Test to 55 KV DC* (*64 KV DC for cable only)
   3) Under no circumstances is the test voltage to exceed 80% of the manufacturer's original DC over-voltage acceptance test
d. An installation consisting of a combination of new and existing cables, splices and terminations shall be tested as follows:
   1) 5 KV System – Test to 20 KV DC provided the existing system passes the meggar test
   2) 15 KV System – Test to 35 KV DC provided the existing system passes the meggar test
   3) Lower test voltages may be used upon direction from the Funding Agency or the Department
   4) Under no circumstances is the test voltage to exceed 60% of the manufacturer's original DC over-voltage acceptance test
e. The results shall be plotted in the form of a curve on kilovolt-megohm paper.
f. In the step voltage tests, voltage shall be applied evenly to the insulation in ten (10) consecutive steps of a specified magnitude or steps equal to the kilovolt rating (whichever is the lower), starting at a pre-selected and specified initial value. Voltage shall be held at each step for one (1) minute and current readings shall be taken and recorded at the end of each one (1) minute period for each voltage step. For certain very long cables, the test current will not have stabilized at the end of one (1) minute. In these cases, each step shall be held for two (2)

minutes or for sufficient time to allow for stabilization of the capacitance and absorption currents. In conducting the test, the voltage shall not be increased or decreased during the time period. At the completion of the step voltage test and when the maximum specified voltage is achieved, the voltage shall be held at this maximum for ten (10) minutes and current readings taken and recorded.

g. In the Polarization Index Test, a specified constant test voltage shall be applied for ten (10) minutes to each conductor, recording insulation resistance at 1/4, 1/2 and 3/4 and one (1) minute and every minute thereafter. The Polarization index (ratio of ten (10) minute insulation resistance to one (1) minute insulation resistance) shall be at least 1.00 to permit application of high potential in the step voltage test.

3. Test Results:

a. Determination – A determination is to be made by the testing firm field technician as soon as the test is completed, as to whether or not the system should be energized.

b. Distribution – Nine (9) certified copies of the field test reports shall be furnished to the Professional through the Project Inspector for approval, and shall include the following:

1) All readings shall be recorded and plotted on kilvoltmegohm paper
2) A written summary by the tester as to the conditions of the installation, and recommendations relative to the acceptability of the installation.

c. In the event that the Department concludes that the test results are marginal, another test shall be run prior to the expiration of the one (1) year bonding period. The test shall be arranged for and paid for by the Electrical Contractor.

SECTION 1009 - HAZARDOUS MATERIALS SPECIFICATION

1009.1 PURPOSE. Based on past project experience, the Department has developed the "Protocol Regarding Asbestos, Lead, PCB's/Mercury, Radon and Other Hazardous Materials", which includes guidance specifications for handling of hazardous materials.

1009.2 GUIDANCE SPECIFICATIONS. The Protocol and Guidance Specifications for hazardous materials work include the following:

A. Professional's Responsibilities To The Funding Agency and the Department

B. Sample Hazardous Materials Survey RFQ Letter

C. Sample Quality Assurance Hazmat Monitoring RFQ Letter

D. Guidance Spec for Removal of Asbestos-Containing Materials*

E. Guidance Spec for Disturbance of Lead-Containing Surface Coatings*

F. Guidance Spec for Removal/Disposal of PCB and Mercury-Containing Materials*

G. Guidance Spec for Radon Testing and Mitigation Design*

H. Lead-Based Paint Guidance Note for Drawings*

* Sections D through H are available upon request; contact the GESA Project Coordinator.

1009.3 EDITING. These specifications are provided for guidance only, and should not be copied verbatim. Edit specifications accordingly to suit project scope and field conditions. All guidance documents are provided to indicate the level of detail that the Department is expecting in the Construction Documents. The use of competent qualified individuals should be used for design.

CHAPTER 11

PROJECT INFORMATION EXHIBITS

EXHIBIT	TITLE
Section A	**Submission Checklists**
A1	Schematic Documents Submission Checklist
A2	Construction Documents Submission Checklist
Section B	**Drawing Standards**
B1	Cover Sheet Layout
B2	Cover Sheet Title Block
B3	Standard Sheet Title Block
Section C	**Miscellaneous Items**
C1	List of Regulatory Approvals/Permits – Status Report
C2	Boiler System Test Report
C3	Receipt for Test Boring Result Drawings
C4	Sample Electrical Panel Schedule
C5	Funding Agency Design Submission Approval Form
C6	Exceptions to L & I Special Inspections
Section D	**HazMat Protocol**
D1	Protocol Regarding Asbestos, Lead, PCB's/Mercury, Radon and Other Hazardous Materials

GESA PROJECT

SCHEMATIC DOCUMENT SUBMISSION CHECKLIST

Project Number:_____ Submission Date: _____

Project Title: _____

_____

1	❑ Transmittal Letter (w/ this Schematic Submission Checklist attached)	
2	❑ Code Review and Analysis	
3	❑ Schematic Design Drawings w/ Cover Sheet	
4	❑ Notification Letters to All Utility Companies (include reply letters if available): O Electric O Telephone O Storm Sewer O Water O TV Cable O Other O Gas O Sanitary Sewer O Other	
5	❑ Fuel Feasibility Study (w/ Coal Non-Use Justification, where applicable)	
6	❑ Structural Engineer's Initial Subsurface and Related Site Investigation Reports w/ Professional's Request for Quotes for Geotechnical Services	
7	❑ Initial Report on Site Restrictions	
8	❑ List of Required Regulatory Approvals/Permits – Status Report	
9	❑ Initial Contact Letter to PHMC	
10	❑ Report on Status of Current and Anticipated Additional Services (if applicable)	
11	❑ Additional Items as applicable (list items in Transmittal Letter)	

GESA PROJECT

CONSTRUCTION DOCUMENT SUBMISSION CHECKLIST

Project Number:_____ Submission Date: _____

Project Title: _____

_____

1	❑ Transmittal Letter (w/ this Construction Documents Submission Checklist attached)	
2	❑ Code Review and Analysis	
3	❑ Project Specifications	
4	❑ All Construction Drawings w/ Cover Sheet	
5	❑ Report Summarizing the Status of All Utilities	
6	❑ List of Required Regulatory Approvals/Permits – Status Report with copies of all applications/approvals	
7	❑ Geotechnical Report and All Other Reports (if applicable)	
8	❑ Funding Agency's Final Design Approval Letter	

Submit Final Documents to L&I for UCC Review/Approval and Building Permit after you receive the Construction Documents Submission Acceptance Letter from the Department.

1 3/4" 3/4" 34 1/2" 5" 3/4"

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF GENERAL SERVICES

List Approval Numbers and Dates for each applicable Agency.

HARRISBURG, PENNSYLVANIA

Xxxxxx X. Xxxxxxx, Governor Xxxxxx X. Xxxxxxxx, Secretary

PROJECT NO. D.G.S. 578-12 PHASE 1
ERIE CIVIC HUMAN RESOURCES CENTER
ERIE, ERIE COUNTY, PENNSYLVANIA

(VOLUME OF)

COVER SHEET INSTRUCTIONS

- Cover Sheet layout may be varied as determined by the Project Professional; however, all pertinent information must be included with adjustments, as applicable to particular projects.
- Do not place lists of abbreviations, material legends or symbols on Cover Sheet.
- Include diagrammatic Project Location Map Vicinity Map, and Institutional Map or Campus Plan.

28 1/2"

ARCHITECT / PROFESSIONAL
RIVERSIDE ARCHITECTURAL PARTNERSHIP
1234 MAIN STREET
ERIE, PA

PHONE: (918) 246-3208

STRUCTURAL ENGINEERING CONSULTANT
BIRKENSTOCK ENGINEERS
7890 NORTH SECOND AVENUE
PITTSBURGH, PA

MECHANICAL ENGINEERING CONSULTANT
BUTTONDOWN ENGINEERS
7654 EAST 42ND STREET
JOHNSTOWN, PA

INDEX TO DRAWINGS

CS-1 Cover Sheet

General Construction
Contract No. DGS 578-12 Phase 1.1

CIVIL DWGS.
C-1
C-2

ARCHITECTURAL DWGS.
AHE-1
A-2
A-3

STRUCTURAL DWGS.
S-1
S-2
S-3

H.V.A.C. Construction
Contract No. DGS 578-12 Phase 1.2

HVAC DWGS.
AHE-1
H-2
H-3

Plumbing Construction
Contract No. DGS 578-12 Phase 1.3

PLUMBING DWGS.
P-1
P-2
P-3

FIRE PROTECTION DWGS.
FP-1
FP-2
FP-3

Electrical Construction
Contract No. DGS 578-12 Phase 1.4

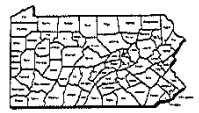
ELECTRICAL DWGS.
AHE-1
E-2
E-3

Cover Sheet title block (See full scale sample)

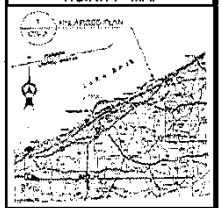
3/4"

CODE APPROVALS

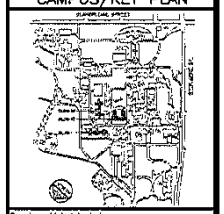
PROJECT LOCATION MAP



VICINITY MAP



CAMPUS/KEY PLAN



Drawings Listed in Index
APPROVED _____ DATE _____

SEAL

JOHN E. SMITH & ASSOCIATES
ARCHITECTS & ENGINEERS
208 MAIN STREET, SUITE 4
HARRISBURG, PENNSYLVANIA

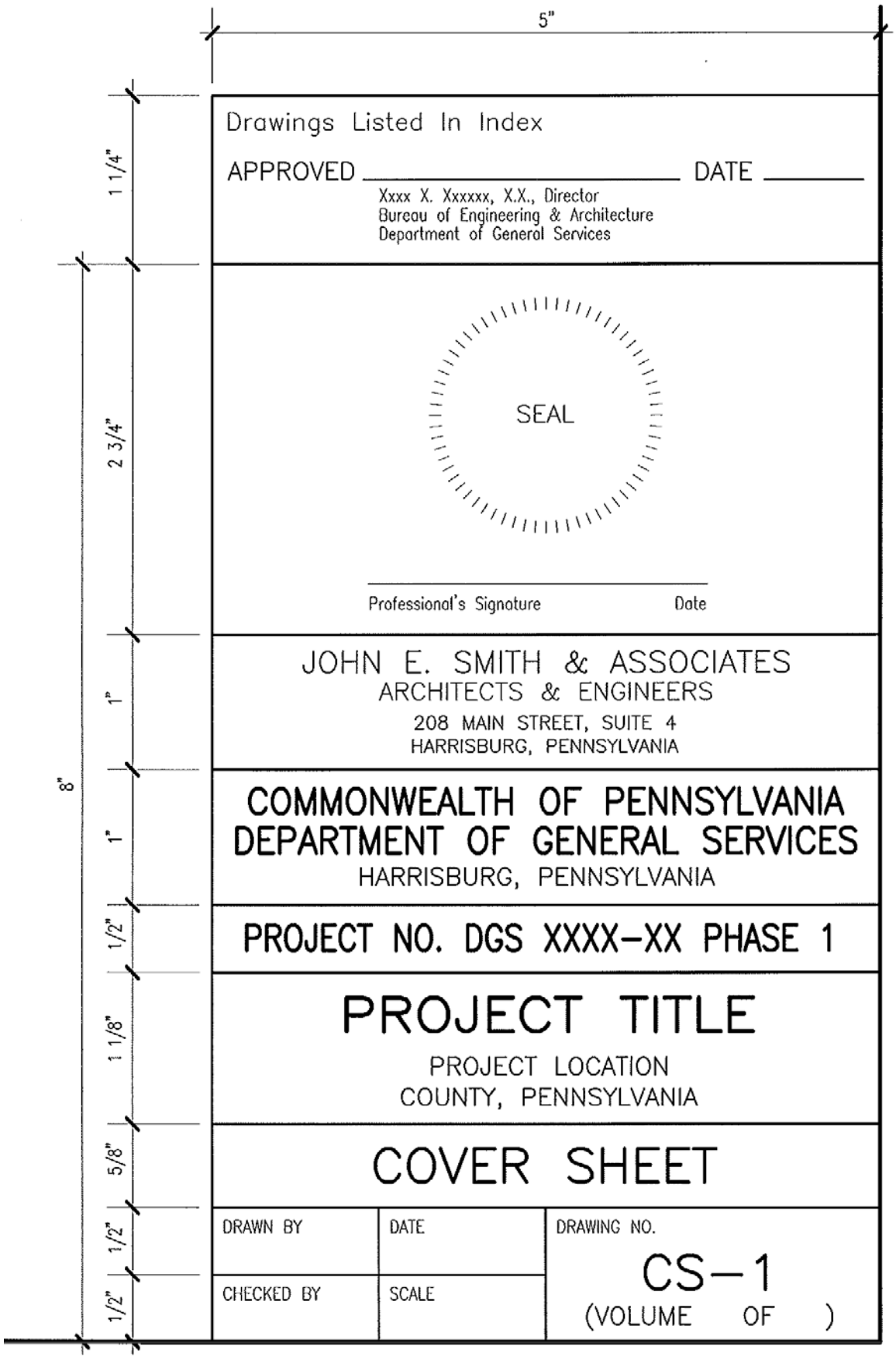
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF GENERAL SERVICES
HARRISBURG, PENNSYLVANIA

PROJECT NO. D.G.S. XXXX-XX PHASE 1

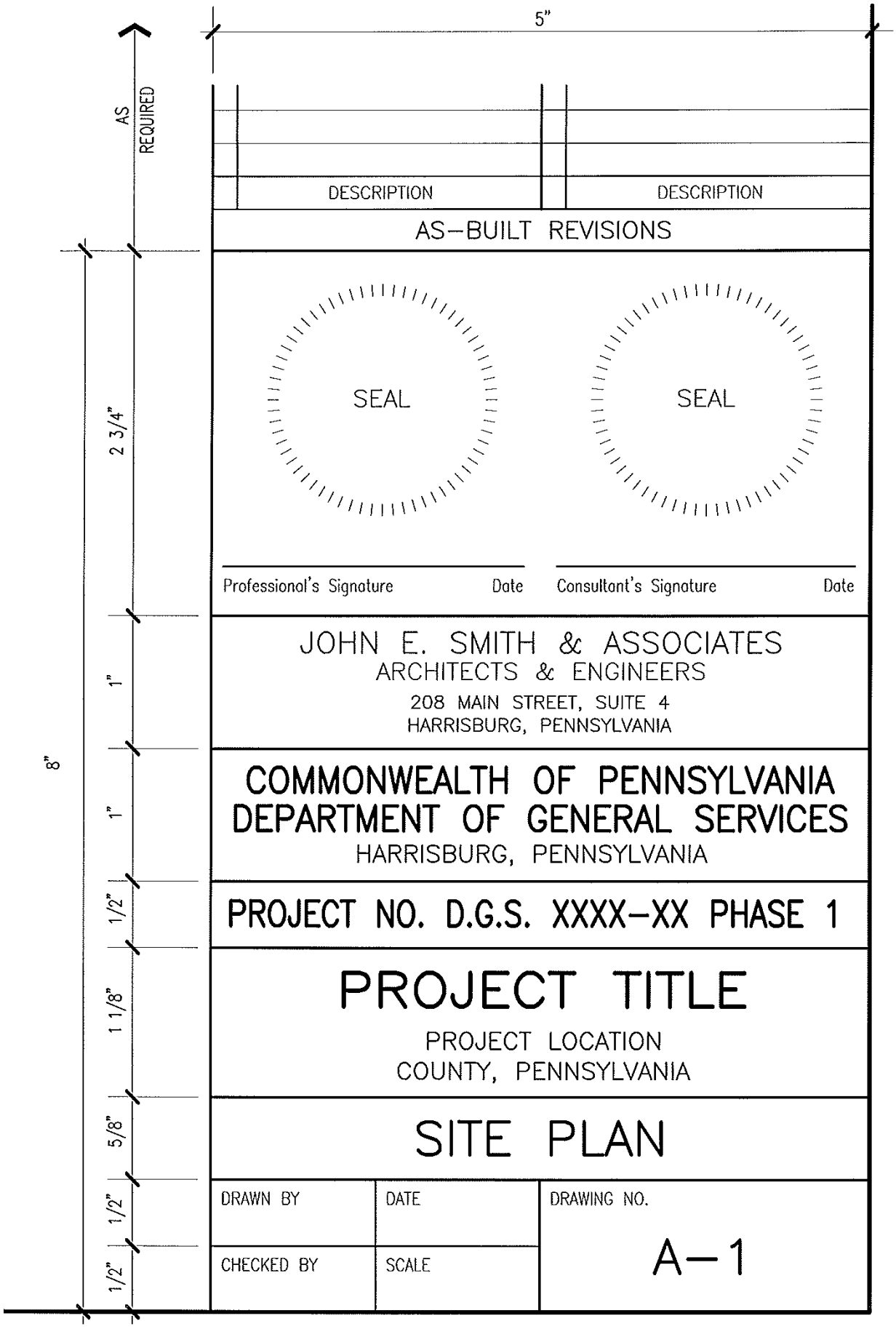
PROJECT TITLE
PROJECT LOCATION
COUNTY, PENNSYLVANIA
(VOLUME OF)

COVER SHEET

CS-1



TITLE BLOCK: For use on the Cover Sheet, only. This is a sample. Edit with the correct information for Project No., Project Title and Location, Professional's Name & Address, Director's Name, Date, etc.



TITLE BLOCK: For all drawings other than the Cover Sheet. This is a sample. Edit with the correct information for Project No., Project Title and Location, Professional's Name & Address, Drawing Title, Drawing No., Date, etc.

LIST OF REGULATORY APPROVALS / PERMITS – Status Report

Project Number: _____ Time Period: _____

Project Location: _____ Funding Agency: _____

Professional Firm: _____

NO.	ITEM	GRANTING AUTHORITY	STATUS REPORT (Incl. anticipated approval date)
1	Local Approvals (as applicable)	Municipality	
2	Zoning Permit	Municipality	
3	Storm Water Mgt. Approval	Municipality/ County	
4	Soil Erosion and Sedimentation Control Permit	Municipality/ County	
5	Land Development Plan/ Subdivision Approval	Municipality/ County	
6	PA. UCC Approval (incl. Building Permit)	L & I	
7	Pa. Natural Diversity Index	D.C.N.R.	
8	Highway Occupancy Permit	PennDOT	
9	Sanitary Sewer Module	D.E.P.	
10	Underground Tanks Approval	L&I/ D.E.P.	
12	Flood Plain Approval	D.E.P.	
13	Wetlands Approval	D.E.P.	
14	Archaeological Approval	P.H.M.C.	
15	Historical Building Approval	P.H.M.C.	
16	NPDES Approval	D.E.P.	

Instructions to Professional: Add additional Permits/Approvals, as applicable, for complete list of all required for the Project. Attach copies of all approval letters, as applicable.

Date: _____

BOILER SYSTEM TEST REPORT

PROJECT NO. D.G.S. _____

_____(Coal, Gas, Oil)_____Boiler

_____(Funding Agency)_____

PREPARED BY:

_____(Name)_____

_____(Representing)_____

REPORT DATE:

_____

SAMPLE GUIDE

Date: _____

REPORT OF BOILER SYSTEM TEST

The attached report of the Boiler System Test of Project No. D.G.S. GESA_____, High Pressure Boiler, ____(Funding Agency and Location)_____, has been prepared for the Department of General Services by _____(Contractor)_____.

SAMPLE

Testing Agent: _____

Witnessed By: _____
(Funding Agency)

Approved By: _____
(Professional)

Date: _____

Approved By: _____
(Department of - Agency -)

Date: _____

BOILER SYSTEM TEST REPORT

I. PROJECT IDENTIFICATION

Project No. D.G.S. GESA _____

High Pressure Boiler

_____(Funding Agency)_____

_____(Location)_____

Test Dates: _____

Test Dates: _____

II. SYSTEM DESIGN

A. Equipment (*)

Boiler: (Provide description, model number(s) and serial number(s) of all equipment)

Instrumentation:

Fuel Oil Service Pump:

Chemical Feed System:

(*) For coal fired included all associated system equipment – See _____.

B. Predicted Performance – Boiler/Burner – No. 2 Fuel Oil

	MINIMUM [1]	**MAXIMUM HOUR PEAK**
Actual evaporation, lbs/hr	10,000	70,000
Operation pressure, psig	150	150
Steam quality, %	99.5	99.5
Steam temperature at nozzle, ^oF	366	366
Feedwater temperature, ^oF	212	212
CO^2 at boiler outlet, %	12.8*	13.4*
Gas temperature at boiler outlet, ^oF	410	505
Total weight of exit gas, lbs/hr	11,310	77,955
Fuel burning rate, lbs/hr	650	4,480
Draft loss through boiler, WG	0.17	5.75
BTU release/ft^3 gross furnace volume	7,540	52,160
Efficiency complete unit, %	81.3	82.3

* Air Atomization

SAMPLE

[1] Data is to be provided by the boiler manufacturer and to be included as part of Contractor's bid package – See _____ for coal-fired boiler.

C. Fuel Analysis

Fuel Oil No. 2	
Specific gravity, API	0.844
Viscosity, SSU, @ 60°F	40.6
Sulfur, Wt. %, Maximum	0.15
Weight, lbs/gal	7.030
BTU, as fired	136,544

(Data from Laboratory Analysis)

III. OPERATING DATA – (Data as Result of Test)

Fuel Oil No. 2	
Evaporation	
Maximum lbs/hr	62,000
Minimum lbs/hr	5,000
Average lbs/hr	21,160
Total lbs/96 hrs	2,031.330
Steam Conditions	
Drum pressure, psig	150
Outlet temperature, °F	401
Enthalpy, saturated steam, BTU/lbs	1195.6
Purity, calorimeter, %	99.5
Feedwater Conditions	
Temperature to boiler, °F	224
Enthalpy, feedwater, BTU/lbs	192.17
Blowdown, % (approximately)	10.0
Fuel	
Consumed, gallons	16,452
BTU/gallons	136,544

IV. EFFICIENCY CALCULATIONS (Calculated for Test Data)

A. Fuel Oil No.2

$$\% \text{ Eff.} = \frac{W_s (h - hf) + Wb \times hfl}{Vo \times Hv} \times 100$$

Ws	Weight steam produced, lbs
Wb	Weight blowdown, lbs
Vo	Volume oil, gallons
H	Enthalpy saturated steam, BTU/lbs
Hf	Enthalpy feedwater, BTU/lbs
Hv	Heating value fuel, BTU/gal
Hfl	Enthalpy blowdown, BTU/lbs

SAMPLE

$$\% \text{ Eff} = \frac{2{,}031{,}330\ (1195.6 - 192.17) + 20{,}313\ (173.83)}{16{,}452 \times 136{,}544} \times 100 = 90.7$$

V. OBSERVATIONS (Information Prepared by Testing Agent)

A. The boiler performance test was conducted on _____(Date)_____ and _____(Date)_____, in accordance with the Department's standard boiler system testing procedures. The primary interest of the test was to determine the ability of the boiler system components furnished and installed under Project D.G.S. GESA_____, to satisfy the requirements of the system under normal institutional steam demand. No. 2 fuel oil was burned for the entire ninety-six (96) hour test.

B. A capacity test of approximately one (1) hour duration was run. Difficulty was experienced at peak of _____ lbs. per hour. The lack of sufficient quantity of boiler feedwater resulted in this limitation of capacity.

C. The ninety-six (96) hour test was started at 10:00 A.M. on ____(Date)_____, and ended at 10:00 A.M. on _____(Date)_____. No difficulties were encountered other than the limitation as detailed in Paragraph B.

D. The calculated overall boiler efficiency was 90.7%. This obviously high calculated efficiency is believed related to: (1) the steam flow recorder calibration factor and need to change orifice size and (2) an oil flow meter range below that recommended by the meter manufacturer.

E. Difficulty was experienced in feeding the boiler at near peak conditions while using the existing Funding Agency boiler feedwater system. Peak boiler steam capacity was not obtained.

F. The smoke density of combustion gases was satisfactory and in compliance with DEP regulations.

G. The boiler water chemical control was not satisfactory. Concentrations exceeded recommended control limits throughout the test.

H. The boiler chemical feed system failed on the third day of the test due to cutout of electrical overload in pump motor. Piping restrictions would cause such a condition.

I. The installation, operation and performance of the system components were satisfactory except as follows:

- ❖ Funnel drain to discharge overflow from injector was inadequately sized resulting in flooding boiler room floor. Drain piping size should be increased.

SAMPLE

- ❖ The orifice related to the Bailey steam flow recorder should be changed so as to have the recorded flow read direct without correction factor.

VI. SUMMARY (Information Prepared by Testing Agency)

A. The results of the test were satisfactory with the exception of items listed under VI above. Those items considered to be the responsibility of the Mechanical Contractor should be corrected promptly. Other items of a design nature are offered for consideration by the Authority. Some items are the responsibility of the Funding Agency. All safety controls and lockout devices were tested and found to be satisfactory.

VII. RECOMMENDATIONS (Provided by Design Professional)

- ❖ Shall verify test results are proper.
- ❖ Shall comment as to action to be taken regarding any noted deficiencies, if any.
- ❖ Shall recommend acceptance or qualified rejection of boiler and provide action to be taken.
- ❖ For coal fired boilers, the Contractor shall obtain from DEP, Bureau of Air Quality Management 'Certification to Operate'. A copy shall be included in report.

VIII. ATTACHMENTS

A. Data sheets, Boiler System Test (for each test day)

B. Steam Flow Recorder Charts (for each test day)

C. Fuel Analysis

D. List of Representatives in Attendance (for each test day)

E. Copy of 'Certificate to Operate'

SAMPLE

SAMPLE ELECTRICAL PANEL SCHEDULE

PANEL NAME:	PANELBOARD "S"	NO. OF POLES:	30
LOCATION:	STORAGE	TYPE:	NQOD
VOLTAGE:	120 / 208V, 3 PHASE, 4 WIRE	BRACING:	10 KAIC SYM
AMPACITY:	100 AMP	MAINS:	100 M.L.O.

LOAD SERVED	COND.	GND.	WIRE SIZE	WIRE NO.	AMPS	POLES	POLE NO.	KW PER PHASE A	KW PER PHASE B	KW PER PHASE C	POLE NO.	POLES	AMPS	WIRE NO.	WIRE SIZE	GND.	COND.	LOAD SERVED
							1	1.0			2							
AHU-2	3/4	10	10	3	20	3	3		1.0		4	3	20	2	12	12	3/4	AHU-1
							5			0.8	6							
EC-1	3/4	12	12	2	20	1	7	1.0			8	1	20	2	12	12	3/4	EC-2
EC-3	3/4	12	12	2	20	1	9		5.5		10	1	20	2	12	12	3/4	EC-4
EXTERIOR RECEPTACLE	3/4	12	12	2	20	1	11			5.5	12	1	20	2	12	12	3/4	CHILLER HEAT TAPE
RECEPTACLES	3/4	12	12	2	20	1	13	5.5			14	1	20	2	12	12	3/4	RECEPTACLES
FOLDING DOOR POWER	3/4	12	12	2	20	1	15		0		16	1	20	2	12	12	3/4	GARAGE DOOR POWER
CLOCK POWER/LIGHT	3/4	12	12	2	20	1	17		1.0	0	18	1	20	2	12	12	3/4	PUMPS CP-2, CP-3
CANOPY LETTERS	3/4	12	12	2	20	1	19	0		0.8	20	1	20	2	12	12	3/4	EXT. LIGHT CONTROL
RECEPTACLES	3/4	12	12	2	20	1	21	1.2			22	1	20	2	12	12	3/4	RECEPTACLES
RECEPTACLES	3/4	12	12	2	20	1	23		1.2		24	1	20	2	12	12	3/4	RECEPTACLES
RECEPTACLES	3/4	12	12	2	20	1	25			1.2	26	1	20	2	12	12	3/4	RECEPTACLES
RECEPTACLES	3/4	12	12	2	20	1	27	0.8			28	1	20	2	12	12	3/4	RECEPTACLES
RECEPTACLES	3/4	12	12	2	20	1	29		5.5		30	1	20					SPARE
BOOKSTORE TRACK	3/4	12	12	2	20	1	31			5.5	32	1	20	2	12	12	3/4	BOOKSTORE TRACK
BOOKSTORE TRACK	3/4	12	12	2	20	1	33	5.5			34	1	20					SPARE
BOOKSTORE TRACK	3/4	12	12	2	20	1	35		0		36	1	20	2	12	12	3/4	LOBBY DISPLAY TRACK
LOBBY DISPLAY TRACK	3/4	12	12	2	20	1	37			0	38	1	20	2	12	12	3/4	LOBBY DISPLAY TRACK
LOBBY DISPLAY TRACK	3/4	12	12	2	20	1	39	0			40	1	20					SPARE
SPARE					20	1	41		0		42	1	20					SPARE
TOTAL KILOWATTS PER PHASE								7.3	6.5	6.3								
								2.0	1.4	1.0								

TOTAL A PHASE KILOWATTS =	9.0	TOTAL A PHASE AMPS =	75
TOTAL B PHASE KILOWATTS =	7.9	TOTAL B PHASE AMPS =	66
TOTAL C PHASE KILOWATTS =	7.3	TOTAL C PHASE AMPS =	61
TOTAL 3 PHASE KILOWATTS =	24.2	TOTAL 3 PHASE AMPS =	67

FUNDING AGENCY DESIGN SUBMISSION APPROVAL FORM

Project Number: _____ Date: _____

Project Title: _____

_____

The _____ has completed its review of the Construction Document Submission on the GESA Project dated _____, for the above-referenced Project, and hereby accepts and approves the design of the project with comments, if any attached to this sheet

APPROVED BY: _____

Funding Agency Representative Date

_____

Title

cc: Project Coordinator

LABOR & INDUSTRY
DEPARTMENT OF
COMMONWEALTH OF PENNSYLVANIA

BUREAU OF OCCUPATIONAL AND INDUSTRIAL SAFETY
HARRISBURG, PA 17120

717-787-3806 Fax: 717-783-5002 www.dli.state.pa.us

May 07, 2007

Gary R. Taylor, P.E.
Director
Bureau of Engineering & Architecture
Room 203
18th & Herr Streets
Harrisburg, Pa. 17125

Re: Special Inspections

Dear Mr. Taylor,

Please be informed that upon a review of the Bureau of Engineering & Architecture's Special Inspection summary, submitted to this Department on April 18, 2007, we find no opposition to your special inspection program as presented.

It is our opinion that your inspection and test program, as summarized, meets both the spirit and the intent of the 2006 International Building Code chapter 17. However, be advised, that thru the adoption of future triennial code editions, we may have to revisit this matter if the testing and inspection requirements were to change.

If I can be of any further assistance please do not hesitate to contact me at 717-787-2525 of email at rseiler@state.pa.us.

Sincerely,

Ronald Seiler BCO
Chief
Buildings Plan Review Division

Cc: Edward Leister
File

APPENDIX P

Environmental Statement

ENVIRONMENTAL STATEMENT

According to the Commonwealth Procurement Code, Act of May 15, 1998, P.L. 358, No. 57, 62 Pa.C.S. §§ 101-4509, all Requests for Quotes for construction projects issued by any government agency shall set forth any provision of Federal and State statutes, rules and regulations dealing with the prevention of environmental pollution and the preservation of public natural resources that affect the projects.

The Offeror is hereby notified that this Project is subject to those statutes, rules and regulations shown on the following list, and the Work must be carried out in compliance with these statutes, rules and regulations.

STATE LAW

I. Purdon's Statutes - Title 3 (Agriculture)

Fertilizer Act, Act of Dec. 13, 2001, 3 Pa. C.S.A. § 6701, et seq.
Soil and Plant Amendment Act, Act of Dec. 13, 2001, 3 Pa. C.S.A. § 6901, et seq.

PA Pesticide Control Act of 1973, Act of March 1, 1974 as amended, 3 P.S. § 111.21, et seq.

Agricultural Liming Materials Act, Act of March 17, 1978, as amended, 3 P.S. § 132-1, et seq.

The PA Plant Pest Act of 1992, Act of December 16, 1992 as amended, 3 P.S. § 258.1, et seq.

Noxious Weed Control Law, Act of April 7, 1982 as amended, 3 P.S. § 255.1, et seq.

Conservation District Law, Act of May 15, 1945 as amended, 3 P.S. § 849, et seq.

(Relating to weather modification), Act of January 19, 1968, as amended, 3 P.S. § 1101, et seq.

II. Purdon's Statutes - Title 16 (Counties)

(Relating to land use), Act of January 13, 1966 as amended, 16 P.S. § 11941, et seq.

III. Purdon's Statutes - Title 18 (Crimes and Offenses)

The Crimes Code, Act of December 6, 1972, as amended, 18 Pa. C.S.A. § 101, et seq.

IV. Purdon's Statutes - Title 24 (Education)

Public School Code of 1949, Act of March 10, 1949, as amended, 24 P.S. § 7-731, et seq.

V. Purdon's Statutes - Title 30 (Fish)

The Fish and Boat Code, Act of October 16, 1980, as amended, 30 Pa. C.S.A. § 101, et seq.

VI. Purdon's Statutes - Title 32 (Forests, Waters and State Parks)

(Relating to water power and water supply permits), Act of June 14, 1923, as amended, 32 P.S. § 591, et seq.

Water Well Drillers License Act, Act of May 29, 1956, as amended, 32 P.S. § 645.1, et sec.

(Relating to Flood Control Districts), Act of August 7, 1936, as amended, 32 P.S. § 653, et seq.

Flood Plain Management Act, Act of October 4, 1978, as amended, 32 P.S. § 679.101, et seq.

Storm Water Management Act, Act of October 4, 1978, as amended, 32 P.S. § 680.1, et seq.

Dam Safety and Encroachments Act, Act of November 26, 1978, as amended, 32 P.S. § 693.1, et seq.

(Relating to Stream Clearance), Act of June 5, 1947, as amended, 32 P.S. § 701, et seq.

(Relating to Potomac River Pollution), Act of May 29, 1945 (P.L. 1134, § 1), as amended, 32 P.S. 741 et seq. *Repealed in Part*. Section 4 of Act 1981, May 1, P.L. 22 No. 9, repeals this section to "the extent it required one of the members of the Interstate Commission on the Potomic River Basin to be a member of the Pennsylvania Commission on Interstate Cooperation."

(Relating to Schuylkill River pollution), Act of June 4, 1945, as amend., 32 P.S. § 751.1, et seq.

(Relating to Delaware River pollution) Act of April 19, 1945 as amend.32 P.S. § 815.31, et seq.

Delaware River Basin Compact, Act of July 7, 1961, as amended, 32 P.S. § 815.101, et seq.

Ohio River Valley Water Sanitation Compact, Act of April 2, 1945, as amended, 32 P.S. § 816.1, et seq.

Great Lakes Basin Compact, Act of March 22, 1956, as amended, 32 P.S. § 817.1, et seq.

Brandywine River Valley Compact, Act of September 9, 1959, as amend. 32 P.S. § 818, et seq.

Wheeling Creek Watershed Protection and Flood Prevention District Compact, Act of August 2, 1967, as amended, 32 P.S. § 819.1, et seq.

Susquehanna River Basin Compact, Act of July 17, 1968, as amended, 32 P.S. § 820.1, et seq.

Chesapeake Bay Commission Agreement, Act of June 25, 1985, as amended, 32 P.S. § 820.11, et seq.

(Relating to Preservation and Acquisition of Land for Open Space Uses), Act of January 19, 1968, as amended, 32 P.S. § 5001, et seq.

Land and Water Conservation and Reclamation Act, Act of January 19, 1968, § 2), as amended, 32 P.S. § 5101, et seq.

Bluff Recession and Setback Act, Act of May 13, 1980, as amended, 32 P.S. § 5201, et seq.

Wild Resource Conservation Act, Act of June 23, 1982, as amended, 32 P.S. § 5301, et seq.

VII. Purdon's Statutes - Title 34 (Game)

The Game and Wildlife Code, Act of July 8, 1986, as amended, 34 Pa. C.S.A. § 101, et seq.

VIII. Purdon's Statutes - Title 35 (Health and Safety)

(Related to public eating and drinking places), Act of May 23, 1945, as amended, 35 P.S. 655.1 et seq. *Repealed in Part*. Section 6(b) of Act 1994, repealed this section in so far as it is inconsistent with said act (3 Pa. C.S.A. § 6501, et seq.). §§ 655.1 to 655.11. §§ 655.12a to 655.13a repealed by 2010, Nov. 23, P.L. 1039, No.106, § 8(2)(ii), effective in 60 days [Jan.24, 2011]

The Public Bathing Law, Act of June 23, 1931, as amended, 35 P.S. § 672, et seq.

The Clean Streams Law (Related to the protection of public water supply), Act of June 22, 1937, as amended, 35 P.S. § 691.1, et seq.

PA Safe Drinking Water Act, Act of May 1, 1984, as amended, 35 P.S. § 721.1, et seq.

PA Sewage Facilities Act, Act of January 24, 1966 as amended, 35 P.S. § 750.1, et seq. Repealed in Part. Section 15 of Act 1990, July 1, repealed this section insofar as it relates to fee payments.

PA Solid Waste-Resource Recovery Development Act, Act of July 20, 1974, as amended, 35 P.S. § 755.1, et seq.

(Related to pollution from abandoned coal mines), Act of December 15, 1965 as amended, 35 P.S. § 760.1, et seq.

Low-Level Radioactive Waste Disposal Act, Act of February 9, 1988, as amended, 35 P.S. § 7130.101, et seq.

(Related to Camp Regulation), Act of November 10, 1959 as amended 35 P.S. § 3001, et seq.

Air Pollution Control Act, Act of January 8, 1960, as amended 35 P.S. § 4001, et seq.

Solid Waste Management Act, Act of July 7, 1980 as amended, 35 P.S. § 6018.101, et seq. *Repealed in Part*. Section 905(b) of Act 1988, Feb. 9, the Low-Level Radioactive Waste Disposal Act (35 P.S. § 7130.101, et seq.), repealed this section insofar as it is inconsistent with said act.

Radiation Protection Act, Act of July 10, 1984, as amended, 35 P.S. 7110.101, et seq. *Repealed in Part*. Section 17(b) of Act 1992, Dec. 18, provides that this section is repealed insofar as it is inconsistent with said act. Section 6(3) of 2007, July 13, P.L. 95, No. 31, imd. Effective, provides that "[a]ll other acts and parts of acts are repealed insofar as they are inconsistent with this act.

Worker and Community Right-to-Know Act, Act of October 5, 1984 as amended, 35 P.S. § 7301, et seq.

IX. Purdon's Statutes - Title 36 (Highways and Bridges)

State Highway Law, Act of June 1, 1945, as amended, 36 P.S. § 670-101, et seq. *Repealed in Part*. Section 4 of Act 1985, July 3, repealed this act insofar as it's inconsistent with said act.

Junkyards and Automotive Recycler Screen Law, Act of July 28, 1966, as amended, 36 P.S. § 2719.1, et seq.

Highway Vegetation Control Act of December 20, 1983 as amended, 36 P.S. § 2720.1, et seq.

X. Purdon's Statutes – Title 37 APPENDIX (Historical & Museums)

History Code, Act of May 26, 1988, as amd, 37 Pa.C.S.A. § 101, et seq.

XI. Purdon's Statutes - Title 43 (Labor)

General Safety Law
(Related to General Safety), Act of May 18, 1937, as amended, 43 P.S. § 25-1, et seq.

Seasonal Farm Labor Act, Act of June 23, 1978, as amended, 43 P.S. § 1301.101, et seq.

XII. Purdon's Statutes - Title 52 (Mines and Mining)

Coal Refuse Disposal Control Act of September 24, 1968, as amended, 52 P.S. § 30.51, et seq.

Surface Mine Land Acquisition & Reclamation Law
(Related to Coal Land Improvement), Act of July 19, 1965, as amended, 52 P.S. § 30.101, et seq.

Mine Fire and Subsidence Remedial Project Indemnification Law
(Related to Mine Fires & Subsidence),Act of April 3,1968, as amd. 52 P.S. § 30.201, et seq.

PA Anthracite Coal Mine Act, Act of November 10, 1965 as amended, 52 P.S. § 70-101, et seq.

(Related to discharge of coal into streams), Act of June 27, 1913 as amended, 52 P.S. § 631, et seq.

(Caving-in, Collapse, Subsidence), Act of May 27, 1921, as amended, 52 P.S. § 661, et seq.

Anthracite Coal Mining Regulation Law
(Related to Subsidence), Act of September 20, 1961 as amended, 52 P.S. § 672.1, et seq.

Anthracite Strip Mining and Conservation Act, Act of June 27, 1947 as amended, 52 P.S. § 681.1, et seq. Repealed in Part. Section 16 of Act 1971, Nov. 30, provided that this section repealed insofar as it is inconsistent with Act No. 147.

Anthracite Mine Drainage Law
(Related to control and drainage of water from coal formations), Act of July 7, 1955 as amended, 52 P.S. § 682, et seq.

Bituminous Coal Mine Safety Act, Act of July 7, 2008, 52 P.S. § 690-101, et seq.

(Related to Abandoned Mines – abandoned mines; sealing entries and air shafts), Act of May 7, 1935, as amended, 52 P.S. § 809, et seq.

(Related to maps and plans of mines), Act of June 15, 1911, as amended, 52 P.S. § 823.

Surface Mining Conservation and Reclamation Act, Act of May 31, 1945 as amended, 52 P.S. § 1396.1 et seq. *Repealed in Part*. Section 27 of Act 1984, Dec. 19, provides that, except as provided in § 3304 of this title, this section "is repealed to the extent that it applies to the surface mining of minerals other than bituminous and anthracite coal."

The Bituminous Mine Subsidence and Land Conservation Act, Act of April 27, 1966, as amended, 52 P.S. § 1406.1, et seq

Bituminous Mine Subsidences in Counties of the Second Class. (Related to cave-in or subsidence of surface above mines), Act of July 2, 1937, as amended, 52 P.S. § 1407, et seq.

(Related to Coal Stripping – Coal stripping Operation Defined), Act of June 18, 1941 as amended, 52 P.S. § 1471, et seq.

(Related to Coal under State Lands – Easements and Rights of Way), Act of June 1, 1933 as amended, 52 P.S. § 1501, et seq.

(Related to Mining Safety Zones – Establishment of Safety Zones), Act of Dec. 22, 1959 as amended, 52 P.S. § 3101, et seq. *Repealed in Part* – Act 1959, Dec. 22, P.L. 1994, No. 729 [52 P.S. §§3101 TO 3109], is repealed to the extent applicable to bituminous coal mines by 2008, July 7, P.L. 654, No. 55, §3101(b)(3), effective in 180 days [Jan. 5, 2009]

(Coal and Clay Mine Coal Subsidence Insurance Fund Law), Act of August 23, 1961 as amended, 52 P.S. § 3201, et seq.

Interstate Mining Compact, Act of May 5, 1966 as amended, 52 P.S. § 3251, et seq.

Noncoal Surface Mining Conservation and Reclamation Act, Act of December 19, 1984, as amended, 52 P.S. § 3301, et seq.

XIII. Purdon's Statutes - Title 58 (Oil and Gas)

Oil and Gas Conservation Law, Act of July 25, 1961 as amended, 58 P.S. § 401, et seq.

PA Used Oil Recycling Act, Act of April 9, 1982, as amended, 58 P.S. § 471, et seq.

Coal & Gas Resource Coord.Act, Act of Dec.18, 1984, as amended, 58 P.S. § 501, et seq.

(Relates to oil and gas), Act of February 14, 2012, 58 Pa. C.S.A. § 3201, et seq.

XIV. Purdon's Statutes Title 63 (Professions and Occupations)

Water and Wastewater Systems Operators' Certification Act, Act of November 18, 1968 as amended, 63 P.S. § 1001, et seq.

XV. Purdon's Statutes - Title 64 (Public Lands)

PA Appalachian Trail Act, Act of April 28, 1978, as amended, 64 P.S. § 801, et seq.

XVI. Purdon's Statutes - Title 71 (State Government)

The Administrative Code of 1929, Act of April 9, 1929 as amended, 71 P.S. § 51, et seq.

XVII. Purdon's Statutes - Title 72 (Taxation and Fiscal Affairs)

Project 70 Land Acquisition and Borrowing Act, Act of June 22, 1964 as amended, 72 P.S. § 3946.1, et seq.

(Related to pollution control services), Act of March 4, 1971 as amended, 72 P.S. § 7602.1, et seq. Deleted Section 7602.5 by the Act 2000, May 24. *Repealed in Part.* Section 7602.3 of the Act 2007, Dec. 18, was repealed to effectuate the enactment of 35 P.S. § 6021.4.

XVIII. Purdon's Statutes - Title 73 (Trade and Commerce)

Infrastructure Development Act, Act of July 11, 1996, as amended, 73 P.S. § 393.21, et seq.

(Related to Explosives), Act of July 1, 1937 as amended, 73 P.S. § 151, et seq.; *Suspended in Part*. This section is suspended insofar as it is in conflict with the provisions of Reorganization Plan No. 8 of 1981. *See* 71 P.S. § 751-35.

(Related to Explosives), Act of July 10, 1957 as amended, 73 P.S. § 164, et seq. *Suspended in Part*. Section 164 is suspended insofar as it is in conflict with the provisions of Reorganization Plan No. 8 of 1981. *See* 71 P.S. § 751-35.

Purchase of Black Powder in Contiguous States
(Related to Black Powder), Act of May 31, 1974, 73 P.S. § 169 et seq.
(Related to excavation and demolition), Act of Dec.10, 1974 as amended, 73 P.S. § 176, et seq.

XIX. Purdon's Statutes - Title 75 (Vehicles)

Vehicle Code, Act of June 17, 1976, as amended., 75 Pa. C.S.A. § 101, et seq.
Snowmobile and All-Terrain Vehicle Law, Act of June 17, 1976, as amended, 75 Pa. C.S.A. § 7701, et seq.

(Related to hazardous materials transportation), Act of June 30, 1984, 75 Pa. C.S.A. § 8301, et seq.

XX. Purdon's Statutes - Title 77 (Workmen's Compensation)

Workers' Compensation Act, Act of June 2, 1915 as amended, 77 P.S. § 1, et seq.
PA Occupational Disease Act, Act of June 21, 1939, as amended, 77 P.S. § 1201, et seq.

XXI. Other Statutes

Infectious and Chemotherapeutic Waste Disposal
(Relating to Medical Waste-Manifesting and Transporter Licensing), Act of July 13, 1988, 35 P.S. § 6019.1, et seq.

Municipal Waste Planning, Recycling and Waste Reduction Act, Act of July 28, 1988, 53 P.S. § 4000.1501.

Hazardous Sites Cleanup Act, Act of October 18, 1988, 35 P.S. § 6020.101. Repealed insofar as inconsistent with the Hazardous Sites Cleanup Fund Funding Act, 35 P.S. § 6021.1 ET SEQ., PURSUANT TO 2007, Dec. 18, P.L. 486, No. 77, § 18(b) imd. effective

XXII. Pennsylvania Constitution - Article I, Section 27 (Adopted May 18, 1971)

FEDERAL LAW

Acid Precipitation Act of 1980 (42 U.S.C. § 8901-8912).

Act to Prevent Pollution from Ships (33 U.S.C. § 1901-1915).

Americans with Disabilities Act of 1990, (42 U.S.C. § 12101-12213 and 47 U.S.C. § 225 and 611).

Asbestos Hazard Emergency Response Act of 1986 [see Toxic Substances Control Act secs. 201-214 (15 U.S.C. § 2641-2656)].

Atomic Energy Act of 1954 (42 U.S.C. § 2014, 2021, 2021a, 2022, 2111, 2113, 2114).

Aviation Safety and Noise Abatement Act of 1979 (49 U.S.C. § 47501-47510).

Clean Air Act (42 U.S.C. § 7401-7642).

Clean Water Act [see Federal Water Pollution Control Act].

Coastal Zone Management Act of 1972 (16 U.S.C. § 1451-1466).

Comp.Env.Response, Compensation, and Liability Act of 1980 (42 U.S.C. § 9601-9675).

Emergency Planning and Community Right-to-Know Act of 1986 (42 U.S.C. § 11001-11050).

Energy Supply and Environmental Coordination Act of 1974 (15 U.S.C. § 791-798).

Environmental Quality Improvement Act of 1970 (42 U.S.C. § 4371-4375).

Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. § 136-136y).

Federal Land Policy and Management Act of 1976 (43 U.S.C. § 1701-1784).

Federal Water Pollution Control Act (33 U.S.C. § 1251-1387).

Geothermal Energy R& Development, Demonstration Act of 1974 (30 U.S.C. § 1101-1164).

Global Climate Protection Act of 1987 (15 U.S.C. § 2901 note).

Hazardous Substance Response Revenue Act 1980 (see 26 U.S.C. § 4611, 4612, 4661, 4662).

Low-Level Radioactive Waste Policy Act (42 U.S.C. § 2021b-2021d).

Marine Protection, Research, and Sanctuaries Act of 1972 (33 U.S.C. § 1401-1445)

National Climate Program Act (15 U.S.C. § 2901-2908).

National Environmental Policy Act of 1969 (42 U.S.C. § 4321-4370h).

Noise Control Act of 1972 (42 U.S.C. § 4901-4918).

Nuclear Waste Policy Act of 1982 (42 U.S.C. § 10101-10270).

Outer Continental Shelf Land Act Amendments of 1978 (43 U.S.C. § 1801-1866).

Public Health Service Act (42 U.S.C. § 300f-300j-11).

Safe Drinking Water Act [Public Health Service Act 1401-1451 (42 U.S.C. § 300f-300j-26)].

Soil and Water Resources Conservation Act of 1977 (16 U.S.C. § 2001-2009).

Solid Waste Disposal Act (42 U.S.C. § 6901-6991i).

Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. § 1201-1328)

Toxic Substances Control Act (15 U.S.C. § 2601-2695d).

Uranium Mill Tailings Radiation Control Act of 1978 (42 U.S.C. § 7901-7942).

Water Resources Research Act of 1984 (42 U.S.C. § 10301-10309).

APPENDIX Q

Energy Consultant Contract
Between
DGS and Sample Firm

ENERGY CONSULTANT CONTRACT

BETWEEN

THE DEPARTMENT OF GENERAL SERVICES

AND

Sample Firm

This Energy Consulting Contract ("CONTRACT"), executed this _____ day of _____ 20 ___ , by and between the Department of General Services, hereinafter called "the Department" and _____ hereinafter called the "Energy Consultant" at this address: _____ a corporation incorporated under the Laws of the State of _____, its successors and assigns, with Federal Identification No. _____ and Commonwealth Vendor Identification No. _____.

WHEREAS, the Department requires energy consultant services for project and construction administration and assessments and design review for certain GESA projects in various areas of the Commonwealth.

WHEREAS, the Energy Consultant has qualified through the Commonwealth's Invitation to Qualify (ITQ) process and has been awarded as the DGS Energy Consultant via the Request for Quote (RFQ) process.

NOW, THEREFORE, the Department and the Energy Consultant, with intention to be legally bound, agree as follows:

ARTICLE 1

Definitions:

A. Contract Documents: the Invitation to Qualify (ITQ) documents (including the ITQ and all appendices and attachments, the ITQ Quote submitted by the Energy Consultant, and the ITQ contract; the GESA Contract and all attachments hereto; the Request for Quote, ("the RFQ"); the Energy Consultant's Quote submitted in response to the RFQ; the Conditions of the Contract (General, Special, Supplementary, and other Conditions); all drawings created by or for the GESA Contractor and/or the GESA Contractor Design Consultant; the specifications

created by or for the GESA Contractor and/or its GESA Contractor Design Consultant; the Investment Grade Audit (IGA) prepared by the GESA Contractor setting forth the approved energy conservations measures (ECMs – Attachment 1); all bulletins and addenda issued before and after to execution of the contract; all change orders; the GESA Project Design Manual; and the Administrative Procedures for the GESA Contract.

B. Department of General Services ("Department"): The executive agency of the Commonwealth of Pennsylvania, also known as "DGS" and is referred through the contract documents as singular in number.

C. ESCO: The Energy Savings Company that was awarded the GESA Contract for the Project. After award to ESCO, they are also known as the GESA Contractor.

D. Funding Agency: The executive agency that will enter the contracts for the GESA Project and that operates the facilities included in the scope of the Work Order and GESA Project.

E. GESA: Guaranteed Energy Savings Act: 62 Pa. C.S. §§ 3751-3758, as amended.

F. Energy Use Intensity (EUI) score: EUI is a unit of measurement that describes a building's energy use. EUI represents the energy consumed by a building relative to its size. Its value is expressed in kBTU's/sq. ft.

G. GESA Project ("Project"): The evaluation and recommendations of energy conservation measures and for implementation of one or more such measures at a facility that will be included in the Energy Consultant's Work Order.

H. Work Order: The authorization by the Department that defines the Energy Consultant's specific scope of work and location of the GESA Project.

ARTICLE 2

SCOPE OF SERVICES AND RESPONSIBILITIES

The Energy Consultant, after a Work Order is executed and during the Project, along with other items specifically stated elsewhere within this Contract, will provide the following architectural, engineering, and consulting services to assist the Department and Funding Agency:

A. For the facility selected by the Department as the Project, the Energy Consultant will:

    1. Meet with the Department and Funding Agency as needed to discuss the Funding Agency's needs and to review, in general, the type of project contemplated.

B. Energy Consultant shall provide peer reviews of all architectural and engineering services performed by the ESCO during the Project, including but not limited to reviews of structural, mechanical and electrical engineering services. The Energy Consultant warrants that the reviewers of the ESCO's architectural and engineering services are regularly licensed, as required by the Pennsylvania Statutes and Pennsylvania Code (Architects Licensure Law, Act of Dec. 14, 1982, P.L. 1227, as amended, 63 P.S. §34.1 et seq. and Regulations of the State Architects Licensure Board, 49 PA. CODE §9.1 et seq. and the Engineer, Land Surveyor and Geologist Registration Law, Act 367, 63 P.S. §148-158.2, as amended and Regulations of the Board of Engineers, Land Surveyors and Geologists, 37 PA. Code §37.31 et seq.), to practice their professions in the Commonwealth of Pennsylvania.

C. Energy Consultant shall designate an individual as the Project Manager in charge of the Project upon issuance of a Work Order.

D. Energy Consultant shall become familiar with their role in the GESA Contract Documents posted on the Department's web site.

E. Energy Consultant shall assist the Department in the preparation of a Request for Quotes ("RFQ") to solicit competitive quotes from ESCOs for the project, as further discussed in Article 3.

F. If requested to do so by the Department, Energy Consultant shall assist with conducting interviews with the ESCOs, clarify the scope and cost of the proposed projects, and review the qualifications and experience of each ESCO team.

G. Energy Consultant shall assist the Department and/or Agency in creating a standard ECM matrix to fairly evaluate both the core ECMs and any additional ECMs submitted by the ESCO.

H. If requested to do so by the Department, Energy Consultant shall assist and advise regarding financing for the project.

I. Energy Consultant shall advise the ESCO during the ESCO's preparation of specifications and drawings for the Project. The drawings, plans and specifications prepared by the ESCO will be prepared in compliance with all applicable laws, rules, regulations and codes, including, but not limited to the GESA, Uniform Construction Code, and other applicable standards as appropriate. The Energy Consultant will review and comment on the final submission to the Department and Funding Agency.

J. Energy Consultant shall provide construction administration/inspection services throughout the Project to ensure the work is completed in accordance with approved plans and specifications and the GESA Contract in accordance with Article 5 of this Contract.

K. Energy Consultant shall supervise ESCO's monitoring and verification and commissioning procedures to ensure that savings will be realized.

L. Energy Consultant shall prepare certificate(s) of substantial completion and assist the Funding Agency and the ESCO in applying for and receiving grants, incentives, rebates, and aid for the Project.

M. For a period of three (3) years after the date of substantial completion, Energy Consultant shall assist the Funding Agency with the evaluation of actual energy savings realized by the Project. This will include, where needed, discussions and meetings with the Funding Agency and ESCO and the review of monitoring and verification procedures, reports and related calculations. If the guaranteed savings do not materialize, the Energy Consultant will assist the Funding Agency to recoup the deficit.

N. Energy Consultant shall certify that it is free from financial interest in all ESCOs submitting quotes for the Project which conflicts with the proper completion of the audit and any Consulting work associated with the GESA Project and that full disclosure will be made to the Department detailing all financial compensation received from the ESCO at the appropriate time. By signature to this Contract, the Energy Consultant represents and warrants that it will not have any interest, monetary or otherwise, and/or is not affiliated with the ESCO selected for the Project and that it will abide by the Contractor Integrity Provisions included in this Contract.

These above services shall be performed in accordance with all applicable laws, rules and regulations.

ARTICLE 3

REQUESTS FOR QUOTE and ENERGY CONTRACT AWARD

A. Upon the Department's selection of an ESCO, the Energy Consultant, they will review and monitor the development of the Investment Grade Audit ("IGA") submitted by the ESCO to ensure that a feasible energy project exists. The Energy Consultant shall review all ESCO documentation to justify the proposed energy savings contained in the IGA and present this information to the Department.

B. The Energy Consultant will review the GESA Contract with regard to specific products and procedures that will be employed in constructing the various ECMs that were agreed to in the GESA Contract.

ARTICLE 4

DESIGN SERVICES

A. The ESCO (not the Energy Consultant) shall be the design professional for the Project. The Energy Consultant will advise the ESCO during the ESCO's preparation of plans, specifications, and applications for approval by the appropriate authorities. These documents will reflect the scope of services for the Project in accordance with the Department's GESA Design Manual.

B. Energy Consultant shall review and evaluate plans, specifications, and applications for approval by appropriate authorities that are produced by ESCO to ensure the quality and proper utilization of ECMs.

C. Energy Consultant shall review the costs submitted by the ESCO to verify the accuracy of the construction costs. The Energy Consultant shall further review the cash flow analysis for the project to be certain that the work to be performed by the ESCO will guarantee that the Funding Agency will maintain a non-negative cash flow for each year during the term of the GESA Contract and guarantee period.

D. The Energy Consultant will work with the Funding Agency in assisting the ESCO to prepare a project schedule to accomplish the work of the Project as set forth in detail in the General Conditions of the Energy Contract.

ARTICLE 5

CONSTRUCTION ADMINISTRATION SERVICES

A. The Energy Consultant shall provide construction administration of the GESA Contract for the Project as set forth in this Article and the project specific Contract Documents. If a conflict arises, the construction administrative services which best serves the Department or Funding Agency will control.

B. The Energy Consultant's responsibility to provide services for the construction phase of this Contract commences as of the effective date of GESA contract with the ESCO and terminates upon the issuance to the Funding Agency of the final certificate of payment to the contractor.

C. The Energy Consultant shall have authority to act on behalf of the Department only to the extent provided in this Contract, unless the Department consents to such authority, and/or unless otherwise set forth in the Contract Documents.

D. The Energy Consultant shall at a minimum visit the site weekly while there is active work, and as often as required to resolve critical design issues in the field, to observe the site and work, to familiarize itself with the general progress and quality of the work, and to determine for the Funding Agency's benefit and protection if the work is proceeding in accordance with the intent of the Contract Documents.

E. The Energy Consultant shall consult with the Funding Agency as often as necessary

concerning design issues arising during construction and the ESCO's compliance with the Contract Documents.

F. On the basis of its on-site observations, the Energy Consultant shall keep the Funding Agency informed of the progress and quality of the work and it shall use reasonable care in guarding the Funding Agency against defects and deficiencies in the work and against the ESCO's failure to carry out the work in accordance with the construction documents.

G. The Energy Consultant shall be present at bi-weekly project meetings with the ESCO and the Funding Agency's representatives to discuss issues relative to design, progress of the work, quality of the work and timely completion of the work. Agenda and minutes for said meetings shall be developed by the Energy Consultant.

H. The Energy Consultant shall review, comment, and advise appropriate action upon the ESCO's submittals (including Shop Drawings, Product Data and Samples, etc.) as discussed in the General Conditions of the GESA Contract ("General Conditions") to ascertain their conformance with design requirements as indicated in the Contract Documents. The Energy Consultant's review shall not be conducted for the purposes of confirming dimensions or quantities except to the extent that the ESCO has requested in writing the assistance of the Energy Consultant to determine certain dimensions because those indicated in the Contract Documents conflict with existing field conditions or because the dimensions in the Contract Documents contain erroneous, inconsistent, or incomplete dimensions for which clarification is needed and can best be supplied by the Energy Consultant.

I. The Energy Consultant shall maintain a record of each submittal received from the ESCO as discussed in the General Conditions. The record shall include, at a minimum, the subject matter of the submittal, the related specification section number, the provider or supplier of the subject item, material or system, the date received, the action taken, and the date returned to the ESCO.

J. The Energy Consultant's review of a specific item shall not indicate approval of an assembly of which the item is a component. When professional certification of performance characteristics of materials, systems or equipment is required by the Contract Documents, the Energy Consultant shall be entitled to rely upon such certification to establish that the materials, systems or equipment will meet the performance criteria required by the Contract Documents.

K. The Energy Consultant may authorize a field order (a minor change in the Work not involving an adjustment in the Contract Sum and/or an extension of the Contract Time) which is consistent with the intent of the Contract Documents.

L. The Energy Consultant shall not have control over or charge of and shall not be responsible for construction means, methods, techniques, sequences, procedures, scheduling or for safety precautions and programs in connection with the Work. The

Energy Consultant shall not have control over, charge of, or responsibility for acts or omissions of the Department, the Funding Agency, ESCO, its subcontractors, or their agents or employees, or of any other persons performing portions of the Work. However, as set forth in subparagraph M hereof, the Energy Consultant shall report to the Funding Agency known material deviations from the Contract Documents as to quality and scope of work, as well as timeliness of the ESCO's performance as ascertained from the most recent construction schedule submitted by the ESCO.

M. The Energy Consultant shall advise the ESCO of work which does not conform to the Contract Documents as to quality of the work, scope of the work, or progress of the work. If the Energy Consultant observes or is aware of work which does not conform to the Contract Documents, he shall immediately advise the Funding Agency.

N. Whenever the Energy Consultant considers it necessary or advisable for implementation of the intent of the Contract Documents, the Energy Consultant will have authority to require additional inspection or testing of the Work in accordance with the provisions of the Contract Documents, whether or not such Work is fabricated, installed or completed, at no cost to the Funding Agency, as further described in the General Conditions. Additionally, when the Energy Consultant receives a recommendation that such additional testing or inspection is required, the Energy Consultant shall require such additional inspection or testing. However, neither this authority of the Energy Consultant nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Energy Consultant to the ESCO, its subcontractors, material and equipment suppliers, their agents or employees or other persons performing portions of the Work.

O. Based on the Energy Consultant's on-site observations and analysis of the ESCO's Applications for Release of Payment, the Energy Consultant shall review and certify the amounts due the ESCO. The Energy Consultant's certification for payment shall constitute a representation to the Funding Agency, based on the Energy Consultant's evaluations of the work and on the data comprising the ESCO's Application for Release Payment, that the Work has progressed to the point indicated and that, to the best of the Energy Consultant's knowledge, information and belief, the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion and measurement and verification for three (3) years thereafter, to results of subsequent tests and inspections, to minor deviations from the Contract Documents correctable prior to completion and to specific qualifications expressed by the Energy Consultant.

P. The Energy Consultant shall maintain a record of the ESCO's applications for release payment, copies of which applications shall be sent to the Funding Agency with certification of each such application by the Energy Consultant. Further, the Energy Consultant shall not certify said application for release payment if it does not comply with the Administrative Procedure governing payment, including but not limited to:

1. A current Sworn Statement from the ESCO setting forth all subcontractors and material suppliers with whom the ESCO has subcontracted, the amount of such subcontract, the amount requested for any subcontractor or material supplier in the application for payment and the amount to be paid to the ESCO from such progress payment, together with a current, duly executed waiver of mechanics' and material supplier's liens from the ESCO establishing receipt of payment or satisfaction of the payment requested by the ESCO in the current Application for Release of Payment;

2. PA Prevailing Wage Certified payrolls for employees and employees of subcontractors performing work on the Project;

3. Other documents as deemed necessary by the Funding Agency relevant to an Application for Release of Payment (e.g., E-Verify)

ARTICLE 6

ENERGY CONSULTANT'S CLOSE-OUT SERVICES

A. The Energy Consultant, in accordance with this Article and the Contract Documents, shall provide the following services upon completion of the work:

   1. Preparation of punch lists for completion of the Work by ESCO.

   2. Review of final close-out paperwork submitted by the ESCO, reviewed and collected, and execute such documents which require the Energy Consultant's signature.

   3. The Energy Consultant shall conduct inspections to determine the date or dates of Substantial Completion and the date of final completion, shall receive and review, approve or disapprove as appropriate, and forward to the Funding Agency, for the Funding Agency's review and records written warranties and related documents required by the Contract Documents and assembled by the ESCO, and shall recommend the Funding Agency issue a final Certificate for Payment upon compliance with the requirements of the Contract Documents.

B. The Energy Consultant's responsibility to provide services for Close-out phase are included in the Contract Documents and terminates upon issuance to the Funding Agency of the final certificates for payment from all contractors.

C. The Energy Consultant shall provide post construction services to the Funding Agency including an evaluation of actual energy savings realized during the first, second, and third years of the ESCO guarantee period following completion of the Project.

ARTICLE 7

ADDITIONAL SERVICES

A. The Department reserves the right to request Additional Services from the Energy Consultant. Such request will be in writing by the Department or Funding Agency and generally based on the Energy Consultant's advice as to the need for these Additional Services arise. The Department or Funding Agency is not liable for any costs incurred by Energy Consultant in performing any services without the Department's or Funding Agency's prior written authorization. If Additional Services are required due to circumstances beyond the Energy Consultant's control, the Energy Consultant shall notify the Department or Funding Agency prior to commencing such services. If the Department or Funding Agency deems that such Additional Services are not authorized, the Department or Funding Agency shall give prompt written notice to the Energy Consultant.

B. The Energy Consultant's compensation for the Additional Services must be agreed upon by the ESCO for purposes of reimbursement from the ESCO in accordance with Article 9 of this Contract. All approved Additional Services shall be invoiced by the Energy Consultant pursuant to the hourly rate schedule annexed hereto as Chart A.

ARTICLE 8

DEPARTMENT'S RESPONSIBILITIES

A. The Department shall furnish the following documentation, if it possesses same, to the Energy Consultant to assist it in the performance of its obligations under this Contract:

1. Existing surveys describing physical characteristics, legal limitations and utility locations for the site or the Project, and a written legal description of the site. The surveys and legal information shall include, as applicable, grades and lines of streets, alleys, pavements and adjoining property and structures; adjacent drainage; rights-of-way, restrictions, easements, encroachments, zoning, deed restrictions, boundaries and contours of the site; locations, dimensions and necessary data pertaining to existing buildings, other improvements and trees; and information concerning available utility services and lines, both public and private, above and below grade, including inverts and depths.

2. Existing Long Range Planning Studies prepared on behalf of the Department.

3. Existing Asbestos Reports on file with the Department or Funding Agency.

4. Utility bills and water usage bills of the Funding Agency who operates the facility for as many years as possible.

B. Ownership of documents: All design concepts; preliminary, feasibility and special studies; design calculations; Contract Drawings and Specifications; Special Conditions; Statements of Probable Construction Costs; and all other data, samples and surveys compiled by the Energy Consultant or its Consultants under this Contract, become the sole property of the Department. Such documents may be used by the Department for any desired purpose without any compensation to the Energy Consultant.

1. All proprietary materials and methodologies brought by the Energy Consultant to the Project and all documents, sketches, drawings, designs, works, papers, files, reports, computer programs, data, computer documentation and other tangible materials authored and prepared by Energy Consultant as the work product covered in the scope of work shall be treated in accordance with the following principles:

    a. Patent Ownership: Energy Consultant and its subconsultants shall retain ownership to patentable items, patents, processes, inventions or discoveries (collectively the “PATENTABLE ITEMS”) made by the Energy Consultant during the performance of this Contract. Notwithstanding the foregoing, the Department is granted a non-exclusive, non-transferable, royalty free license to use or practice the PATENTABLE ITEMS. The Department may disclose to third parties any such PATENTABLE ITEMS made by Energy Consultant or any of its Subconsultants under the scope of work for the Project that have been previously publicly disclosed. The Department understands that any third party disclosure will not confer any license under such PATENTABLE ITEMS.

    b. Copyright Ownership – Ownership of materials Developed as part of the Scope of Work for the Project: All documents, sketches, drawings, designs, works, papers, files, reports, computer programs, data, computer documentation and other tangible materials authored and prepared by Energy Consultant as the Work Product covered in the scope of work for the Project (collectively the “Works”) including Works developed by Subconsultants are the sole and exclusive property of the Department and shall be considered works made for hire under the federal Copyright Act of 1976, as amended. (Copyright Act). In the event that such Works do not fall within the specifically enumerated works that constitute works made for hire under the Copyright Act , Energy Consultant agrees to assign and, upon their authorship or creation, expressly and automatically assigns all copyright interests, proprietary rights, trade secrets, and other right, title and interest in and to such Works to the Department. The Department shall have all rights accorded a holder of copyright under the Copyright Act including, but not limited to, the exclusive right to reproduce the Works in copies, the right to distribute copies by sale or other transfers, the right to register all copyrights in its own name as author in the United States and in foreign

countries, the right to prepare derivative works based upon the WORKS, the right to display the WORKS and the right to perform the work digitally. Upon completion or termination of this Contract, all working papers, files and other documentation shall immediately be delivered by Energy Consultant to the Department. Energy Consultant warrants that the Works are original and do not infringe the rights of any other work.

c. Engineer License: Notwithstanding the foregoing, Energy Consultant and any Subconsultants shall retain a royalty free non-exclusive license to reproduce such Works for internal use and to have such Works published for any academic purpose including, but not limited to, publication as part of any thesis or dissertation or journal article. This license is conditioned on the Energy Consultant's and the Subconsultants' compliance with the provisions of the intellectual property laws of the United States. All copies of reproductions and publications made pursuant to this License shall bear appropriate proprietary notices.

d. Pre-existing Materials Brought by the Energy Consultant to the Project: The Department shall have no ownership rights to Energy Consultant's proprietary materials, data, software, methodologies or other intellectual property that Energy Consultant brings to the Project or has previously developed with or obtained from third parties ("Energy Consultant Property");

e. Federal Government Interests: It is understood that certain funding under this Contract may be provided by the Federal government. Accordingly, the rights to Works or Patentable Items of Energy Consultants or Subconsultants hereunder will be further subject to government rights as set forth in 37 C.F.R. Section 401, and other applicable statutes. Notwithstanding the foregoing, the Department retains the right to share information relating to WORKS or Patentable Items developed under the scope of work for a wholly state-funded contract with the Federal Government.

ARTICLE 9

PAYMENTS TO THE ENERGY CONSULTANT

A. Payment for the services under this Contract shall be fully realized from the guaranteed savings realized by the GESA Contract. The Department or Funding Agency shall not be responsible to the Energy Consultant for any direct payments for services performed under this Contract. The Energy Consultant acknowledges that the Department, through a Work Order, may engage the Energy Consultant in connection with a GESA

Project and that payment for the Energy Consultant's services will be subject to the execution of the GESA contract.

B. In the event that the Funding Agency enters into a GESA Contract, the Energy Consultant's compensation for the services outlined in Article 2 through 7 from the selected ESCO shall be at a maximum:

    1. 4% of the of the GESA Contract value for projects equal to or greater than $18 million; or

    2. 5% of the GESA Contract value for projects equal to or greater than $13 million but less than $18 million; or

    3. 6% of the GESA Contract value for projects equal to or greater than $8 million but less than $13 million; or

    4. 7% of the GESA Contract value for projects less than $8 million,

    as approved and financed by the Department or Funding Agency.

C. The Energy Consultant shall prepare and submit invoices for its statement of services rendered to the Department for the Department's review and approval. If authorized by the Department, the Department will transmit the invoices to the Funding Agency and/or ESCO for payment to the Energy Consultant. The Department shall not be responsible for any delays associated with payment to the Energy Consultant.

The Energy Consultant selected by the Department shall be entitled to receive at a maximum:

- 4% of the of the GESA Contract value for projects equal to or greater than $18 million; or
- 5% of the GESA Contract value for projects equal to or greater than $13 million but less than $18 million; or
- 6% of the GESA Contract value for projects equal to or greater than $8 million but less than $13 million; or
- 7% of the GESA Contract value for projects less than $8 million.

Payments shall be in accordance with the following schedule:

- 25% upon fully executed contract with ESCO;
- 25% upon approval of all plans and specifications by both the Department and Labor & Industry, to the extent L&I has jurisdiction over the project based upon the scope of the project;
- 40% divided into equal monthly payments based upon the duration of construction;
- 10% upon completion of the three years of Measurement and Verification of post-construction services.

D. Payment of all fees identified in this Contract shall be the sole responsibility of the ESCO selected by the Department for this Project. The Department or Funding Agency shall not be responsible for any Energy Consultant fees not covered by the guaranteed savings and the schedule of fees as provided by the Energy Consultant.

E. In the event that the Department decides not to pursue a GESA Contract for any reason whatsoever, the Department and Funding Agency shall be under no obligation to pay for any services provided by the Energy Consultant.

F. Any additional compensation provided for in this Contract will also be funded by the selected ESCO and this obligation must be included in the ESCO contract with the Funding Agency. To that end, Department agrees to include a copy of the GESA Contract with the Funding Agency, if any.

ARTICLE 10

TERMINATION

A. The Department may terminate this Contract any time for any reason upon fourteen (14) calendar days written notice to the Energy Consultant. The Department shall be under no obligation to pay for any services provided by the Energy Consultant.

B. The Energy Consultant may terminate this Contract any time prior to full execution of a Work Order regarding a GESA Project for any reason upon fourteen (14) calendar days written notice to the Department. The Department shall be under no obligation to pay for any services provided by the Energy Consultant.

C. Subsequent to the full execution of a Work Order regarding a GESA Contract, if this Contract is terminated by the Department pursuant to any of the provisions of this Article, the Energy Consultant shall be compensated for work performed to the date of such termination if the termination is not the fault of the Energy Consultant. Payment shall be based upon the payment provisions at Article 12 of this Contract. If such termination occurs during any such phase of work listed, the percentage to be paid to the Energy Consultant shall be paid on a pro-rated basis to the extent of work performed pursuant to such phase.

ARTICLE 11

MISCELLANEOUS PROVISIONS

A. This Contract shall be governed by the laws of Pennsylvania.

B. By entering this Contract, the Energy Consultant is not guaranteed any present or future Work Orders.

C. The Energy Consultant shall not assign this Contract without the prior written consent of the Department, which consent shall not be unreasonably withheld.

D. This Contract represents the entire and integrated agreement between the Department and Energy Consultant and supersedes all prior negotiations, representations or agreements, either written or oral. This Contract may be amended only by written instrument signed by both Department and Energy Consultant.

E. Nothing contained in this Contract shall create a contractual relationship with or a cause of action in favor of a third party against either the Department or Energy Consultant. Nothing in this Contract between the Department and the Energy Consultant should be construed to authorize any person not a party to this Contract to maintain any lawsuit involving the Contract, unless otherwise provided by law.

F. The Energy Consultant shall have the right to include representations of the design of the Project, such as photographs of the exterior and interior, among the Energy Consultant's promotional and professional materials in accordance with Article 11, with the approval of the Funding Agency. The Energy Consultant's materials shall not include the Department's confidential or proprietary information if the Department has previously advised the Energy Consultant in writing of the specific information considered by the Department to be confidential or proprietary.

G. The Energy Consultant shall provide Worker's Compensation, automobile, comprehensive general liability and professional liability (Errors and Omission) insurance in amounts set forth herein. All policies shall be in a form, with a deductible, and with a carrier reasonably acceptable to the Department. Promptly upon signing this Contract, and thereafter as necessary or requested, the Energy Consultant shall provide the Department with proof of the required insurance coverages. Simultaneously with the execution of this Contract, Energy Consultant shall deliver insurance policies and certificates to Department which will provide at least a 30-day notice of cancellation or amendment.

H. The Energy Consultant shall maintain professional liability insurance in an amount no less than $1,000,000 per occurrence, $3,000,000 aggregate, worker's compensation in amounts required by law, and general liability insurance (including owned, non-owned, and hired motor vehicles) in a single limit amount of no less than $1,000,000.

I. The Energy Consultant shall hold the Commonwealth harmless from and indemnify the Commonwealth against any and all third party claims. Demands and actions based upon or arising out of any activities performed by the Energy Consultant and its employees and agents under this Contract, provided the Commonwealth gives Energy Consultant and prompt notice of any such claim of which it learns. Pursuant to the Commonwealth Attorneys Act (71 P.S. Section 732-101, et seq.), the Office of Attorney General (OAG) has the sole authority to represent the Commonwealth in actions brought against the Commonwealth. The OAG may, however, in its sole discretion and under such terms as it deems appropriate, delegate its right of defense. If OAG delegates the defense to the Energy Consultant, the Commonwealth will cooperate with all reasonable requests of Energy Consultant made in the defense of such suits.

J. Notwithstanding the above, neither party shall enter into any settlement without the other party's written consent, which shall not be unreasonably withheld. The Commonwealth may, in its sole discretion, allow the Energy Consultant to control the defense and any related settlement negotiations.

K. The Pennsylvania Right-to-Know Law, 65 P.S. §§ 67.101-3104, ("RTKL") applies to this Contract. For the purpose of these provisions, the term "the Commonwealth" shall refer to the contracting Commonwealth agency.

    1. If the Commonwealth needs the Energy Consultant's assistance in any matter arising out of the RTKL related to this Contract, it shall notify the Energy

Consultant Funding the legal contact information provided in this Contract. The Energy Consultant, at any time, may designate a different contact for such purpose upon reasonable prior written notice to the Commonwealth.

2. Upon written notification from the Commonwealth that it requires the Energy Consultant's assistance in responding to a request under the RTKL for information related to this Contract that may be in the Energy Consultant's possession, constituting, or alleged to constitute, a public record in accordance with the RTKL ("Requested Information"), the Energy Consultant shall:

    a. Provide the Commonwealth, within ten (10) calendar days after receipt of written notification, access to, and copies of, any document or information in the Energy Consultant's possession arising out of this Contract that the Commonwealth reasonably believes is Requested Information and may be a public record under the RTKL; and

    b. Provide such other assistance as the Commonwealth may reasonably request, in order to comply with the RTKL with respect to this Contract.

3. If the Energy Consultant considers the Requested Information to include a request for a Trade Secret or Confidential Proprietary Information, as those terms are defined by the RTKL, or other information that the Energy Consultant considers exempt from production under the RTKL, the Energy Consultant must notify the Commonwealth and provide, within seven (7) calendar days of receiving the written notification, a written statement signed by a representative of the Energy Consultant explaining why the requested material is exempt from public disclosure under the RTKL.

4. The Commonwealth will rely upon the written statement from the Energy Consultant in denying a RTKL request for the Requested Information unless the Commonwealth determines that the Requested Information is clearly not protected from disclosure under the RTKL. Should the Commonwealth determine that the Requested Information is clearly not exempt from disclosure, the Energy Consultant shall provide the Requested Information within five (5) business days of receipt of written notification of the Commonwealth's determination.

5. If the Energy Consultant fails to provide the Requested Information within the time period required by these provisions, the Energy Consultant shall indemnify and hold the Commonwealth harmless for any damages, penalties, costs, detriment or harm that the Commonwealth may incur as a result of the Energy Consultant's failure, including any statutory damages assessed against the Commonwealth.

6. The Commonwealth will reimburse the Energy Consultant for any costs associated with complying with these provisions only to the extent allowed under

the fee schedule established by the Office of Open Records or as otherwise provided by the RTKL if the fee schedule is inapplicable.

7. The Energy Consultant may file a legal challenge to any Commonwealth decision to release a record to the public with the Office of Open Records, or in the Pennsylvania Courts, however, the Energy Consultant shall indemnify the Commonwealth for any legal expenses incurred by the Commonwealth as a result of such a challenge and shall hold the Commonwealth harmless for any damages, penalties, costs, detriment or harm that the Commonwealth may incur as a result of the Energy Consultant's failure, including any statutory damages assessed against the Commonwealth, regardless of the outcome of such legal challenge. As between the parties, the Energy Consultant agrees to waive all rights or remedies that may be available to it as a result of the Commonwealth's disclosure of Requested Information pursuant to the RTKL.

8. The Energy Consultant's duties relating to the RTKL are continuing duties that survive the expiration of this Contract and shall continue as long as the Energy Consultant has Requested Information in its possession.

L. The Energy Consultant shall comply with, and shall include in substantially the same form in any and all contracts between the Energy Consultant and any consultant or contractor hired by the Energy Consultant to perform work related to the Project, all of the clauses, provisions, and requirements listed below, as they are applicable to design and/or construction.

1. Exhibit A - the Nondiscrimination and Sexual Harassment Clause; and

2. Exhibit B - the Contractor Integrity Provisions: and

3. Exhibit C - the Contractor Responsibility Provisions; and

4. Exhibit D - the Americans With Disabilities Act provisions; and

5. Exhibit E - the requirements of the Steel Products Procurement Act, 73 P.S. § 1884 et seq.; and

6. Exhibit F - the requirements of the Trade Practices Act, 71 P.S. § 773.101,; and

7. Exhibit G - the requirements of the Pennsylvania Prevailing Wage Act, 43 P.S. § 165-1,; and

8. Exhibit H - the tax offset provision.

M. **CLAIMS**. The following process will be followed for claims:

Claims By Energy Consultant Against the Department:

1. Any claim, dispute, question or other matter, which the Energy Consultant may have against the Department under this Contract, will be considered by the Deputy Secretary or their designee, if the Energy Consultant files a written claim with the Deputy Secretary within six (6) months after the Energy Consultant knew or should have known that the claim arose. No claim can be filed later than six (6) months after the Energy Consultant knew or should have known of the conditions or facts giving rise to the claim, dispute, or other matter.

2. If the controversy is not resolved by mutual agreement, the Deputy Secretary will issue a decision in writing. The decision will:

    a. State the reasons for the action taken, and

    b. Inform the Energy Consultant of its right to administrative and judicial review.

3. A copy of the decision will be delivered to the Energy Consultant by registered mail.

4. The decision issued by the Deputy Secretary is final and conclusive unless the Energy Consultant files a claim with the Board of Claims within (15) fifteen days of its receipt of the decision.

5. If the Deputy Secretary does not issue a written decision within 120 days after the claim is filed, then the Energy Consultant may proceed as if an adverse decision had been received. The 120 day period may be extended with the written consent of the Department and the Energy Consultant.

6. The Energy Consultant shall carry on its work during the claims process, including Board of Claims proceedings, if any, unless otherwise agreed by it and the Department in writing. Should the Energy Consultant fail to continue to perform its responsibilities regarding all non-disputed work, without delay, any additional costs incurred by the Department or the Energy Consultant as a result of such failure to proceed shall be borne by the Energy Consultant, and the Energy Consultant shall make no claim against the Department for such costs.

N. Claims against the Energy Consultant:

1. Should any claim be brought, or action brought, either directly or indirectly relating to the Energy Consultant's services supplied under this Contract, the Energy Consultant shall render to the Department without compensation any proper and necessary assistance which the Department may require, provided however, that if the claim is the result of action or negligence by the Department, the Energy Consultant shall be reimbursed for any assistance he may be required to provide.

2. The terms and conditions of this Contract, the General Conditions and Special Conditions and any other document incorporated by reference herein, shall not be construed so as to enable any party other than the Department and its assigns to bring any claim or action as referenced in this Section 7 to this Contract.

3. The Energy Consultant shall carry on its work during the claims process, including Board of Claims proceedings, if any, unless otherwise agreed by the Energy Consultant and the Department in writing. Should the Energy Consultant fail to continue to perform its responsibilities regarding all non-disputed work, without delay, any additional costs incurred by the Department or the Energy Consultant as a result of such failure to proceed shall be borne by the Energy Consultant, and the Energy Consultant shall make no claim against the Department for such costs.

ARTICLE 12

TERM OF CONTRACT

A. The Contract shall terminate on **December 31, 2020** ("Termination Date"), subject to any specific exceptions, including termination in accordance with the provisions the Contract. In the event the Energy Consultant has not completed any issued Work Order prior to the Termination Date, the Contract shall remain in effect as to that Work Order until its completion. This Termination Date may be extended, by written letter, at the Department's sole option where a continued need exists for the services of Energy Consultant. The Energy Consultant agrees that the extension of the Termination Date for this Contract shall be on the same terms and conditions as the original Contract except as otherwise agreed to in writing by the parties.

SIGNATURE PAGE IMMEDIATELY FOLLOWS
THE REMAINDER OF THIS PAGE INTENTIONALLY LEFT BLANK

IN WITNESS WHEREOF, the Department of General Services and the Energy Consultant have caused this Contract to be executed the day and year above written.

ENERGY CONSULTANT:	COMMONWEALTH OF PENNSYLVANIA ACTING THROUGH THE DEPARTMENT OF GENERAL SERVICES
by:_____	by: _____ Secretary,

APPROVED AS TO LEGALITY AND FORM:

_____ Office of Chief Counsel, DGS	_____ Office of Attorney General
_____ Office of General Counsel	
_____ Comptroller Operations Date	

Chart A

Hourly Rate Schedule

Licensed Engineer	$250.00
Project Engineer	$200.00
Certified Energy Manager	$175.00
Project Administrator	$125.00
Project Manager	$150.00

APPENDIX R

Prevailing Wage Rates

(Prevailing wage rates will be provided at a later date by Bulletin)

APPENDIX S

Energy Conservation Measures

APPENDIX S

Core Energy Conservation Measures

Note: All items listed below **must** be considered in the RFQ response. For any measure that cannot be incorporated into the quote or is determined infeasible, a detailed explanation must be provided that clearly outlines the financial and technical rationale behind the choice not to include the measure.

Building Included: Capitol East Wing, Capitol East Wing Parking Garage, North Office Building, Health and Welfare Building, Maintenance Tunnels, Central Plant and Labor and Industry Building

Electrical Measures:

1. Facility lighting fixture (interior and exterior building mounted, and site lighting) conversion to LED. Color Temperature shall be 3,000°K (warm white) except for garages and exterior locations, which shall be 5,000°K. Minimum CRI = 80. Conversion of interior lighting shall be limited to occupied buildings.

2. Lighting sensors, including occupancy and daylight harvesting technologies.

Facility Mechanical/Thermal Building Systems:

1. Central Plant chiller sequencing/VFD controls

2. Capitol Complex chilled water loop flow control and delta-T management

3. Central Plant winter - free cooling system

4. Window film treatments

5. Labor and Industry Building sealing of exterior walls

DATE OF ISSUE: APRIL 14, 2017

DEPARTMENT OF GENERAL SERVICES
ENERGY AND RESOURCE MANAGEMENT OFFICE
401 NORTH STREET
HARRISBURG, PENNSYLVANIA

BULLETIN NO. 1
on

Project No. GESA 2017-1 – REQUEST FOR QUOTES FOR A GUARANTEED ENERGY SAVINGS PROJECT AT: DEPT. OF GENERAL SERVICES, CAPITOL COMPLEX, HARRISBURG, PENNSYLVANIA, Department of General Services, Energy & Resource Management, 401 North Street, Room 403, Harrisburg, Pennsylvania, 17120.

PROPOSAL SUBMISSION DEADLINE, THURSDAY JUNE 1, 2017
TIME OF OPENING: 2:00 PM

RFP CLARIFICATIONS/CHANGES

1. On Page 24, in Section 1.39 "Calendar of Events" the "Pre-Quote Conference / Site Visit" should be "April 26, 2017 at 1 P.M. Site Visit will immediately follow". A corrected "Calendar of Events" is on the next page.

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1.39 Calendar of Events:

Activity	Date, Place and Time
Notice to Offerors and RFQ Issued	**April 12, 2017**
Pre-Quote Conference/Site Visit	**April 26, 2017 at 1 P.M. Site Visit will immediately follow.**
Offerors' Deadline to Submit Questions	**COB May 19, 2017**
DGS Deadline to Issue Bulletins	**COB May 24, 2017**
Quote Submission Deadline	**By 2:00 PM. on June 1, 2017** **Delivered to:** **RFQ Coordinator** **4th Floor** **North Office Building** **Dept. of General Services** **401 North Street, Room 403** **Harrisburg, PA 17125**
Interviews with Successful Offerors (Tentative)	**Week of June 26, 2017**

_____

Rebecca Tomlinson, RFQ Coordinator
ENERGY & RESOURCE MANAGEMENT OFFICE

PLEASE ACKNOWLEDGE RECEIPT OF BULLETIN WITHIN 24 HOURS BY EMAIL RESPONSE TO REBECCA TOMLINSON AT retomlinso@pa.gov

DATE OF ISSUE: MAY 5, 2017

DEPARTMENT OF GENERAL SERVICES
ENERGY AND RESOURCE MANAGEMENT OFFICE
401 NORTH STREET
HARRISBURG, PENNSYLVANIA

BULLETIN NO. 2
on

Project No. GESA 2017-1 – REQUEST FOR QUOTES FOR A GUARANTEED ENERGY SAVINGS PROJECT AT: DEPT. OF GENERAL SERVICES, CAPITOL COMPLEX, HARRISBURG, PENNSYLVANIA, Department of General Services, Energy & Resource Management, 401 North Street, Room 403, Harrisburg, Pennsylvania, 17120.

PROPOSAL SUBMISSION DEADLINE, THURSDAY JUNE 1, 2017
TIME OF OPENING: 2:00 PM

QUESTIONS/ANSWERS

1. Will graduated (increasing) annual payments be acceptable or are only flat payments over the life of the term acceptable?

Answer: Flat payments are required for this project.

2. Is there an energy consultant involved in this project?

Answer: No, there will not be a consultant on this project.

3. During the pre-quote conference, there was mention that a previous Guaranteed Energy Savings Agreement (GESA) Investment Grade Audit report may be made available, including energy conservation measure lighting line by lines and chilled water plant scope. Can DGS provide any previous Capitol Complex IGA reports?

Answer: DGS has the lighting line by line information from a previous IGA however, it is only available for the North Office Building and East Wing Building. This information can be found by going to our website: www.dgs.pa.gov State Government > Facilities & Space Management > Energy Savings Programs and then clicking on "2017-1 Capitol Complex" under "Current Projects".

4. To aid our team on building walkthroughs, can fire escape or plot plans be made available for the Capitol East Wing, Capitol East Wing Parking Garage, North Office Building, Health & Welfare, Central Plant, Maintenance Tunnels and Labor & Industry Building, if available?

Answer: Yes, we are currently working on scanning these plans and will add them to our website when they become available electronically.

5. During the pre-quote conference, there was mention of certain areas that should and should not be included in the lighting project scope. Could DGS clarify the lighting scope?

Answer: All interior and *attached* exterior lighting, for all buildings within this project, is included in the lighting project scope.

6. During the pre-quote conference, there was mention of certain buildings that should and should not be included in the window film project scope. Could DGS clarify which buildings are included in the desired window film project scope?

Answer: The 2 buildings that are included in the window film project scope are the Health & Welfare Building and the Labor & Industry Building. The remaining buildings are not included in the window film project scope.

7. During the pre-quote conference, there was mention that only 4 copies of Volume 1 and Volume 2 shall be submitted. However, the RFQ requires 6 copies. Which is correct?

Answer: Please submit 4 hard copies (and one electronic copy) of Volume 1 and Volume 2.

8. Can DGS provide the following information? Chiller plant logs (at least 1 day for each season – winter, summer, spring & fall), district chilled water plans and as-builts for the variable primary conversion, mechanical drawings for Finance and Labor & Industry buildings and elevation drawings for the L&I Building.

Answer: DGS acknowledges this request and is currently gathering any available information. Once the information is obtained, it will be posted on the website www.dgs.pa.gov State Government > Facilities & Space Management > Energy Savings Programs click on "2017-1 Capitol Complex" under "Current Projects".

9. During the pre-quote conference survey, there was mention of certain buildings that should and should not be included in the building envelope project scope. Could DGS clarify which buildings should be included in the desired building envelope scope?

Answer: The Health & Welfare Building, Labor & Industry Building, East Wing Building & North Office Building should all be included in the building envelope project scope.

10. During the pre-quote conference survey, there was mention that the Rachel Carson building recently received window film upgrades. To standardize or select a proven product, could DGS share the specifications of the product(s) used?

Answer: Unfortunately, no. The Rachel Carson window film upgrades occurred approximately 10 years ago, and DGS is assuming that there have been vast product improvements over that length of time.

11. Can DGS provide stipulated lighting hours of operation?

Answer: The standard hours of operation within the Capitol Complex are 6 am – 6 pm. The lights located in the East Wing Garage, tunnels and stairwells are on 24/7 for safety & security purposes.

RFQ CHANGES

1. On page 23 of the RFQ document, Section 2.4, please replace point A with the following:

   A. The Quote shall consist of 3 **separate parts and shall be submitted in separately sealed envelopes or packages clearly labeled as:**

Volume I	Technical Submission (4 copies and 1 CD (or flash drive))
Volume II	ECM/Cost Submission (4 copies and 1 CD (or flash drive))
Volume III	Small Diverse Business Submission (1 copy)

2. On page 27 of the RFQ document, please remove the following (Found in 2-5.4 A1a of Part Two) as Contractors have already been qualified via the ITQ contract document.

a. Offeror's experience on at least five (5) GESA projects completed over the last ten (10) years with a total construction cost greater than $5 million each.

(1). For each project, include date(s), scope, location, owner, owner contact information, capital costs at Quote stage and final contract, energy and operational savings proposed and actually achieved subject to M&V, including an explanation for past projects not meeting the targeted energy savings and any legal action taken by the Owner to ensure replacement of equipment or otherwise achieve the guaranteed savings. Complete and/or incomplete projects may be submitted. Discuss status of project and if completed as originally scheduled. Demonstrate the Offeror's ability to plan and complete all phases of the project within budget, including the ability to reconcile accounts for adjusting windfall/shortfalls in project cash flow.

(2). Responses must be limited to ONLY those projects that have been managed directly by the specific branch, division or office who will be specifically assigned to this project.

Rebecca Tomlinson, RFQ Coordinator
ENERGY & RESOURCE MANAGEMENT OFFICE

PLEASE ACKNOWLEDGE RECEIPT OF BULLETIN BY EMAIL RESPONSE TO BECKY TOMLINSON AT retomlinso@pa.gov

DATE OF ISSUE: MAY 9, 2017

DEPARTMENT OF GENERAL SERVICES
ENERGY AND RESOURCE MANAGEMENT OFFICE
401 NORTH STREET
HARRISBURG, PENNSYLVANIA

BULLETIN NO. 3
on

Project No. GESA 2017-1 – REQUEST FOR QUOTES FOR A GUARANTEED ENERGY SAVINGS PROJECT AT: DEPT. OF GENERAL SERVICES, CAPITOL COMPLEX, HARRISBURG, PENNSYLVANIA, Department of General Services, Energy & Resource Management, 401 North Street, Room 403, Harrisburg, Pennsylvania, 17120.

NEW PROPOSAL SUBMISSION DEADLINE, THURSDAY JUNE 29, 2017
TIME OF OPENING: 2:00 PM

QUESTIONS/ANSWERS

1. Will DGS consider an extension of the June 1, 2017 due date for the proposal?

Answer: Yes; DGS has extended the due date by 4 weeks. The new due date for proposal submission is: June 29, 2017 at 2pm.

RFQ CHANGES

On Page 24, in Section 1.39 "Calendar of Events" the dates of "Offerors' Deadline to Submit Questions", "DGS Deadline to Issue Bulletins", "Quote Submission Deadline" and "Interviews with Successful Offerors (Tentative)" have all been changed. A corrected "Calendar of Events" is on the following page.

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1.39 Calendar of Events:

Activity	**Date, Place and Time**
Notice to Offerors and RFQ Issued	**April 12, 2017**
Pre-Quote Conference/Site Visit	**April 26, 2017 at 1 P.M.** **Site Visit will immediately follow.**
Offerors' Deadline to Submit Questions	**COB June 16, 2017**
DGS Deadline to Issue Bulletins	**COB June 21, 2017**
Quote Submission Deadline	**By 2:00 PM. on June 29, 2017** **Delivered to:** **RFQ Coordinator** **4th Floor** **North Office Building** **Dept. of General Services** **401 North Street, Room 403** **Harrisburg, PA 17125**
Interviews with Successful Offerors (Tentative)	**Week of July 24, 2017**

Rebecca Tomlinson, RFQ Coordinator
ENERGY & RESOURCE MANAGEMENT OFFICE

PLEASE ACKNOWLEDGE RECEIPT OF BULLETIN BY EMAIL RESPONSE TO BECKY TOMLINSON AT retomlinso@pa.gov

DATE OF ISSUE: MAY 18, 2017

DEPARTMENT OF GENERAL SERVICES
ENERGY AND RESOURCE MANAGEMENT OFFICE
401 NORTH STREET
HARRISBURG, PENNSYLVANIA

BULLETIN NO. 4
on

Project No. GESA 2017-1 – REQUEST FOR QUOTES FOR A GUARANTEED ENERGY SAVINGS PROJECT AT: DEPT. OF GENERAL SERVICES, CAPITOL COMPLEX, HARRISBURG, PENNSYLVANIA, Department of General Services, Energy & Resource Management, 401 North Street, Room 403, Harrisburg, Pennsylvania, 17120.

PROPOSAL SUBMISSION DEADLINE, THURSDAY JUNE 29, 2017
TIME OF OPENING: 2:00 PM

REQUEST FOR INFORMATION (DGS Responses in bold text)

1. Please provide the attendance sign-in sheet from the Pre-Quote Conference held on April 26, 2017. **The sign in sheet is attached at the end of this document.**
2. Please provide the site inspection schedule, and when ESCOs will be able to return for escorted inspections of each facility. **Site visits can be scheduled at the convenience of the ESCO company. East Wing site visits are only available on Thursdays & Fridays. Contact Becky Tomlinson at** retomlinso@pa.gov **to schedule a visit. Public spaces do not require a DGS escort.**
3. Please provide electronic copies of existing Mechanical / Electrical / Plumbing (MEP) and controls system drawings on CD. **If we can obtain, we will place on our website for download.**
4. Please provide all available asbestos and hazardous materials logs/information for these sites, or let us know when we may be permitted to return and inspect such information.
    a. Please clarify the extent of hazardous materials ESCOs are responsible considering the limited amount of site access available during the proposal development phase. **We will review available reports and place the "Response Action Tables" on our website once obtained/reviewed.**

QUESTIONS

1. There are certain instances where some screw-in lamps are 3000K as 3500K is not available but the predominant interior color temperature (TLEDs & new fixtures) is 3500K. Are 3500K and 4000K the correct preferences?
   Answer: Yes, anything within the range of 3000K - 3500K for interior lights and 4000K - 5000K for exterior lights are the correct preferences.
2. Can you provide square footage information for each facility included within the project scope?

Answer: Yes, the gross square footage is as follows: East Wing 626,545 sq. ft., North Office 223,946 sq. ft., Labor & Industry 483,161 sq. ft., Health & Welfare 315,462 sq. ft. and Central Plant 26,076 sq. ft.

3. Where is the primary area of concern, regarding caulking, on the L&I building? It seems as if the caulking is aged but no failure at the seams was detected.
   Answer: The primary area of concern is the North side of the building. However, all areas should be evaluated.
4. During the Pre-Quote Conference, it was mentioned that if any conflicts of the Contract Documents arise requiring interpretation, the terms of the Request for Quote (RFQ) shall control. Please confirm this is the case.
   Answer: If any conflicts between the RFQ and the ITQ documents arise, the RFQ supersedes.
5. The scope-of-work includes core ECMs that must be evaluated as part of the response. ECM 2 relates to delta T management of the chilled water distribution loop and loop flow controls. However, the central plant also serves buildings with chilled water distribution systems that are not included in the RFP scope. Any comprehensive solution to improving efficiency here would more than likely also involve modifications to the distribution systems of buildings that are not currently included within the RFP scope. Should ESCOs limit proposed work to buildings solely within the current RFP scope even though this will likely be limiting to the potential success of this measure?
   Answer: This Measure will include more buildings than the listed buildings. The main system used to be a primary secondary system to each building. A project +/- 2006 was done and placed VFD on the main chiller plant pumps, added bypasses to the secondary pumps and replaced the 3-way valve with 2-way valves. In the PJC, there is a heat exchanger with building side pumps. In the Keystone building, there are 22 AHUs - 18 are used in 6 (2 primary, 1 backup systems), 2 are dedicated out door air systems and 2 feed the atrium. Please see attached chart for the remaining buildings. For the building flow summary from previous flow study, see attached sheets.

_____

Rebecca Tomlinson, RFQ Coordinator
ENERGY & RESOURCE MANAGEMENT OFFICE

PLEASE ACKNOWLEDGE RECEIPT OF BULLETIN BY EMAIL RESPONSE TO BECKY TOMLINSON AT retomlinso@pa.gov

SIGN IN SHEET

GESA 2017-1 PRE-QUOTE MEETING – CAPITOL COMPLEX PROJECT

Wednesday, April 26, 2017@ 1:00 P.M.

Keystone Building, Hearing Room No. 2

Print Name	Company	Phone #	Email Address
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BRYAN HAAG	ENTECH	610-373-6667	BHAAG@ENTECHENG.com
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Print Name	Company	Phone #	Email Address
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Rick Evans	Reynolds	↓	
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Rich Madeira	SIEMENS	224-542 0779	

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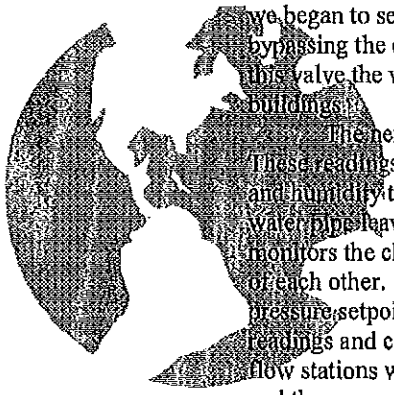
FLOOD & STERLING, INC.

Capitol Complex – Chilled Water Flow Audit

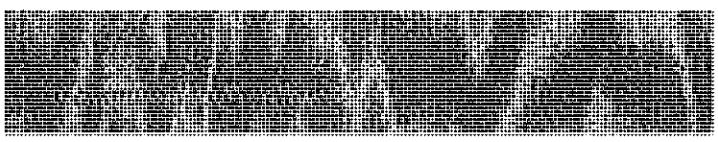
Initial Readings Audit Notes

Flood and Sterling was hired to perform an audit of the chilled water being provided by the central plant to the connected buildings of the Capitol Complex. The first portion of our project we traced down the main piping as it entered into each building and prepare locations for our ultrasonic meter to measure flow in the main pipes entering the building. During this process we searched for any potential locations where chilled water may be short-cycling from the supply to the return piping. While tracking down the piping we did locate a 6" bypass pipe in the lower portion of that East Wing that was full open. With the approval of the maintenance staff we closed this valve. Once we did this we began to see the return temperature to the plant begin to rise. This tells us that this pipe was bypassing the cold supply water directly in to the return pipe and back to the chiller plant. By closing this valve the water that was being bypassed here is now available to cooling in the connected buildings.



The next portion of the project was to take our actual flow readings at each of the buildings. These readings were taken on 6/22/15, we chose this day because of the high outside air temperature and humidity to provide a load on the chiller plant. The first reading was taken on the main chilled water pipe leaving the plant. We took our reading and compared it to the DDC flow station that monitors the chilled water being provided by the plant. The two readings were found to be within 2% of each other. We documented that 3 pumps were operating at this time to maintain a discharge pressure setpoint of 105 psi. Our next step was to go to the individual buildings and take our flow readings and compare them to the installed flow meters if available. It was found that almost all the flow stations were reading close to the flows that were measured by our instrument. A flow diagram and the comparison of our actual readings versus the displayed flow readings can be found in the report. We measured the main flow from the plant at 3 times as the outside air temperature rose to see the impact on the chilled water flows. The pumps speed increased from 77% to 80% throughout the course of the day and the flow increased from 8,045 gpm to 8,475 gpm (5%). The total flow from all the different locations is within 1% of the total flow, making it highly unlikely that any other bypasses in the main piping system exist.

While performing out audit of the system we noted that during the project that converted the buildings from a secondary pumping system to part of the primary system, there are a multitude of normally closed valves and check valves that were installed to by pass the building pumps. Each of these valves is a potential location for supply water to bypass the system and short cycle into the return. The valves appear to be in the proper position but it is possible that some of them may be passing small amounts of water, which can equal large amounts of water if a majority of the valves are leaking. There is no way to measure the leakage at each valve to determine if water is passing through or not. The only way to quantify any leakage in our opinion would be to measure the main flow into the building and then measure the flow leaving the mechanical room going to the units, and compare these readings. This would tell you if water was not making it out to the system but it would not necessarily pinpoint which of the valves is leaking.



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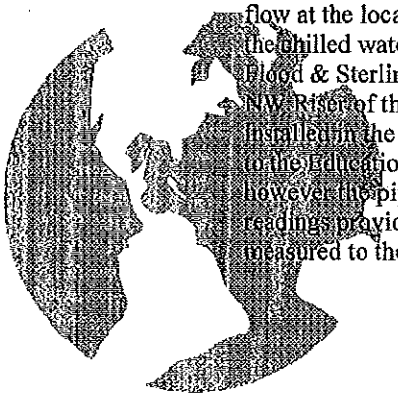
FLOOD & STERLING, INC.

Capitol Complex – Chilled Water Flow Audit

Secondary Readings Audit Notes

Flood & Sterling made a return visit to the Capitol complex to record the flow, pressure, and temperature readings at the buildings connected to the Central Chiller Plant. The readings were taken with 3 pumps operating at 77% speed, and maintaining a discharge pressure of 100 psi at the plant. The supply and return pressure and temperature were taken at each building where ports were installed. We also recorded the temperatures that were being measured by the BAS and the pressure readings of the gauges at the different locations when present. Flood & Sterling also re-measured the flow at the locations and compared to the flow stations where applicable. The location numbers on the chilled water summary page correspond with the numbers on the chilled water flow diagram. Flood & Sterling was unable to obtain pressure, temperature, and flow readings to the Senate Fitout, NW Riser of the East Addition, and S Riser of the East Addition. There were no necessary ports installed in the piping, or access to a suitable location in utilize the ultrasonic flow meter. The flow to the Education, and Forum building seem low for the size of the pipe going to t he building, however the pipe reduces from 12" to 4" upon entering the building. We are confident that the readings provided for this building are accurate since on both occasions roughly the same flow was measured to the building.



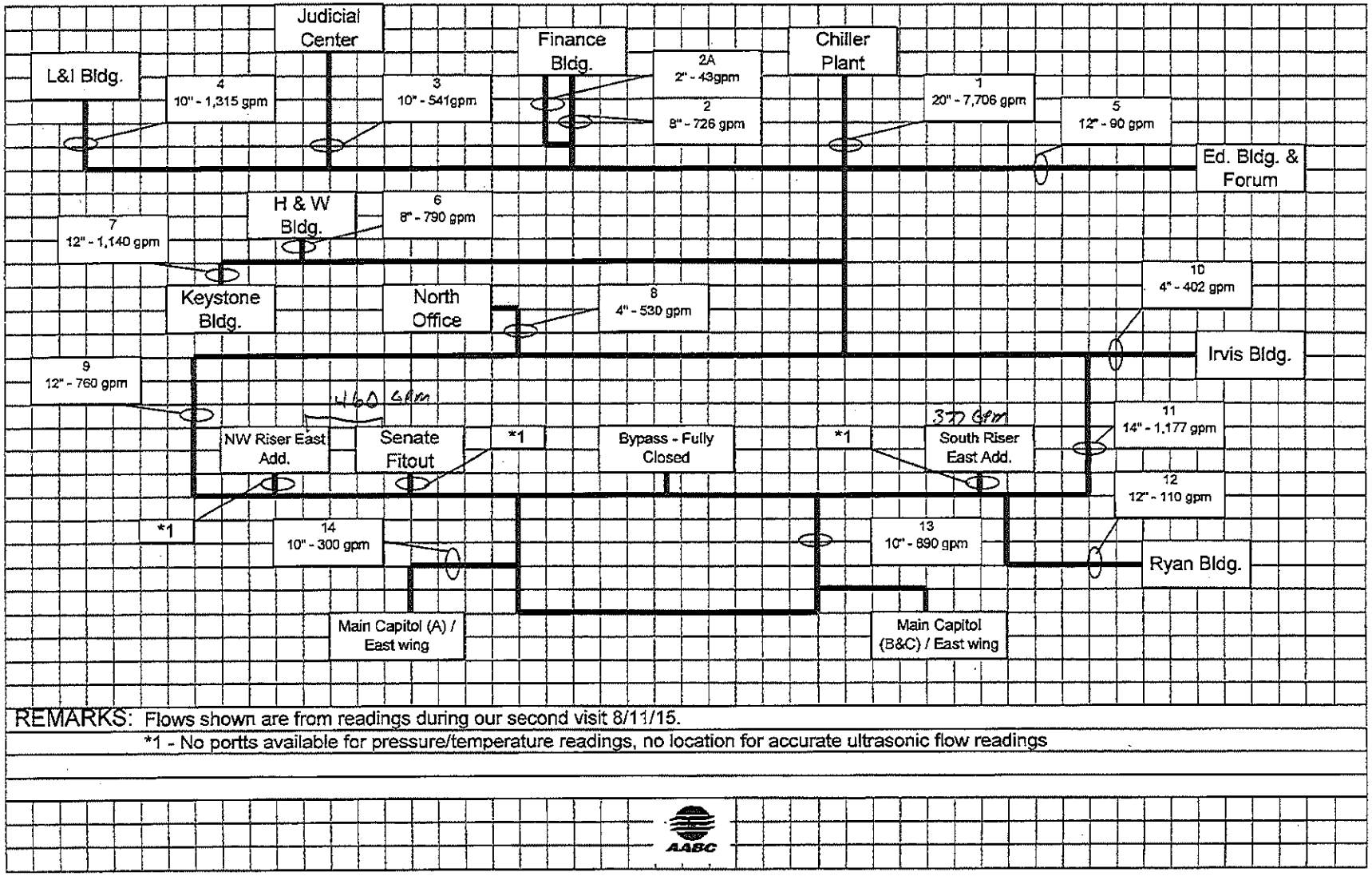
Balancing Report
Table of Contents

ITEM	SHEET #'s
Chilled Water Flow Diagram	1
Second Chilled Water Flow Readings	2-3
Initial Chilled Water Flow Readings	4

FLOOD & STERLING, INC.
DATA SHEET

PROJECT: Capitol Complex - Chilled Water Audit
SYSTEM : Chilled Water
AREA :

DATE: 11/06/15



REMARKS: Flows shown are from readings during our second visit 8/11/15.
*1 - No portts available for pressure/temperature readings, no location for accurate ultrasonic flow readings

FLOOD & STERLING, INC.
CHILLED WATER SUMMARY

PROJECT: Capitol Complex DATE: 11/06/15
SYSTEM: Chilled Water

Building Name	Location	Measured Flow	Flow Station		Entering Water Temp	Leaving Water Temp		Supply Pressure	Return Pressure	
Central Plant	1	7,706	7,591	F&S	42.6	55.1	F&S	109.6	73.6	
				BAS	42.0	54.0	BAS	110.0	70.5	
Finance	2	726	722	F&S	43.1	53.5	F&S	109.6	74.5	
				BAS	42.0	51.0	BAS	106.0	75.0	
	2A	43	~	F&S	42.6	55.0	F&S	NP	NP	
				BAS	~	~	Gauge	NG	NG	
JDC	3	541	590	F&S	42.5	52.3	F&S	105.5	103.6	
				BAS	42.0	52.0	Gauge	110.0	100.0	*1
L & I	4	1,315	1,221	F&S	43.8	52.4	F&S	100.9	84.7	
				BAS	44.0	52.0	Gauge	108.0	84.0	
Ed. & Forum	5	90	~	F&S	43.2	48.0	F&S	105.0	73.8	
				BAS	43.0	47.0	Gauge	NG	NG	
H & W	6	790	828	F&S	42.9	54.0	F&S	98.6	73.6	
				BAS	43.0	53.0	Gauge	105.0	75.0	
Keystone	7	1,140	1,360	F&S	42.1	53.2	F&S	99.0	73.4	
				BAS	39.0	57.5	BAS	96.0	~	
							Gauge	110.0	73.0	
North Office	8	530	528	F&S	43.0	52.4	F&S	100.7	69.1	
				BAS	46.0	52.0	Gauge	100.0	NG	
East Add	9	760	~	F&S	42.7	54.0	F&S	NP	NP	
				BAS	~	~	Gauge	NG	NG	
Irvis	10	402	380	F&S	42.9	53.7	F&S	101.3	64.3	
				BAS	42.0	55.0	Gauge	100.0	NG	
East Add	11	1,177	~	F&S	42.8	56.1	F&S	NP	NP	
				BAS	~	~	Gauge	NG	NG	

REMARKS: NG = No Gauge NP= No Ports
*1 - Gauge only goes to 100 psi
These readings from second visit 8/11/15.

AABC

FLOOD & STERLING, INC.
CHILLED WATER SUMMARY

PROJECT: Capitol Complex DATE: 11/06/15
SYSTEM: Chilled Water

Building Name	Location	Measured Flow	Flow Station		Entering Water Temp	Leaving Water Temp		Supply Pressure	Return Pressure	
Ryan	12	110	114	F&S	43.0	52.6	F&S	93.4	59.1	
				BAS	41.0	51.0	Gauge	NG	NG	
Main Cap	13	690	~	F&S	43.5	53.4	F&S	NP	NP	
				BAS	~	~	Gauge	NG	NG	
Main Cap	14	300	~	F&S	43.3	53.9	F&S	NP	NP	
				BAS	~	~	Gauge	NG	NG	

REMARKS: NG = No Gauge NP= No Ports
These readings from second visit 8/11/15.

AABC

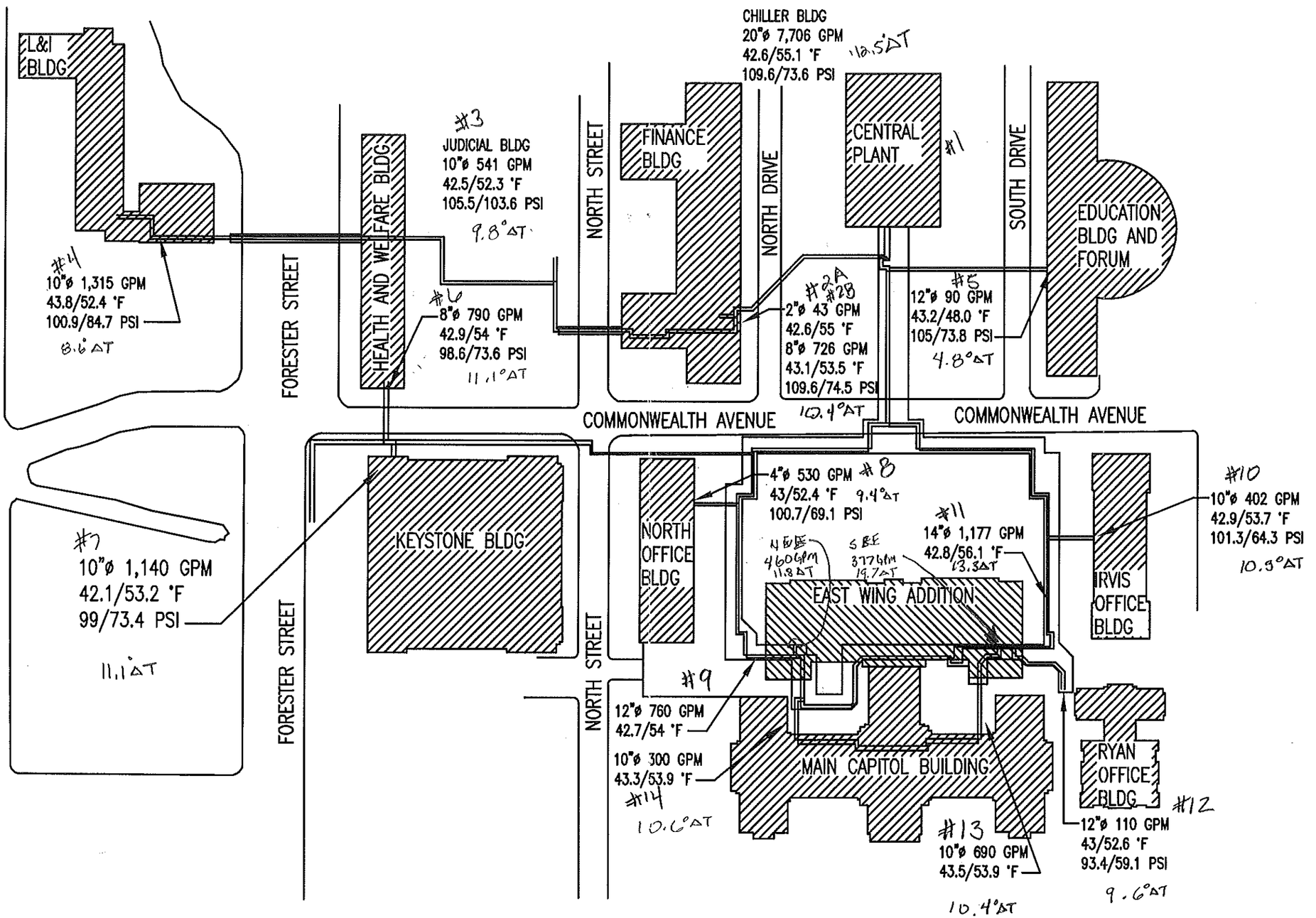
FLOOD & STERLING, INC.
ULTRASONIC CHILLED WATER SUMMARY

PROJECT: Capitol Complex - Chilled Water Audit DATE 11/06/15
SYSTEM: Chilled Water

Reading Location Number	Building (Area Served)		Pipe Size	Measured Flow	Flow Station Reading	Time	Outside Air Temp
1	Chiller Plant Main		20"	8,045	7,877	7:00 AM	79°F
1	Chiller Plant Main		20"	8,370	8,198	12:00 PM	84°F
1	Chiller Plant Main		20"	8,475	8,312	3:00 PM	86°F
2	Finance Building		8"	590	605	8:30 AM	82°F
2A	Finance Building		2"	37	~	8:30 AM	82°F
3	Judicial Center		10"	691	820	9:00 AM	82°F
4	Labor and Industry		10"	1,252	1,125	9:30 AM	82°F
5	Education Bldg. / Forum		12"	158	~	8:00 AM	81°F
6	Health and Welfare		8"	880	920	11:00 AM	83°F
7	Keystone Building		12"	1,780	1,692	10:30 AM	83°F
8	North Office		4"	433	429	10:00 AM	83°F
9	East Add. (NW riser), Capitol (A)		12"	780	~	1:00 PM	85°F
10	Irvis Building		4"	532	528	1:30 PM	85°F
11	East Add. (South riser), Capitol (B,C)		14"	1,400	~	2:30 PM	86°F
12	Ryan Building		6"	172	160	2:00 PM	86°F
13	Main Cap. (B,C) East Wing		10"	793	~	2:30 PM	86°F
14	Main Cap. (A) AHU's		10"	406	~	3:00 PM	86°F

REMARKS: 7:00 AM - 3 pumps running at 77% speed, Chillers 1,2,4 running
3:30 PM - 3 pumps running at 80% speed, Chillers 1,2,4 running
These readings from first vist 6/24/15

AABC



BUCHART HORN
ENGINEERS • ARCHITECTS • PLANNERS

CAPITOL COMPLEX CHILLED WATER STUDY

HARRISBURG PENNSYLVANIA

77066-00

PROJECT NO:	77066-00
ISSUE DATE:	12/01/2015
ISSUED FOR:	REPORT
SHEET REF:	
CHECKED BY:	BWO

DRAWING NOTICE IS TO INCLUDE GENERAL ARRANGEMENT, DESIGN AND INTENT OF WORK AND IS PARTLY DIAGRAMMATIC.
DRAWING SHALL NOT BE SCALED.
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DWG TITLE:

COMPLEX CHILLED WATER DATA

DWG NO: M-1

CONTROL VALVE SCHEDULE

BUILDING	LOCATION	AHU TAG	SERVICE	TYPE	LINE SIZE	Cv	DESIGN VALVE PD	MAX VALVE PD	SHUTOFF DIFF. PRESS.	REFERENCE NOTES	COMMENTS
H & W	PH MER	AHU-1	CHW	2-WAY	4"	NOTES 1&2	5 PSI	20 PSI	60 PSID	NOTES 1&2	PROVIDE NEW TWO-WAY VALVE
	PH MER	AHU-2			4"	NOTES 1&2	5 PSI	20 PSI	60 PSID	NOTES 1&2	PROVIDE NEW TWO-WAY VALVE
	PH MER	AHU-3			4"	NOTES 1&2	5 PSI	20 PSI	60 PSID	NOTES 1&2	PROVIDE NEW TWO-WAY VALVE
	PH MER	AHU-4			4"	NOTES 1&2	5 PSI	20 PSI	60 PSID	NOTES 1&2	PROVIDE NEW TWO-WAY VALVE
L & I	B29	P&F H/X			3"	NOTES 1&2	5 PSI	20 PSI	60 PSID	NOTES 1,2&5	PROVIDE NEW TWO-WAY VALVE
	B29	AHU			3"	NOTES 1&2	5 PSI	20 PSI	60 PSID	NOTES 1,2&5	PROVIDE NEW TWO-WAY VALVE
	BASEMENT ELECT ROOM	AHU			3"	NOTES 1&2	5 PSI	20 PSI	60 PSID	NOTES 1,2,3&5	PROVIDE NEW TWO-WAY VALVE
	EB57	AHU-8			4"	NOTES 1&2	5 PSI	20 PSI	60 PSID	NOTES 1,2&5	PROVIDE NEW TWO-WAY VALVE
	EB57	AHU-9			3"	NOTES 1&2	5 PSI	20 PSI	60 PSID	NOTES 1,2&5	PROVIDE NEW TWO-WAY VALVE
	MECH FLR	AHU-10			3"	NOTES 1&2	5 PSI	20 PSI	60 PSID	NOTES 1,2&5	PROVIDE NEW TWO-WAY VALVE
	MECH FLR	AHU-11			3"	NOTES 1&2	5 PSI	20 PSI	60 PSID	NOTES 1,2&5	PROVIDE NEW TWO-WAY VALVE
	MECH FLR	AHU-12			4"	NOTES 1&2	5 PSI	20 PSI	60 PSID	NOTES 1,2&5	PROVIDE NEW TWO-WAY VALVE
ED/FORUM	STAGE EQPT ROOM	AHU-1			2-1/2"	NOTES 1&2	5 PSI	60 PSI	60 PSID	NOTES 1&2	PROVIDE NEW TWO-WAY VALVE
	109	AHU-3			3"	NOTES 1&2	5 PSI	60 PSI	60 PSID	NOTES 1&2	PROVIDE NEW TWO-WAY VALVE
	DRESSING RM	CEILING AHU			1-1/2"	NOTES 1&2	5 PSI	60 PSI	60 PSID	NOTES 1,2&3	PROVIDE NEW TWO-WAY VALVE
	DRESSING RM	CEILING AHU			1-1/2"	NOTES 1&2	5 PSI	60 PSI	60 PSID	NOTES 1,2&3	PROVIDE NEW TWO-WAY VALVE
	DRESSING RM	CEILING AHU			1-1/2"	NOTES 1&2	5 PSI	60 PSI	60 PSID	NOTES 1,2&3	PROVIDE NEW TWO-WAY VALVE
	DRESSING RM	CEILING AHU			1-1/2"	NOTES 1&2	5 PSI	60 PSI	60 PSID	NOTES 1,2&3	PROVIDE NEW TWO-WAY VALVE
	AUDITORIUM	HVAC-3			3" VIF	NOTES 1&2	5 PSI	60 PSI	60 PSID	NOTES 1,2&3	PROVIDE NEW TWO-WAY VALVE
	AUDITORIUM	HVAC-3			3" VIF	NOTES 1&2	5 PSI	60 PSI	60 PSID	NOTES 1,2&3	PROVIDE NEW TWO-WAY VALVE
	AUDITORIUM	HVAC-3			3" VIF	NOTES 1&2	5 PSI	60 PSI	60 PSID	NOTES 1,2&3	PROVIDE NEW TWO-WAY VALVE
	AUDITORIUM	HVAC-3			3" VIF	NOTES 1&2	5 PSI	60 PSI	60 PSID	NOTES 1,2&3	PROVIDE NEW TWO-WAY VALVE
NORTH OFFICE	B09	AC-1			6"	NOTES 1&2	5 PSI	50 PSI	60 PSID	NOTES 1,2&4	PROVIDE NEW TWO-WAY VALVE
	B09	AC-2			6"	NOTES 1&2	5 PSI	50 PSI	60 PSID	NOTES 1,2&4	PROVIDE NEW TWO-WAY VALVE
	B09	FCUs			8"	367	5 PSI	50 PSI	60 PSID	NOTE 4	PROVIDE NEW TWO-WAY VALVE
IRMS OFFICE	B01	AC-1			6"	NOTES 1&2	5 PSI	50 PSI	60 PSID	NOTES 1,2&4	PROVIDE NEW TWO-WAY VALVE
	B01	AC-2			6"	NOTES 1&2	5 PSI	50 PSI	60 PSID	NOTES 1,2&4	PROVIDE NEW TWO-WAY VALVE
	B36	AC-1			* 2"	155	5 PSI	50 PSI	60 PSID	NOTE 4	PROVIDE NEW TWO-WAY VALVE
	B36	AC-2			* 2"	155	5 PSI	50 PSI	60 PSID	NOTE 4	PROVIDE NEW TWO-WAY VALVE
	B31	AC-3			2" VIF	NOTES 1&2	5 PSI	50 PSI	60 PSID	NOTES 1,2,3&4	PROVIDE NEW TWO-WAY VALVE
	B37	AC-4			2" VIF	NOTES 1&2	5 PSI	50 PSI	60 PSID	NOTES 1,2,3&4	PROVIDE NEW TWO-WAY VALVE
	B36	AC-5			2" VIF	NOTES 1&2	5 PSI	50 PSI	60 PSID	NOTES 1,2,3&4	PROVIDE NEW TWO-WAY VALVE
	VIF	AC-6			2" VIF	NOTES 1&2	5 PSI	50 PSI	60 PSID	NOTES 1,2,3&4	PROVIDE NEW TWO-WAY VALVE
	G52	AC-7			2" VIF	NOTES 1&2	5 PSI	50 PSI	60 PSID	NOTES 1,2,3&4	PROVIDE NEW TWO-WAY VALVE
	B01	FCUs			*2-1/2"	255	5 PSI	50 PSI	60 PSID	NOTE 4	PROVIDE NEW TWO-WAY VALVE
RYAN BLDG	PUMP ROOM	AHU-1			*1"	9.4	5 PSI	30 PSID	60 PSID		PROVIDE NEW TWO-WAY VALVE
	068	AHU-2			*1-1/4"	14.0	5 PSI	30 PSID	60 PSID		PROVIDE NEW TWO-WAY VALVE
	VIF	AHU-3			*1-1/4"	14.0	5 PSI	30 PSID	60 PSID		PROVIDE NEW TWO-WAY VALVE
	VIF	AHU-4			*1-1/4"	10.6	5 PSI	30 PSID	60 PSID		PROVIDE NEW TWO-WAY VALVE
	VIF	AHU-5			*1-1/4"	12.9	5 PSI	30 PSID	60 PSID		PROVIDE NEW TWO-WAY VALVE
	VIF	AHU-6			*2"	29.5	5 PSI	30 PSID	60 PSID		PROVIDE NEW TWO-WAY VALVE
	VIF	AHU-7			*1"	8.7	5 PSI	30 PSID	60 PSID		PROVIDE NEW TWO-WAY VALVE
	VIF	AHU-8			*1-1/4"	15.2	5 PSI	30 PSID	60 PSID		PROVIDE NEW TWO-WAY VALVE
EAST ADD.	RM 99	AHU-1			VIF	124	5 PSI	40 PSI	60 PSID		PROVIDE NEW TWO-WAY VALVE
	RM 87	AHU-2			VIF	124	5 PSI	40 PSI	60 PSID		PROVIDE NEW TWO-WAY VALVE
	RM 29	AHU-3			VIF	124	5 PSI	40 PSI	60 PSID		PROVIDE NEW TWO-WAY VALVE
	RM 120	AHU-4			VIF	124	5 PSI	40 PSI	60 PSID		PROVIDE NEW TWO-WAY VALVE
	RM 150	AHU-5			VIF	41	5 PSI	40 PSI	60 PSID		PROVIDE NEW TWO-WAY VALVE
	150 ROTUNDA	AHU-6			VIF	41	5 PSI	40 PSI	60 PSID		PROVIDE NEW TWO-WAY VALVE
	116 ATRIUM	AHU-7			VIF	41	5 PSI	40 PSI	60 PSID		PROVIDE NEW TWO-WAY VALVE
	ELEC SHOP	AHU-8			VIF	41	5 PSI	40 PSI	60 PSID		PROVIDE NEW TWO-WAY VALVE
	CAP POLICE RM 70	AHU-9			VIF	25	5 PSI	40 PSI	60 PSID		PROVIDE NEW TWO-WAY VALVE
	PLUMBERS SHOP	AHU-10			VIF	14	5 PSI	40 PSI	60 PSID		PROVIDE NEW TWO-WAY VALVE
	DOCK PRINT SHOP	AHU-11			VIF	14	5 PSI	40 PSI	60 PSID		PROVIDE NEW TWO-WAY VALVE
	PLUMBERS SHOP	AHU-12			VIF	14	5 PSI	40 PSI	60 PSID		PROVIDE NEW TWO-WAY VALVE
	IMCS	AHU-13			VIF	25	5 PSI	40 PSI	60 PSID		PROVIDE NEW TWO-WAY VALVE
	RM 87	AHU-14			VIF	124	5 PSI	40 PSI	60 PSID		PROVIDE NEW TWO-WAY VALVE
	RM 4	AHU-15			VIF	25	5 PSI	40 PSI	60 PSID		PROVIDE NEW TWO-WAY VALVE
	STORAGE	AHU-16,17,18			VIF	25	5 PSI	40 PSI	60 PSID	NOTE 4	PROVIDE NEW TWO-WAY VALVE
MAIN CAPITOL	INTFACE A	AHU			8"	289	5 PSI	40 PSI	60 PSID		MODIFY/REPLACE EXIST VALVE
	INTFACE B	AHU			8"	343	5 PSI	40 PSI	60 PSID		MODIFY/REPLACE EXIST VALVE
	INTFACE C	AHU			8"	289	5 PSI	40 PSI	60 PSID		MODIFY/REPLACE EXIST VALVE

* ACTUAL CONTROL VALVE SIZE LISTED, NOT LINE SIZE.

CONTROL VALVE SCHEDULE NOTES:

1. ALL NEW CONTROL VALVES TO BE MINIMUM ONE SIZE SMALLER THAN LINE SIZE UNLESS OTHERWISE NOTED.
2. CONTRACTOR TO VERIFY COIL DESIGN FLOW AND VERIFY CV FOR 5 PSIG CONTROL VALVE DESIGN PRESSURE DROP WITH RANGEABILITY UP TO MAX VALVE PRESSURE DROP LISTED.
3. VERIFY LINE SIZE.
4. DO NOT IMPLEMENT LEAVING AIR TEMPERATURE CONTROL (SEE DETAIL 9, THIS DRAWING) FOR CONTROL OF THIS CONTROL VALVE. CONTROL VALVE TO THROTTLE FLOW BASED ON LOCAL DIFFERENTIAL PRESSURE BETWEEN SUPPLY AND RETURN LINES.
5. AIR HANDLING UNIT AND CONTROL VALVE CONTROL IN LABOR & INDUSTRY BUILDING BY AUTOMATED LOGIC.

ISSUED FOR BID
JANUARY 25, 2006

DESCRIPTION	DESCRIPTION
AS BUILT REVISIONS	
SUBMITTED ARCHITECT (ENGINEER)	
SUBMITTED ENGINEER (ARCHITECT)	

REVIEWED BY DEPARTMENT OF GENERAL SERVICES

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL THOMAS M. LONG ENGINEER No. 037026 PENNSYLVANIA

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL DOUGLAS WEN ENGINEER PENNSYLVANIA

GANNETT FLEMING INC.
207 SENATE AVENUE
CAMP HILL, PA 17011

WM Group
WM Group Engineers, P.C.
370 Seventh Avenue, Suite 701
New York, New York 10001

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF GENERAL SERVICES
HARRISBURG, PENNSYLVANIA

PROJECT No. D.G.S. 948-37
PHASE 6

EXPANSION OF CENTRAL AIR CONDITIONING SYSTEM TO MAIN CAPITOL BULIDING
HARRISBURG,
DAUPHIN COUNTY, PENNSYLVANIA

DETAILS AND SCHEDULES

DRAWN BY	DATE	DRAWING No.
CT	JAN 25, 2006	M-16
CHECK BY	SCALE	
---	NONE	

DATE OF ISSUE: MAY 24, 2017

DEPARTMENT OF GENERAL SERVICES
ENERGY AND RESOURCE MANAGEMENT OFFICE
401 NORTH STREET
HARRISBURG, PENNSYLVANIA

BULLETIN NO. 5
on

Project No. GESA 2017-1 – REQUEST FOR QUOTES FOR A GUARANTEED ENERGY SAVINGS PROJECT AT: DEPT. OF GENERAL SERVICES, CAPITOL COMPLEX, HARRISBURG, PENNSYLVANIA, Department of General Services, Energy & Resource Management, 401 North Street, Room 403, Harrisburg, Pennsylvania, 17120.

PROPOSAL SUBMISSION DEADLINE, THURSDAY JUNE 29, 2017
TIME OF OPENING: 2:00 PM

QUESTIONS / CLARIFICATIONS / REQUESTS FOR INFORMATION (DGS responses in bold text)

1. Under RFQ Section 4.3 "Project Parameters", it states: "Quote must contain a statement from the Offeror that the total energy savings projected in the final scope of work will be at least 95% of the savings projected in the Quote, the actual ECM costs shall be within 10% of the costs listed in the CEA, and that the project will be self-funded over the financial term of the project (maximum term of 20 years.);". Considering ESCOs are permitted a total of 13 hours (maximum) of site access, achieving these levels of detail for both costs and savings is difficult and high risk with the proposed limited number of available site visits. Will DGS allow the ESCO to make more site visits during the proposal phase? **This percentage is to hold unless the Funding Agency or DGS modify the proposed requirements and/or greater savings are found in the IGA study and clarification.** Please clarify the penalties imposed against the ESCO for not adhering to this requirement. **The project's contract may be terminated and payment for the IGA will be withheld.**
2. Are there any existing Energy Star accounts for these facilities? If so, please provide access information to DGS's existing Energy Star accounts for each site. **No, there are not any Energy Star accounts for these facilities.**
3. Are these facilities currently participating in any Demand Response Programs? **Yes** If so, please explain which programs, and remaining term of contract. **It is the extended limited program. The terms of contract are set by the DGS Bureau of Procurement and should not be considered part of this project.**
4. Is the utilization of Union labor / contractors required on this project? **No, however; ESCO will need to pay their employees per the current Prevailing Wage Rates. Prevailing wage rates for this project are attached to the end of this bulletin.**

5. Please confirm that the 20-year financing term starts post-acceptance of construction for all ECMs. **Confirmed.**
6. Please confirm that design engineering services and costs (for ECMs requiring engineering design) will be addressed by the ESCO during the construction phase of the project, after DGS acceptance of the awarded ESCO's IGA report and after GESA execution. **The ESCO will be considered the professional of record therefore, the engineering of the project is within their work product.**
7. Please confirm that ESCOs will need to propose an IGA fee as part of RFQ proposals, and that the Commonwealth will reimburse the awarded ESCO for such IGA costs in the event the project does not move forward to GESA contract. **Confirmed. The actual IGA fee will be determined once the ESCO has been selected.**
8. Please confirm that the ESCO's IGA fee should be presented under Volume II ECM/Cost Submission; response to 2.6 Energy Conservation Measures/Cost Submission; D Energy Conservation Measures and Costs, item "a". **Confirmed.**
9. Please provide a copy of the new DGS IGA Agreement that will be used for this project. **The IGA contract will be issued once the ESCO has been selected.**
10. On page 18, under 1.35 Investment Grade Audit (IGA) by Successful Offeror, it states: "The IGA must be submitted to the Commonwealth within 60 calendar days of the date on the Commonwealth's Notice of Selection." Delays to schedule can occur that are beyond the control of the ESCO, such as data collection efforts being performed by the client/others, or events within the client's facilities that prevent the ESCO from gaining access to the site. In addition, 60 days will not be enough time for the awarded ESCO to conduct its necessary due diligence for such a comprehensive and sensitive scope-of-work being considered by this project, especially considering the severe limitations on proposal phase site visitation. Can this please be extended to 180 calendar days? **The IGA timeline can be extended after the proposal stage and the accepted ECM(s) of the project are known.** What penalties are imposed on the ESCO if the IGA is not submitted within the required time limit? **There are no pre-determined penalties, however; if it is felt that the proposer is not acting in good faith, their contract may be terminated by the Commonwealth.**
11. In Part 1.35 B, Is the IGA submission deadline of 60 calendar days a true requirement or will this timeline be developed in coordination with the Commonwealth and adjusted based upon the actual time required to complete the IGA for the proposed ECM's by the successful ESCO? **The IGA timeline can be extended after the proposal stage and the accepted ECM(s) of the project are known.**
12. The ESCOs savings guarantee is supported by the Measurement and Verification (M&V) program, and the service term of that program. However, there are conflicting statements within the RFQ regarding the term of the M&V program for this GESA project. Under Section 1.5: Scope, B., on page 4, it states: "The GESA Contractor will be required to guarantee energy and cost savings on an annual basis. No credit for the achievement of savings above and beyond the annual guarantee will be credited to satisfy performance guarantees in future years of the contract. Annual reconciliation of the achieved savings will be required." However, under "4.3 Project Parameters" of the RFQ,

on page 42, it states "26. Include Measurement and Verification (M&V) costs for 3 years as part of your Quote. M&V methods must be in accordance with the International Performance Measurement and Verification Protocol (IPMVP) as appropriate. Indicate in your RFQ response the M&V Option being employed for each measure. At no time, may measures be simply noted as "stipulated savings".

Regarding the Volume II ECM/Cost Submission, page 32 of the RFQ, under 2.6 Energy Conservation Measures/Cost Submission; D Energy Conservation Measures and Costs," item "h., (5). Payments for monitoring and maintenance services;", please confirm ESCOs should carry M&V costs for years 1-3 (only), post construction, within their proposed annual financial projections. **The ESCO shall do M&V at the end of the project before acceptance and for the next three years as part of the contract. The cost of the M&V for the three years shall be included in the overall cost and itemized in the payment schedule.**

13. Please clarify the amounts of Liquidated damages that will be applied to this GESA contract. **The liquidated damages will be determined and listed in the Guaranteed Energy Savings Contract between DGS and the ESCO. The typical penalty is .025% of the contract value per day. Example: $5,000,000 * .00025 = $1,250.**
14. Please clarify the term of the warranty – we recommend it extending for one (1) year past substantial completion of an ECM. (Article 8.2 of Attachment L - GESA Contract) **All construction for 1 year after construction plus performance for length of payback period. Article 8.2 of Attachment L will remain as written.**
15. As DGS is not using an Energy Consultant on this project, please confirm that there are no other payments ESCO must make to DGS or any potential DGS consultants and ESCO need not include any such costs in our project pricing. **Confirmed.**
16. Section 4.3(A)(16) (page 41) references no escalation of project costs or maintenance costs. Please clarify this requirement as maintenance and other service costs typically increase over time. **Do not include inflation of maintenance cost in your calculations.**
17. Please clarify the payment terms associated with the project – will payments be made within 30days of an approved invoice? Please identify where this is referenced in the contract documents as well as where the ongoing service payment obligation is referenced. **While we cannot guarantee payment processing times, we will make every effort to expedite the payment process through the escrow account. For more information, see GESA Invitation to Qualify (ITQ), Part I, Section 17 and GESA General Conditions, Article 12, Section 12.3.**
18. Information on any lighting controls systems that exist at the Complex. **Other than random motion detectors throughout some of the buildings, no lighting control systems exist.**
19. Copies of any energy or equipment assessment studies on the Complex since the last GESA project. **These are unavailable as there aren't any.**
20. Can the number of tertiary chilled water loops connected to the central plant be provided? Any additional information about the connected buildings (such as building loop pump sizes, heat exchanger information, building load, etc.) would also be helpful. **The sketch and balancing numbers from the last report were provided in Bulletin 4.**

21. As-built lighting inventory, which is usually provided at the end of the construction phase of a GESA project and would have been supplied by the ESCO who implemented the last GESA at the Complex (Excel spreadsheet preferred) **What is available has been placed on the website. Click** here **to go to the website.**
22. Another core ECM (ECM 3) relates to providing a water side economizer for the central plant. Development of this measure will require ESCOs to evaluate the winter cooling profile of all buildings, including those that are not part of the RFP scope, served by the central plant. Will central plant chilled water load logs be made available for review? **It is reported that one 2800-ton chiller runs 60% in winter. Chiller logs have been placed on the website.**
23. Please confirm the required performance and payment bonds in the amount of 100% of the awarded contract relate only to the construction work and do not extend to any energy savings guarantees or ongoing verification / maintenance services. We request language be added in Article 8.3 to clarify this. **The contract bonds are for the faithful performance of the contract and for payment of labor and material.**
24. Section 1.32 - 133 and Article 9 of the GESA –
    a. 1.32B: Can the references to occurrence be changed to per claim? Our existing policy is claims made and a separate occurrence based policy for this project could be a significant added expense. **1.32(B) remains as written.**
    b. 1.33 A.1.b Employers Liability is not available in unlimited amounts – please delete or replace with any statutory limits. **Employers Liability covering statutory requirements is standard and Insurers can provide such coverage. 1.32(A)(1)(a) and 1.32(A)(1)(b) remains as written.**
    c. 1.33 A.2.b: $50,000 for Medical Expenses is a high coverage limit – can this be changed to $10,000 which is more in-line with typical coverages? **1.33(A)(2)(b) remains as written.**
    d. 1.33 A.2.f: Please confirm specified limits may be satisfied through a combination of primary and excess policies. **The specified limits for Vehicle Liability may be satisfied through a combination of primary and excess policies.**
    e. 1.33 A.2.k: Please add "except ten days for nonpayment of premium" at the end of the paragraph. **1.33(A)(2)(k) remains as written.**
    f. 1.33 A.2.p: The specified language appears atypical and problematic as only the first named insured has the right to negotiate and settle claims with the insurer. We request that this requirement be deleted. **1.33(A)(2)(p) remains as written.**
    g. 1.33 A.2.r: As requested above, Can the references to occurrence be changed to per claim? Our existing policy is claims made and a separate occurrence based policy for this project could be a significant added expense. **1.33(A)(2)(r) remains as written.**
    h. Article 9, 9.10: Our insurer has requested the following changes to the insurance requirements – can the documents be revised accordingly? Strike "or changed". Add "except ten days for nonpayment of premium". Strike "prior to the

expiration" and replace with "within ten business days of the renewal" Add "with the exception of Professional Liability and Workers Compensation" to the additional insured requirement. **Article 9, Section 9.10 of the GESA General Conditions remains as written.**

25. Section 2-5.4(A)(1)(d)(1) (page 28). Please clarify and provide additional information on the intent of the "resource availability" / capacity question. The specified formula does not reflect previous investment in resources that would now become utilized, resources currently available, nor additional resources being brought on board to support the backlog. Also, as some companies specify "sales" differently than "revenue" please clarify that the intent is average revenue over the last 3 years. **Beyond what is requested, the Offeror is welcome to discuss, in this section, its investment in resources that would become utilized, resources currently available, or additional resources to support backlog, as well as its specification of sales or revenue.**
26. Please provide all available asbestos and hazardous materials logs/information for these sites, or let us know when we may be permitted to return and inspect such information. Please clarify the extent of hazardous materials ESCOs are responsible considering the limited amount of site access available during the proposal development phase. **Asbestos findings and observations from previous reports have been placed on the website & attached for reference. Winning proposer will have access to full reports as needed.**
27. In Part 1.32 A: Is it the expectation that the GESA Contractor carry the cost for hazardous material abatement in our Quote? Any costs carried at this time will be somewhat arbitrary since the GESA Contractor will not have had the chance to review any Hazardous Material Plan / Surveys, review site conditions or obtain any indicative pricing for abatement. May we suggest that all GESA Contractors carry a contingency fund as part of our quote, value assigned by DGS, to level the playing field for all GESA Contractors? Can DGS please clarify who is responsible for the testing and abatement of unforeseen hazardous materials, or suspected hazardous materials, encountered during the work which were not identified by DGS in the RFP documents? Given the short IGA timeline of 60 days, it is unlikely any testing of suspected materials could occur during the IGA. **Asbestos findings and observations from previous reports have been placed on the website & attached for reference. List only costs you anticipate based on these findings.**
28. Part 1.36 D: In this section, the RFQ states that if no GESA is executed, then the "Commonwealth shall not liable for any cost or expense incurred by the GESA Contractor." Does this mean that the GESA contractor will not recover the cost of the Investment Grade Audit? **The intent is to ensure the ESCO is reimbursed for an audit that indicates a self-funded project.**
29. Part 2-5.4, A, 3: How binding is our identification of Key subcontractor in the proposal phase? Is there a mechanism for "switching" contractors so we can give DGS the benefits of competitive bidding during the IGA Phase? **At this stage, subcontractors are not binding.**
30. Part 2.7 A: In the computation of SDB percent by ECM, is the percent by ECM based on a total of ALL ECMs in the project or just the CORE ECMs in the project? **The SDB percentage is based on core ECMs only. If non-core ECMs are found in the SDB calculations, they will be removed and the SDB percentage will be re-calculated.**

_____

Rebecca Tomlinson, RFQ Coordinator
ENERGY & RESOURCE MANAGEMENT OFFICE

PLEASE ACKNOWLEDGE RECEIPT OF BULLETIN BY EMAIL RESPONSE TO BECKY TOMLINSON AT retomlinso@pa.gov

CENTRAL PLANT + TUNNEL SYSTEM

This management plan was prepared by Mr. Daniel R. Gensemer and reviewed by Mr. William C. Wilkins, both of whom are EPA and Pennsylvania accredited management planners. This management plan should be utilized as a guidance document on how to address any asbestos found in this building.

1.1 SUMMARY OF FINDINGS

Prior to the actual building inspection, a record search was performed on-site of existing buildings records to determine, if any, asbestos containing materials were used as building materials during the construction of the Central Heating and Cooling Plant - Tunnel System. No information pertaining to any asbestos containing materials could be found. Homogeneous areas and functional space areas are referred to throughout this report. A functional space is defined as an area within a building which is spatially distinct whose occupants or equipment perform a similar function, i.e., basement, stairwell, mechanical room, etc. A homogeneous area is defined as a material with similar visual appearance, texture and hardness, date of installment and functional use, i.e., elbows, tanks, walls, etc.

- The following asbestos containing materials were found in the Central Heating and Cooling Plant - Tunnel System.

- Approximately 45 linear feet of 4" mag pipe insulation was observed in the Tunnel. This material is in good condition and should be handled under your operations and maintenance program.

- Approximately 30 linear feet of 6" mag pipe insulation was observed in the Tunnel. This material is in good condition and should be handled under our operations and maintenance program.

- Approximately 1,115 linear feet of 12" mag pipe insulation was observed in the Tunnel. This material is in good condition and should be handled under our operations and maintenance program.

Table 1.1 gives a summary of findings, listing of location of ACM, material type and approximate quantity.

TABLE 1.1

CENTRAL HEATING AND COOLING PLANT - TUNNEL SYSTEM
INSTALLATION I.D. 50000
BUILDING 001
HARRISBURG-CAPITOL COMPLEX/SOLDIERS GROVE, PENNSYLVANIA

ASBESTOS CONTAINING MATERIALS
-- SUMMARY OF FINDINGS --

LOCATION OF ACM	MATERIAL	TYPE	APPROXIMATE QUANTITY
Main Area			
Tunnel	4" Mag Pipe Insulation	T	45 LF
Tunnel	6" Mag Pipe Insulation	T	30 LF
Tunnel	12" Mag Pipe Insulation	T	1,115 LF

T Thermal Insulation

B. FINDINGS AND OBSERVATIONS

Laboratory analysis of bulk samples collected in the Health and Welfare Building confirmed the presence of asbestos in debris, tank insulation, mudded joint packings, pipe insulation, stored insulation, sprayed acoustical plaster, exterior duct insulation, hard wall/ceiling plaster, vinyl floor tiles and floor tile mastic, and cementitious panels.

Asbestos-containing debris was observed under the hot water tank in the southwest corner of the basement mechanical room and in the paper drum along the south wall of the east wing of the penthouse. All debris should be removed and the areas properly cleaned.

Asbestos-containing tank insulation was found in the basement mechanical room on the south and center hot water tanks and on two heat exchangers, and in the penthouse on the east and west heat exchangers and on Chillers 1 and 2. Two layers of insulation on each of the tanks were noted and sampled and are listed separately within the "Assessment Results." The insulation on the south and center hot water tanks was in poor condition, with considerable contact damage, and should be removed. The insulation on the remaining tanks should be repaired and monitored as part of an operations and maintenance program until removal is feasible.

Mudded joint packings and pipe covering were observed in the basement and on the second, ninth, and penthouse levels. The materials were in fair condition, with minor damage. They should be repaired and monitored as part of an operations and maintenance program until removal is feasible.

Stored materials that were confirmed asbestos-containing were roofing tar and gasket material in the basement mechanical room, and gasket material in the penthouse. The roofing tar and gasket material were labelled with manufacturers' names and can be referenced in the Assessment Data and Production Identification portions of the report. The stored materials should not be used and should be properly stored as evidence.

Exterior duct insulation was observed in the basement electrical closet and southwest storage room, and in the penthouse. The insulation was in fair condition, with minor damage, and should be repaired and monitored as part of an operations and maintenance program until removal is feasible.

Sprayed acoustical plaster was observed throughout the main lobby and in the center storage room on the first floor. The plaster was in good condition, with minor damage. It should be repaired as needed and closely monitored as part of an operations and maintenance program until removal is feasible.

Hard wall and ceiling plaster was observed on the basement through penthouse levels. All plaster except for the walls in the first floor men's and women's restrooms and janitor's closet was determined nonasbestos-containing. The asbestos-containing plaster in these areas should be monitored as part of an operations and maintenance program until removal is feasible.

Other asbestos-containing materials included vinyl floor tiles and mastic on the basement through tenth floors, and cementitious panels on both cooling towers on the penthouse level. These materials were in fair condition and should be monitored as part of an operations and maintenance program until removal is feasible. For specific locations of the floor tiles and mastic, please refer to the Inspection Results.

Materials sampled and determined nonasbestos-containing were various areas of vinyl floor tiles, vinyl floor tile mastic, fireproofing, mudded joint packings, pipe covering, ceiling panels, debris, hard wall/ceiling plaster, and gasket material. Please refer to the Assessment Results for distinctions between asbestos-containing and nonasbestos-containing materials.

B. FINDINGS AND OBSERVATIONS

Laboratory analysis of bulk samples collected in the North Office Building confirmed the presence of asbestos in tank insulation, mudded joint packings, pipe covering, tar pipe covering, sprayed acoustical plaster, woven paper/tape, vibration joint cloth, vinyl floor tiles, and stored material.

The tank insulation was observed in basement Room B-09 on the small expansion tank, west and east hot water tanks, east and west expansion tanks, and Heat Exchangers 1 and 2. Two layers of insulation on each of the tanks were noted and sampled and are listed separately within the assessment results. The tank insulation was in good overall condition, with potential for damage, and should be monitored as part of an operations and maintenance program until it is removed.

Asbestos-containing mudded joint packings associated with nonsuspect pipe covering on heating hot water and chilled water lines were also observed in basement Room B-09. Black tar pipe wrap was observed on the refrigerant lines at the chiller control and refrigerant compressor in Room B-09. The mudded joint packings and tar wrap were in fair condition, with minor contact and water damage, and should be monitored as part of an operations and maintenance program until they are removed. Other material in Room B-09 included paper pipe wrap on top of the electrical switch. The pipe wrap should not be used and should be properly disposed.

Sprayed acoustical plaster was observed in the office areas on the basement through sixth floors. The plaster was encapsulated and was in fair condition, with minor contact and water damage. It should be closely monitored as part of an operations and maintenance program until it is removed.

Asbestos-containing woven paper was found behind the radiator vents in Rooms G-06, G-16, and G-33 and in the south and southeast corridors. The paper was in poor condition, with extensive damage. Due to the high asbestos content and poor condition, it should be removed.

Other materials included vibration joint cloth in the northwest corner of the penthouse and vinyl floor tiles in Elevators 1, 2, and 3. These materials were in good condition and should be monitored as part of an operations and maintenance program until they are removed.

Miscellaneous materials that were documented during the inspection are listed in Section F of Chapter III. These materials may contain asbestos, but were not sampled to avoid compromising their structural integrity.

Other suspect materials were decorative hard wall and ceiling plaster observed in the public hallways and hearing rooms on the ground floor, and in the south entrance on the first floor and the simulated leather ceiling in the PUC Conference Room on the first floor. These materials were not sampled to preserve their aesthetic value, but were assumed asbestos-containing and should be monitored as part of an operations and maintenance program. Sampling/Inspection Release Forms are included in Appendix I.

Materials sampled and determined nonasbestos-containing were mudded joint packings associated with nonsuspect pipe covering on heating hot water and chilled water lines in basement Room B-07, hard wall and ceiling plaster and drop ceiling panels throughout the building, and various areas of vinyl floor tiles and linoleum with associated mastics. Please refer to the "Assessment Results" for distinctions between asbestos-containing and nonasbestos-containing materials.

B. FINDINGS AND OBSERVATIONS

Laboratory analysis of bulk samples collected in the Labor and Industry Building confirmed the presence of asbestos in debris, stored vinyl floor tiles and gasket material, heat exchanger and tank insulation, exterior duct insulation, pipe and mudded joint insulations, vibration joint cloth, sprayed acoustical plaster, vinyl floor tiles and vinyl floor tile mastic, breeching exhaust insulation, and tar.

Asbestos-containing debris was observed in Bays 3 and 7 and above the access panel in the west end of the third floor; in telephone room on the fifteenth floor; and beneath Fan Unit 4 ducting in the penthouse. The debris had a significant potential for disturbance and should be removed.

Other materials for which removal is recommended were significantly damaged mudded joint packings on steam lines in Bays 5 and 6 and asbestos rope on the heat exchanger in Bay 5 of the third floor; pipe covering on steam lines in the fourth floor dishwasher room; and wrapped cardboard/paper pipe covering on domestic water lines on the fifth and seventh floors, including the associated mudded joint packings on this piping on the seventh floor. Other materials which should be removed are exterior duct insulation, wrapped cardboard/paper pipe covering and associated mudded joint packings on drain lines, heat exchanger insulation, pipe covering and associated mudded joint packings on low-pressure steam lines, mudded joint packings and pipe covering on dual-temperature lines, and mudded joint packings on cardboard/paper-insulated dual-temperature lines in the penthouse.

Stored vinyl floor tiles in the southwest corner of the southwest mechanical room and stored gaskets in the northwest corner of the northeast mechanical room of the basement, and stored gaskets and roofing tar in the penthouse should not be used and should be turned over to the Attorney General's office.

All other friable and nonfriable asbestos-containing materials not specifically addressed above had areas of minor damage and should be monitored as part of an operations and maintenance program until removal. (Please refer to the Inspection Report Data for specific locations of the materials.) Mudded joint packings associated with preformed pipe covering on dual-temperature lines in the men's restrooms on the tenth and twelfth floors were inaccessible at the time of the inspection and were assumed asbestos-containing. Sampling/Inspection Release Forms for these materials are included in Appendix I.

Materials sampled and determined nonasbestos-containing were specific areas of exterior duct insulation, pipe insulation, mudded joint packings, stored insulations, vinyl floor tiles, vinyl floor tile mastic, hard wall/ceiling plaster, drop ceiling panels, tar paper, batt-type insulation, radiator blanket, electrical wire covering, linoleum, and cementitious panels.

BUREAU OF LABOR LAW COMPLIANCE
PREVAILING WAGES PROJECT RATES

Project Name:	2017-1 Capitol Complex - GESA
Awarding Agency:	DGS
Contract Award Date:	10/16/2017
Serial Number:	17-04101
Project Classification:	Building
Determination Date:	5/24/2017
Assigned Field Office:	Harrisburg
Field Office Phone Number:	(717)787-4763
Toll Free Phone Number:	(800)932-0665
Project County:	Dauphin County

BUREAU OF LABOR LAW COMPLIANCE
PREVAILING WAGES PROJECT RATES

Project: 17-04101 - Building	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Asbestos & Insulation Workers	6/26/2017		$33.90	$24.61	$58.51
Asbestos & Insulation Workers	6/27/2016		$32.00	$25.51	$57.51
Boilermaker (Commercial, Institutional, and Minor Repair Work)	3/1/2018		$29.52	$18.22	$47.74
Boilermaker (Commercial, Institutional, and Minor Repair Work)	3/1/2017		$28.52	$18.22	$46.74
Boilermaker (Commercial, Institutional, and Minor Repair Work)	3/1/2016		$27.52	$18.22	$45.74
Boilermakers	1/1/2018		$46.26	$33.36	$79.62
Boilermakers	1/1/2017		$44.26	$33.36	$77.62
Boilermakers	1/1/2016		$42.26	$33.36	$75.62
Bricklayers, Stone Masons, Pointers, Caulkers, Cleaners	5/1/2019		$33.43	$16.87	$50.30
Bricklayers, Stone Masons, Pointers, Caulkers, Cleaners	5/1/2020		$33.99	$17.31	$51.30
Bricklayers, Stone Masons, Pointers, Caulkers, Cleaners	5/1/2021		$34.62	$17.78	$52.40
Bricklayers, Stone Masons, Pointers, Caulkers, Cleaners	5/1/2016		$32.21	$15.58	$47.79
Bricklayers, Stone Masons, Pointers, Caulkers, Cleaners	5/1/2017		$32.54	$16.06	$48.60
Bricklayers, Stone Masons, Pointers, Caulkers, Cleaners	5/1/2018		$32.95	$16.45	$49.40
Carpenters, Drywall Hangers, Framers, Instrument Men, Lathers, Soft Floor Layers	6/1/2016		$28.40	$15.23	$43.63
Carpenters, Drywall Hangers, Framers, Instrument Men, Lathers, Soft Floor Layers	6/1/2017		$28.88	$15.75	$44.63
Cement Finishers	5/1/2017		$27.20	$22.45	$49.65
Drywall Finisher	5/1/2016		$23.30	$11.89	$35.19
Drywall Finisher	5/1/2017		$23.30	$12.39	$35.69
Electric Lineman	5/30/2016		$46.16	$20.29	$66.45
Electricians	6/1/2017		$30.00	$23.06	$53.06
Electricians	6/1/2018		$29.75	$24.44	$54.19
Electricians	6/1/2016		$29.75	$22.19	$51.94
Elevator Constructor	1/1/2017		$43.98	$31.89	$75.87
Elevator Constructor	1/1/2016		$43.05	$31.11	$74.16
Glazier	5/1/2018		$25.63	$11.95	$37.58
Glazier	5/1/2017		$25.63	$11.45	$37.08
Glazier	5/1/2020		$25.63	$12.95	$38.58
Glazier	5/1/2021		$25.63	$13.45	$39.08
Glazier	5/1/2019		$25.63	$12.45	$38.08
Iron Workers (Bridge, Structural Steel, Ornamental, Precast, Reinforcing)	7/1/2016		$30.02	$28.71	$58.73
Iron Workers (Bridge, Structural Steel, Ornamental, Precast, Reinforcing)	1/1/2017		$30.02	$29.42	$59.44
Laborers (Class 01 - See notes)	5/1/2018		$21.31	$13.93	$35.24
Laborers (Class 01 - See notes)	5/1/2016		$20.21	$12.93	$33.14
Laborers (Class 01 - See notes)	5/1/2017		$20.86	$13.33	$34.19
Laborers (Class 01 - See notes)	5/1/2020		$22.21	$15.13	$37.34

BUREAU OF LABOR LAW COMPLIANCE
PREVAILING WAGES PROJECT RATES

Project: 17-04101 - Building	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Laborers (Class 01 - See notes)	5/1/2019		$21.76	$14.53	$36.29
Laborers (Class 02 - See notes)	5/1/2016		$22.21	$12.93	$35.14
Laborers (Class 02 - See notes)	5/1/2018		$23.31	$13.93	$37.24
Laborers (Class 02 - See notes)	5/1/2020		$24.21	$15.13	$39.34
Laborers (Class 02 - See notes)	5/1/2019		$23.76	$14.53	$38.29
Laborers (Class 02 - See notes)	5/1/2017		$22.86	$13.33	$36.19
Laborers (Class 03 - See notes)	5/1/2016		$23.66	$13.11	$36.77
Laborers (Class 03 - See notes)	5/1/2017		$24.31	$13.51	$37.82
Laborers (Class 03 - See notes)	5/1/2019		$25.36	$14.71	$40.07
Laborers (Class 03 - See notes)	5/1/2020		$24.21	$15.13	$39.34
Laborers (Class 03 - See notes)	5/1/2018		$24.81	$14.11	$38.92
Laborers (Class 04 - See notes)	5/1/2018		$26.31	$14.11	$40.42
Laborers (Class 04 - See notes)	5/1/2020		$24.21	$15.13	$39.34
Laborers (Class 04 - See notes)	5/1/2019		$26.86	$14.71	$41.57
Laborers (Class 04 - See notes)	5/1/2016		$25.16	$13.11	$38.27
Laborers (Class 04 - See notes)	5/1/2017		$25.81	$13.51	$39.32
Laborers (Class 05 - See notes)	5/1/2016		$25.66	$13.11	$38.77
Laborers (Class 05 - See notes)	5/1/2017		$26.31	$13.51	$39.82
Laborers (Class 05 - See notes)	5/1/2018		$26.81	$14.11	$40.92
Laborers (Class 05 - See notes)	5/1/2019		$27.36	$14.71	$42.07
Laborers (Class 05 - See notes)	5/1/2020		$24.21	$15.13	$39.34
Laborers (Class 06 - See notes)	5/1/2020		$24.21	$15.13	$39.34
Laborers (Class 06 - See notes)	5/1/2016		$22.21	$12.93	$35.14
Laborers (Class 06 - See notes)	5/1/2019		$23.76	$14.53	$38.29
Laborers (Class 06 - See notes)	5/1/2018		$23.31	$13.93	$37.24
Laborers (Class 06 - See notes)	5/1/2017		$22.86	$13.33	$36.19
Marble Mason	5/1/2017		$29.27	$15.62	$44.89
Marble Mason	5/1/2019		$30.46	$16.43	$46.89
Marble Mason	5/1/2018		$29.88	$16.01	$45.89
Marble Mason	5/1/2021		$31.55	$17.34	$48.89
Marble Mason	5/1/2020		$31.02	$16.87	$47.89
Millwright	5/1/2016		$33.59	$17.51	$51.10
Millwright	5/1/2017		$33.79	$18.16	$51.95
Operators (Building, Class 01 - See Notes)	5/1/2017		$35.24	$24.58	$59.82
Operators (Building, Class 01 - See Notes)	5/1/2018		$36.78	$25.03	$61.81
Operators (Building, Class 01 - See Notes)	5/1/2019		$38.32	$25.49	$63.81
Operators (Building, Class 01 - See Notes)	5/1/2016		$34.46	$23.35	$57.81
Operators (Building, Class 01 - See Notes)	5/1/2021		$41.41	$26.40	$67.81
Operators (Building, Class 01 - See Notes)	5/1/2020		$39.87	$25.94	$65.81
Operators (Building, Class 01A - See Notes)	5/1/2016		$36.71	$24.01	$60.72
Operators (Building, Class 01A - See Notes)	5/1/2017		$37.49	$25.23	$62.72
Operators (Building, Class 01A - See Notes)	5/1/2018		$39.03	$25.69	$64.72
Operators (Building, Class 01A - See Notes)	5/1/2019		$40.57	$26.15	$66.72
Operators (Building, Class 01A - See Notes)	5/1/2021		$43.66	$27.06	$70.72

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Project: 17-04101 - Building	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Operators (Building, Class 01A - See Notes)	5/1/2020		$42.12	$26.60	$68.72
Operators (Building, Class 02 - See Notes)	5/1/2020		$39.59	$25.84	$65.43
Operators (Building, Class 02 - See Notes)	5/1/2018		$36.50	$24.95	$61.45
Operators (Building, Class 02 - See Notes)	5/1/2021		$41.13	$26.30	$67.43
Operators (Building, Class 02 - See Notes)	5/1/2016		$34.18	$23.26	$57.44
Operators (Building, Class 02 - See Notes)	5/1/2017		$34.96	$24.49	$59.45
Operators (Building, Class 02 - See Notes)	5/1/2019		$38.05	$25.39	$63.44
Operators (Building, Class 02A - See Notes)	5/1/2019		$40.30	$26.06	$66.36
Operators (Building, Class 02A - See Notes)	5/1/2017		$37.21	$25.16	$62.37
Operators (Building, Class 02A - See Notes)	5/1/2016		$36.43	$23.93	$60.36
Operators (Building, Class 02A - See Notes)	5/1/2018		$38.75	$25.61	$64.36
Operators (Building, Class 02A - See Notes)	5/1/2021		$43.38	$26.98	$70.36
Operators (Building, Class 03 - See Notes)	5/1/2017		$32.23	$23.68	$55.91
Operators (Building, Class 03 - See Notes)	5/1/2016		$31.46	$22.45	$53.91
Operators (Building, Class 03 - See Notes)	5/1/2018		$33.78	$24.12	$57.90
Operators (Building, Class 03 - See Notes)	5/1/2020		$36.86	$25.05	$61.91
Operators (Building, Class 03 - See Notes)	5/1/2021		$38.41	$25.50	$63.91
Operators (Building, Class 03 - See Notes)	5/1/2019		$35.32	$24.59	$59.91
Operators (Building, Class 04 - See Notes)	5/1/2019		$34.17	$24.27	$58.44
Operators (Building, Class 04 - See Notes)	5/1/2021		$37.26	$25.18	$62.44
Operators (Building, Class 04 - See Notes)	5/1/2020		$35.73	$24.71	$60.44
Operators (Building, Class 04 - See Notes)	5/1/2016		$30.33	$22.11	$52.44
Operators (Building, Class 04 - See Notes)	5/1/2017		$30.33	$22.12	$52.45
Operators (Building, Class 04 - See Notes)	5/1/2018		$32.63	$23.80	$56.43
Operators (Building, Class 05 - See Notes)	5/1/2019		$33.73	$24.14	$57.87
Operators (Building, Class 05 - See Notes)	5/1/2020		$35.28	$24.59	$59.87
Operators (Building, Class 05 - See Notes)	5/1/2021		$36.82	$25.04	$61.86
Operators (Building, Class 05 - See Notes)	5/1/2017		$29.87	$21.99	$51.86
Operators (Building, Class 05 - See Notes)	5/1/2016		$29.87	$28.99	$58.86
Operators (Building, Class 05 - See Notes)	5/1/2018		$32.18	$23.69	$55.87
Operators (Building, Class 06 - See Notes)	5/1/2017		$29.00	$21.72	$50.72
Operators (Building, Class 06 - See Notes)	5/1/2016		$29.00	$21.73	$50.73
Operators (Building, Class 06 - See Notes)	5/1/2018		$31.31	$23.41	$54.72
Operators (Building, Class 06 - See Notes)	5/1/2019		$32.86	$23.86	$56.72
Operators (Building, Class 06 - See Notes)	5/1/2021		$35.95	$24.77	$60.72
Operators (Building, Class 06 - See Notes)	5/1/2020		$34.40	$24.32	$58.72
Operators (Building, Class 07A- See Notes)	5/1/2018		$44.29	$28.68	$72.97
Operators (Building, Class 07A- See Notes)	5/1/2017		$42.44	$28.13	$70.57
Operators (Building, Class 07A- See Notes)	5/1/2019		$46.15	$29.22	$75.37
Operators (Building, Class 07A- See Notes)	5/1/2020		$48.00	$29.77	$77.77
Operators (Building, Class 07A- See Notes)	5/1/2016		$41.36	$26.81	$68.17
Operators (Building, Class 07A- See Notes)	5/1/2021		$49.86	$30.31	$80.17
Operators (Building, Class 07B- See Notes)	5/1/2020		$47.65	$29.67	$77.32
Operators (Building, Class 07B- See Notes)	5/1/2021		$49.51	$30.20	$79.71

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Project: 17-04101 - Building	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Operators (Building, Class 07B- See Notes)	5/1/2019		$45.80	$29.12	$74.92
Operators (Building, Class 07B- See Notes)	5/1/2016		$41.02	$26.70	$67.72
Operators (Building, Class 07B- See Notes)	5/1/2017		$42.09	$28.03	$70.12
Operators (Building, Class 07B- See Notes)	5/1/2018		$43.95	$28.58	$72.53
Operators (Heavy, Class 01 - See Notes)	5/1/2016		$33.06	$22.92	$55.98
Operators (Heavy, Class 01A - See Notes)	5/1/2016		$35.31	$23.56	$58.87
Operators (Heavy, Class 02 - See Notes)	5/1/2016		$32.77	$22.84	$55.61
Operators (Heavy, Class 02A - See Notes)	5/1/2016		$35.02	$23.50	$58.52
Operators (Heavy, Class 03 - See Notes)	5/1/2016		$29.84	$21.97	$51.81
Operators (Heavy, Class 04 - See Notes)	5/1/2016		$28.70	$21.64	$50.34
Operators (Heavy, Class 05 - See Notes)	5/1/2016		$28.25	$21.51	$49.76
Operators (Heavy, Class 06 - See Notes)	5/1/2016		$27.37	$21.25	$48.62
Operators (Heavy, Class 07A - See Notes)	5/1/2016		$39.68	$26.28	$65.96
Operators (Heavy, Class 07B - See Notes)	5/1/2016		$39.32	$26.19	$65.51
Painters Class 1 (see notes)	5/1/2017		$23.47	$13.32	$36.79
Painters Class 1 (see notes)	5/1/2016		$23.47	$12.82	$36.29
Painters Class 2 (see notes)	5/1/2016		$25.60	$12.82	$38.42
Painters Class 2 (see notes)	5/1/2017		$25.60	$13.32	$38.92
Painters Class 3 (see notes)	5/1/2016		$31.35	$12.82	$44.17
Painters Class 3 (see notes)	5/1/2017		$31.35	$13.32	$44.67
Pile Driver Divers (Building, Heavy, Highway)	1/1/2016		$48.10	$17.37	$65.47
Pile Driver Divers (Building, Heavy, Highway)	1/1/2017		$49.13	$17.95	$67.08
Piledrivers	1/1/2018		$33.55	$18.55	$52.10
Piledrivers	1/1/2019		$34.30	$19.30	$53.60
Piledrivers	1/1/2017		$32.75	$17.95	$50.70
Plasterers	5/1/2017		$25.03	$20.58	$45.61
Plumber/Pipefitter	5/1/2017		$35.82	$24.51	$60.33
Plumber/Pipefitter	5/1/2016		$35.22	$23.61	$58.83
Roofers (Composition)	5/1/2017		$36.15	$30.22	$66.37
Roofers (Shingle)	5/1/2016		$25.70	$19.17	$44.87
Roofers (Slate & Tile)	5/1/2016		$28.70	$19.17	$47.87
Roofers (Slate & Tile)	5/1/2016		$28.70	$19.17	$47.87
Sheet Metal Workers	6/1/2016		$33.60	$33.43	$67.03
Sprinklerfitters	4/1/2017		$37.40	$21.74	$59.14
Sprinklerfitters	4/1/2016		$36.05	$21.02	$57.07
Sprinklerfitters	4/1/2018		$38.80	$22.74	$61.54
Terrazzo Finisher	5/1/2017		$31.64	$15.62	$47.26
Terrazzo Finisher	5/1/2016		$30.17	$16.09	$46.26
Terrazzo Finisher	5/1/2018		$32.35	$15.91	$48.26
Terrazzo Finisher	5/1/2019		$33.04	$16.22	$49.26
Terrazzo Setter	5/1/2019		$31.81	$19.67	$51.48
Terrazzo Setter	5/1/2017		$30.63	$18.85	$49.48
Terrazzo Setter	5/1/2016		$30.00	$18.48	$48.48
Terrazzo Setter	5/1/2018		$31.23	$19.25	$50.48

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Project: 17-04101 - Building	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Tile & Marble Finisher	5/1/2020		$28.96	$14.79	$43.75
Tile & Marble Finisher	5/1/2018		$27.60	$14.15	$41.75
Tile & Marble Finisher	5/1/2017		$26.89	$13.86	$40.75
Tile & Marble Finisher	5/1/2019		$28.29	$14.46	$42.75
Tile & Marble Finisher	5/1/2021		$29.61	$15.14	$44.75
Tile Setter	5/1/2019		$30.46	$16.43	$46.89
Tile Setter	5/1/2021		$31.55	$17.34	$48.89
Tile Setter	5/1/2020		$31.02	$16.87	$47.89
Tile Setter	5/1/2017		$29.27	$15.62	$44.89
Tile Setter	5/1/2018		$29.88	$16.01	$45.89
Truckdriver class 1(see notes)	5/1/2019		$36.12	$0.00	$36.12
Truckdriver class 1(see notes)	5/1/2016		$33.57	$0.00	$33.57
Truckdriver class 1(see notes)	5/1/2017		$34.47	$0.00	$34.47
Truckdriver class 1(see notes)	5/1/2018		$35.32	$0.00	$35.32
Truckdriver class 2 (see notes)	5/1/2017		$34.54	$0.00	$34.54
Truckdriver class 2 (see notes)	5/1/2018		$35.39	$0.00	$35.39
Truckdriver class 2 (see notes)	5/1/2019		$36.19	$0.00	$36.19
Truckdriver class 2 (see notes)	5/1/2016		$33.64	$0.00	$33.64
Truckdriver class 3 (see notes)	5/1/2017		$35.03	$0.00	$35.03
Truckdriver class 3 (see notes)	5/1/2018		$35.88	$0.00	$35.88
Truckdriver class 3 (see notes)	5/1/2016		$34.13	$0.00	$34.13
Truckdriver class 3 (see notes)	5/1/2019		$36.68	$0.00	$36.68

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Project: 17-04101 - Heavy/Highway	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Carpenters	5/1/2016		$29.67	$14.54	$44.21
Carpenters	5/1/2017		$30.12	$15.34	$45.46
Cement Finishers	5/1/2016		$26.40	$22.35	$48.75
Iron Workers	1/1/2017		$30.02	$29.42	$59.44
Laborers (Class 01 - See notes)	5/1/2018		$20.96	$16.79	$37.75
Laborers (Class 01 - See notes)	5/1/2017		$20.36	$16.29	$36.65
Laborers (Class 01 - See notes)	5/1/2019		$21.61	$17.29	$38.90
Laborers (Class 01 - See notes)	5/1/2016		$19.81	$15.79	$35.60
Laborers (Class 02 - See notes)	5/1/2018		$27.58	$16.79	$44.37
Laborers (Class 02 - See notes)	5/1/2017		$26.98	$16.29	$43.27
Laborers (Class 02 - See notes)	5/1/2019		$28.23	$17.29	$45.52
Laborers (Class 02 - See notes)	5/1/2016		$26.43	$15.79	$42.22
Laborers (Class 03 - See notes)	5/1/2018		$24.57	$16.79	$41.36
Laborers (Class 03 - See notes)	5/1/2019		$25.22	$17.29	$42.51
Laborers (Class 03 - See notes)	5/1/2016		$23.42	$15.79	$39.21
Laborers (Class 03 - See notes)	5/1/2017		$23.97	$16.29	$40.26
Laborers (Class 04 - See notes)	5/1/2018		$24.92	$16.79	$41.71
Laborers (Class 04 - See notes)	5/1/2017		$24.32	$16.29	$40.61
Laborers (Class 04 - See notes)	5/1/2019		$25.57	$17.29	$42.86
Laborers (Class 04 - See notes)	5/1/2016		$23.77	$15.79	$39.56
Laborers (Class 05 - See notes)	5/1/2016		$24.44	$15.79	$40.23
Laborers (Class 05 - See notes)	5/1/2019		$26.24	$17.29	$43.53
Laborers (Class 05 - See notes)	5/1/2018		$25.59	$16.79	$42.38
Laborers (Class 05 - See notes)	5/1/2017		$24.99	$16.29	$41.28
Laborers (Class 06 - See notes)	5/1/2017		$24.41	$16.29	$40.70
Laborers (Class 06 - See notes)	5/1/2018		$25.01	$16.79	$41.80
Laborers (Class 06 - See notes)	5/1/2016		$23.86	$15.79	$39.65
Laborers (Class 06 - See notes)	5/1/2019		$25.66	$17.29	$42.95
Laborers (Class 07 - See notes)	5/1/2016		$24.15	$15.79	$39.94
Laborers (Class 07 - See notes)	5/1/2019		$25.95	$17.29	$43.24
Laborers (Class 07 - See notes)	5/1/2017		$24.70	$16.29	$40.99
Laborers (Class 07 - See notes)	5/1/2018		$25.30	$16.79	$42.09
Laborers (Class 08 - See notes)	5/1/2016		$24.63	$15.79	$40.42
Laborers (Class 08 - See notes)	5/1/2017		$25.18	$16.29	$41.47
Laborers (Class 08 - See notes)	5/1/2018		$25.78	$16.79	$42.57
Laborers (Class 08 - See notes)	5/1/2019		$26.43	$17.29	$43.72
Operators (Building/Heavy, Class 01 - See Notes)	5/1/2016		$32.16	$22.64	$54.80
Operators (Building/Heavy, Class 01 - See Notes)	5/1/2017		$33.80	$24.16	$57.96
Operators (Building/Heavy, Class 01 - See Notes)	5/1/2020		$38.44	$25.52	$63.96
Operators (Building/Heavy, Class 01 - See Notes)	5/1/2019		$36.90	$25.06	$61.96
Operators (Building/Heavy, Class 01 - See Notes)	5/1/2021		$39.98	$25.97	$65.95
Operators (Building/Heavy, Class 01 - See Notes)	5/1/2018		$35.35	$24.61	$59.96
Operators (Building/Heavy, Class 01a - See Notes)	5/1/2018		$37.60	$25.27	$62.87
Operators (Building/Heavy, Class 01a - See Notes)	5/1/2017		$36.05	$24.82	$60.87

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Project: 17-04101 - Heavy/Highway	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Operators (Building/Heavy, Class 01a - See Notes)	5/1/2020		$40.69	$26.19	$66.88
Operators (Building/Heavy, Class 01a - See Notes)	5/1/2019		$39.14	$25.73	$64.87
Operators (Building/Heavy, Class 01a - See Notes)	5/1/2021		$42.24	$26.64	$68.88
Operators (Building/Heavy, Class 02 - See Notes)	5/1/2017		$33.52	$24.07	$57.59
Operators (Building/Heavy, Class 02 - See Notes)	5/1/2018		$35.07	$24.52	$59.59
Operators (Building/Heavy, Class 02 - See Notes)	5/1/2020		$38.16	$25.44	$63.60
Operators (Building/Heavy, Class 02 - See Notes)	5/1/2019		$36.61	$24.98	$61.59
Operators (Building/Heavy, Class 02 - See Notes)	5/1/2021		$39.70	$25.89	$65.59
Operators (Building/Heavy, Class 02a - See Notes)	5/1/2020		$40.41	$26.10	$66.51
Operators (Building/Heavy, Class 02a - See Notes)	5/1/2021		$41.95	$26.56	$68.51
Operators (Building/Heavy, Class 02a - See Notes)	5/1/2019		$38.87	$25.64	$64.51
Operators (Building/Heavy, Class 02a - See Notes)	5/1/2017		$35.78	$24.72	$60.50
Operators (Building/Heavy, Class 02a - See Notes)	5/1/2018		$37.32	$25.19	$62.51
Operators (Building/Heavy, Class 03 - See Notes)	5/1/2021		$36.78	$25.03	$61.81
Operators (Building/Heavy, Class 03 - See Notes)	5/1/2020		$35.23	$24.57	$59.80
Operators (Building/Heavy, Class 03 - See Notes)	5/1/2018		$32.15	$23.66	$55.81
Operators (Building/Heavy, Class 03 - See Notes)	5/1/2019		$33.69	$24.11	$57.80
Operators (Building/Heavy, Class 03 - See Notes)	5/1/2017		$30.60	$23.21	$53.81
Operators (Building/Heavy, Class 04 - See Notes)	5/1/2020		$33.65	$24.11	$57.76
Operators (Building/Heavy, Class 04 - See Notes)	5/1/2017		$29.47	$22.88	$52.35
Operators (Building/Heavy, Class 04 - See Notes)	5/1/2019		$32.55	$23.78	$56.33
Operators (Building/Heavy, Class 04 - See Notes)	5/1/2018		$31.01	$23.32	$54.33
Operators (Building/Heavy, Class 04 - See Notes)	5/1/2021		$35.64	$24.69	$60.33
Operators (Building/Heavy, Class 05 - See Notes)	5/1/2021		$35.20	$24.56	$59.76
Operators (Building/Heavy, Class 05 - See Notes)	5/1/2019		$32.11	$23.65	$55.76
Operators (Building/Heavy, Class 05 - See Notes)	5/1/2020		$33.65	$24.11	$57.76
Operators (Building/Heavy, Class 05 - See Notes)	5/1/2017		$29.02	$22.74	$51.76
Operators (Building/Heavy, Class 05 - See Notes)	5/1/2018		$30.56	$23.20	$53.76
Operators (Building/Heavy, Class 06 - See Notes)	5/1/2021		$34.31	$24.31	$58.62
Operators (Building/Heavy, Class 06 - See Notes)	5/1/2018		$29.68	$22.93	$52.61
Operators (Building/Heavy, Class 06 - See Notes)	5/1/2017		$28.14	$22.49	$50.63
Operators (Building/Heavy, Class 06 - See Notes)	5/1/2020		$32.78	$23.84	$56.62
Operators (Building/Heavy, Class 06 - See Notes)	5/1/2019		$31.22	$23.40	$54.62
Operators (Heavy, Class 07A - See Notes)	5/1/2019		$44.43	$28.73	$73.16
Operators (Heavy, Class 07A - See Notes)	5/1/2021		$48.14	$29.83	$77.97
Operators (Heavy, Class 07A - See Notes)	5/1/2018		$42.58	$28.18	$70.76
Operators (Heavy, Class 07A - See Notes)	5/1/2020		$46.28	$29.27	$75.55
Operators (Heavy, Class 07A - See Notes)	5/1/2017		$40.73	$27.63	$68.36
Operators (Heavy, Class 07B - See Notes)	5/1/2019		$44.09	$28.63	$72.72
Operators (Heavy, Class 07B - See Notes)	5/1/2020		$45.94	$29.17	$75.11
Operators (Heavy, Class 07B - See Notes)	5/1/2021		$47.79	$29.71	$77.50
Operators (Heavy, Class 07B - See Notes)	5/1/2017		$40.38	$27.53	$67.91
Operators (Heavy, Class 07B - See Notes)	5/1/2018		$42.23	$28.09	$70.32
Operators (Highway, Class 01 - See Notes)	5/1/2019		$36.02	$24.79	$60.81

BUREAU OF LABOR LAW COMPLIANCE
PREVAILING WAGES PROJECT RATES

Project: 17-04101 - Heavy/Highway	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Operators (Highway, Class 01 - See Notes)	5/1/2020		$37.56	$25.24	$62.80
Operators (Highway, Class 01 - See Notes)	5/1/2021		$39.10	$25.70	$64.80
Operators (Highway, Class 01 - See Notes)	5/1/2018		$34.47	$24.33	$58.80
Operators (Highway, Class 01 - See Notes)	5/1/2016		$32.16	$22.64	$54.80
Operators (Highway, Class 01 - See Notes)	5/1/2017		$32.93	$23.87	$56.80
Operators (Highway, Class 01a - See Notes)	5/1/2020		$36.38	$24.90	$61.28
Operators (Highway, Class 01a - See Notes)	5/1/2021		$41.35	$26.38	$67.73
Operators (Highway, Class 01a - See Notes)	5/1/2021		$37.93	$25.35	$63.28
Operators (Highway, Class 01a - See Notes)	5/1/2019		$34.84	$24.43	$59.27
Operators (Highway, Class 01a - See Notes)	5/1/2020		$39.81	$25.92	$65.73
Operators (Highway, Class 01a - See Notes)	5/1/2019		$38.27	$25.46	$63.73
Operators (Highway, Class 01a - See Notes)	5/1/2018		$36.72	$25.01	$61.73
Operators (Highway, Class 01a - See Notes)	5/1/2017		$35.18	$24.56	$59.74
Operators (Highway, Class 01a - See Notes)	5/1/2016		$34.41	$23.32	$57.73
Operators (Highway, Class 01a - See Notes)	5/1/2017		$31.75	$23.54	$55.29
Operators (Highway, Class 01a - See Notes)	5/1/2018		$33.30	$23.97	$57.27
Operators (Highway, Class 02 - See Notes)	5/1/2016		$30.98	$22.31	$53.29
Operators (Highway, Class 03 - See Notes)	5/1/2021		$37.23	$25.16	$62.39
Operators (Highway, Class 03 - See Notes)	5/1/2019		$34.14	$24.25	$58.39
Operators (Highway, Class 03 - See Notes)	5/1/2016		$30.28	$22.10	$52.38
Operators (Highway, Class 03 - See Notes)	5/1/2017		$31.06	$23.32	$54.38
Operators (Highway, Class 03 - See Notes)	5/1/2018		$32.59	$23.80	$56.39
Operators (Highway, Class 03 - See Notes)	5/1/2020		$35.69	$24.69	$60.38
Operators (Highway, Class 04 - See Notes)	5/1/2019		$33.68	$24.12	$57.80
Operators (Highway, Class 04 - See Notes)	5/1/2021		$36.77	$25.03	$61.80
Operators (Highway, Class 04 - See Notes)	5/1/2017		$30.60	$23.20	$53.80
Operators (Highway, Class 04 - See Notes)	5/1/2016		$29.82	$21.98	$51.80
Operators (Highway, Class 04 - See Notes)	5/1/2020		$35.23	$24.57	$59.80
Operators (Highway, Class 04 - See Notes)	5/1/2018		$32.14	$23.66	$55.80
Operators (Highway, Class 05 - See Notes)	5/1/2019		$33.18	$23.97	$57.15
Operators (Highway, Class 05 - See Notes)	5/1/2020		$34.72	$24.42	$59.14
Operators (Highway, Class 05 - See Notes)	5/1/2021		$36.26	$24.87	$61.13
Operators (Highway, Class 05 - See Notes)	5/1/2016		$29.31	$21.83	$51.14
Operators (Highway, Class 05 - See Notes)	5/1/2017		$30.08	$23.06	$53.14
Operators (Highway, Class 05 - See Notes)	5/1/2018		$31.63	$23.51	$55.14
Operators (Highway, Class 06 - See Notes)	5/1/2020		$37.79	$25.30	$63.09
Operators (Highway, Class 06 - See Notes)	5/1/2021		$39.33	$25.78	$65.11
Operators (Highway, Class 06 - See Notes)	5/1/2018		$34.71	$24.39	$59.10
Operators (Highway, Class 06 - See Notes)	5/1/2019		$36.25	$24.85	$61.10
Operators (Highway, Class 06 - See Notes)	5/1/2017		$33.17	$23.94	$57.11
Operators (Highway, Class 06 - See Notes)	5/1/2016		$32.40	$22.70	$55.10
Operators (Highway, Class 06/A - See Notes)	5/1/2016		$34.65	$23.36	$58.01
Operators (Highway, Class 06/A - See Notes)	5/1/2020		$40.04	$25.97	$66.01
Operators (Highway, Class 06/A - See Notes)	5/1/2017		$35.42	$24.59	$60.01

BUREAU OF LABOR LAW COMPLIANCE
PREVAILING WAGES PROJECT RATES

Project: 17-04101 - Heavy/Highway	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Operators (Highway, Class 06/A - See Notes)	5/1/2021		$41.58	$26.43	$68.01
Operators (Highway, Class 06/A - See Notes)	5/1/2019		$38.50	$25.52	$64.02
Operators (Highway, Class 06/A - See Notes)	5/1/2018		$36.96	$25.05	$62.01
Operators (Highway, Class 07/A - See Notes)	5/1/2019		$43.37	$28.41	$71.78
Operators (Highway, Class 07/A - See Notes)	5/1/2020		$45.23	$28.94	$74.17
Operators (Highway, Class 07/A - See Notes)	5/1/2021		$47.08	$29.49	$76.57
Operators (Highway, Class 07/A - See Notes)	5/1/2016		$38.56	$25.99	$64.55
Operators (Highway, Class 07/A - See Notes)	5/1/2017		$39.66	$27.31	$66.97
Operators (Highway, Class 07/A - See Notes)	5/1/2018		$41.52	$27.84	$69.36
Operators (Highway, Class 07/B - See Notes)	5/1/2016		$37.17	$25.57	$62.74
Operators (Highway, Class 07/B - See Notes)	5/1/2017		$38.25	$26.89	$65.14
Operators (Highway, Class 07/B - See Notes)	5/1/2019		$43.37	$28.41	$71.78
Operators (Highway, Class 07/B - See Notes)	5/1/2020		$43.81	$28.53	$72.34
Operators (Highway, Class 07/B - See Notes)	5/1/2018		$40.10	$27.44	$67.54
Operators (Highway, Class 07/B - See Notes)	5/1/2021		$45.66	$29.08	$74.74
Pile Driver Divers (Building, Heavy, Highway)	1/1/2017		$49.13	$17.95	$67.08
Piledrivers	1/1/2017		$32.75	$17.95	$50.70
Piledrivers	1/1/2019		$34.30	$19.30	$53.60
Piledrivers	1/1/2018		$33.55	$18.55	$52.10
Steamfitters (Heavy and Highway - Gas Distribution)	5/1/2017		$40.98	$32.53	$73.51
Truckdriver class 1(see notes)	5/1/2018		$35.32	$0.00	$35.32
Truckdriver class 1(see notes)	5/1/2017		$34.47	$0.00	$34.47
Truckdriver class 1(see notes)	5/1/2019		$36.12	$0.00	$36.12
Truckdriver class 1(see notes)	5/1/2016		$33.57	$0.00	$33.57
Truckdriver class 2 (see notes)	5/1/2015		$32.64	$0.00	$32.64
Truckdriver class 2 (see notes)	5/1/2016		$33.64	$0.00	$33.64
Truckdriver class 2 (see notes)	5/1/2019		$36.19	$0.00	$36.19
Truckdriver class 2 (see notes)	5/1/2017		$34.54	$0.00	$34.54
Truckdriver class 2 (see notes)	5/1/2018		$35.39	$0.00	$35.39
Truckdriver class 3 (see notes)	5/1/2019		$36.68	$0.00	$36.68
Truckdriver class 3 (see notes)	5/1/2016		$34.13	$0.00	$34.13
Truckdriver class 3 (see notes)	5/1/2017		$35.03	$0.00	$35.03
Truckdriver class 3 (see notes)	5/1/2018		$35.88	$0.00	$35.88

DATE OF ISSUE: JUNE 20, 2017

DEPARTMENT OF GENERAL SERVICES
ENERGY AND RESOURCE MANAGEMENT OFFICE
401 NORTH STREET
HARRISBURG, PENNSYLVANIA

BULLETIN NO. 6
on

Project No. GESA 2017-1 – REQUEST FOR QUOTES FOR A GUARANTEED ENERGY SAVINGS PROJECT AT: DEPT. OF GENERAL SERVICES, CAPITOL COMPLEX, HARRISBURG, PENNSYLVANIA, Department of General Services, Energy & Resource Management, 401 North Street, Room 403, Harrisburg, Pennsylvania, 17120.

PROPOSAL SUBMISSION DEADLINE, THURSDAY JUNE 29, 2017
TIME OF OPENING: 2:00 PM

QUESTIONS / CLARIFICATIONS / REQUESTS FOR INFORMATION (DGS responses in bold text)

1. Part 2.6 B & Appendix C: Can DGS please clarify how many days the bid bond will secure the quotation? In Part B, there is a reference to a timeline in the RFQ, but we did not see a time line. In the form of Bid Bond, Appendix C, the timing for forfeiture is not clear. **The timeline consists of quote submission, award, development of the IGA (which may take up to 60 calendar days), and full execution of the GESA Contract (which may take up to 90 days).**

2. Appendix C: Can DGS please clarify how the sum forfeited pursuant to the bid bond will be calculated if the selected proposer and the next highest ranked proposer do not propose identical scopes of work or equipment selections? **The sum forfeited will be the difference between the amount specified in the awarded offeror's quote and the next lowest quote for which the Commonwealth may in good faith contract for the work covered by the RFQ, limited by the value of the bid bond.**

3. Please clarify the previously stated square foot (SF) areas of the buildings, specifically, does the East Wing SF of 626,545 SF include the garage? **Yes.**

4. Please provide the SF area of the East Wing garage, utility tunnels and the Central Plant. **The East Wing Garage is 283,180 SF, Utility Tunnels are 17,600 SF and Central Plant is 26,076 SF.**

5. Please provide daily building occupant totals for each of the buildings (staff + estimate of visitors). **See the below chart for employee counts. Since we have public buildings, accurate information about the visitors is not available.**

DGS HIGH VOLTAGE SUBSTATION	EAST WING (MAIN CAPITOL)	FINANCE BUILDING	FORUM BUILDING	FORUM PLACE	HEALTH & WELFARE	IRVIS OFFICE BUILDING	JUDICIAL CENTER	KEYSTONE BUILDING	LABOR & INDUSTRY	MAIN CAPITOL	NORTH OFFICE	CAPITOL COMPLEX[1] SUBTOTAL
8	304	764	127	1191	894	475	336	1617	881	783	339	7719

6. Could we please be provided a detailed explanation regarding the operation of the Hot Water Heating Distribution System that is generated within the central plant? **There are two heat exchangers with constant volume pumps. Steam is purchased from NRG.**
    a. List of buildings that it serves **North Office, South Office, Ryan, East Wing and the Forum building.**
    b. Metering information of the hot water consumption / billing at the buildings. **No metering or billing is done.**
7. Regarding question 3. A. (4) "Each key Subcontractor's Workman's Compensation Experience Modification Rating for calendar years 2012, 2013 and 2014." We assume you'd prefer the most recent three years which would be 2014, 2015 and 2016. Is this correct? **Yes.**
8. The drawings posted on the DGS site are all electrical power and lighting drawings. Could we please be provided the available corresponding HVAC drawings posted to the DGS site for all the buildings? **The HVAC Drawings we have are not available electronically.**
9. Regarding the provided steam utility bills: The bills that are labeled "Central Plant Account #001002 appear to be proportioned between the North Office, Irvis, Ryan and Main Capitol buildings. Could we get a clarification as to what buildings and facilities are included in the "Main Capitol Buildings" and how much of this percentage should be allocated to the East Wing and the East Wing Garage? **Percentages are only available for each main building on the Central Plant steam bill (Acct. 001002) and they are as follows: Main Capitol 42%, Irvis 24%, North Office 25% and Ryan 9%. The East Wing building, East Wing garage & Main Capitol building are all included under the "Main Capitol" portion of this account.**

Rebecca Tomlinson, RFQ Coordinator
ENERGY & RESOURCE MANAGEMENT OFFICE

PLEASE ACKNOWLEDGE RECEIPT OF BULLETIN BY EMAIL RESPONSE TO BECKY TOMLINSON AT retomlinso@pa.gov

PRESENTED TO
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF GENERAL SERVICES
06/29/2017 – 2:00 PM

PENNSYLVANIA CAPITOL COMPLEX

DAUPHIN COUNTY, PA

PROJECT NO. GESA 2017-1
CONTRACT NO. GESA 2017-1.1

VOLUME I TECHNICAL SUBMISSION

TEN Headquarters
1501 Reedsdale St., Ste. 401
Pittsburgh, PA 15233

TEN DC/Baltimore
9025 Maier Rd., Ste. B
Laurel, MD 20723

TEN Philadelphia
40 West Evergreen Ave.
Philadelphia, PA 11918

855.429.1010 | **tensaves.com** | **info@tensaves.com**

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Quote Signature

Offeror's Representations and Authorizations. Offeror by signing on the signature page and submitting its Quote understands, represents, acknowledges and certifies that:

1. All information provided by, and representations made by, the Offeror in the Quote are material and important and will be relied upon by the Issuing Office in awarding the contract(s). Any misstatement shall be treated as fraudulent concealment from the Issuing Office of the true facts relating to the submission of this Quote. A misrepresentation shall be punishable under 18 Pa. C.S. § 4904.

2. No attempt has been made or will be made to induce any firm or person to refrain from submitting a Quote on this contract, or to submit a Quote higher than this Quote, or to submit any intentionally high or noncompetitive Quote or other form of complementary Quote.

3. The Quote is made in good faith and not pursuant to any agreement or discussion with, or inducement from, any firm or person to submit a complementary or other noncompetitive Quote.

4. To the best knowledge of the person signing the Quote for the Offeror, the Offeror, its affiliates, subsidiaries, officers, directors, and employees are not currently under investigation by any governmental agency and have not in the last four (4) years been convicted or found liable for any act prohibited by State or Federal law in any jurisdiction, involving conspiracy or collusion with respect to bidding or proposing on any public contract, except as disclosed by the Offeror in its Quote.

   - See statement attached to Non-Collusion Affidavit as Exhibit 1.

5. To the best of the knowledge of the person signing the Quote for the Offeror and except as otherwise disclosed by the Offeror in its Quote, the Offeror has no outstanding, delinquent obligations to the Commonwealth including, but not limited to, any state tax liability not being contested on appeal or other obligation of the Offeror that is owed to the Commonwealth.

6. The Offeror is not currently under suspension or debarment by the Commonwealth, or any other state, or the federal government. If the Offeror has received, within three years of the issuance of this RFP, a Notice of Default from the Commonwealth, other state or the federal government, then the Offeror shall submit, as part of the Technical Submission, seven copies of a written explanation of why such Notice of Default was issued. This written explanation shall not exceed 1 sheet (2 pages) and shall not count towards the sheet and page limit established for the Technical Submission of the Quote.

7. The Offeror has not, under separate contract with the Issuing Office, made any recommendations to the Issuing Office concerning the need for the services described in the proposal or the specifications for the services described in the Quote.

8. Each Offeror, by submitting its Quote, authorizes all Commonwealth agencies to release to the Commonwealth information related Quote to liabilities to the Commonwealth including, but not limited to, taxes, unemployment compensation, and workers' compensation liabilities.

9. Until the awarded GESA Contractor receives a fully executed and approved written contract from the Issuing Office there is no legal and valid contract, in law or in equity, and the GESA Contractor should not begin to perform.

10. The total energy savings projected in the final scope of work will be at least 95% of the savings projected in the Quote and that the project will be self-funded over the financial term of the project (maximum term of 20 years.)

11. Offeror agrees and certifies in accordance with the enclosed Commonwealth of Pennsylvania:

- o Nondiscrimination/Sexual Harassment Clause
- o Tax Liability Certification
- o Americans Disabilities Act
- o GESA Contractor Integrity Provisions
- o GESA Contractor Responsibility Provisions
- o Environmental Statement
- o Compliance with State and Federal Statutes, Rules and Regulations
- o Non-Collusion Affidavit

I am authorized to sign this Quote on behalf of the Offeror and I agree and state that The Efficiency Network (TEN) understands and acknowledges that the above representations are material and important, and will be relied upon by the Department of General Services in awarding the contract(s) for which this proposal is submitted. I understand and my firm understands that any misstatement shall be treated as fraudulent concealment from the Department of General Services of the true facts relating to the submission of this Quote.

Signature

Robert G. Campbell
President & Chief Operating Officer
The Efficiency Network, Inc.

Non-Collusion Affidavit

DGS Project Number: GESA 2017-1

State of Pennsylvania:
County of Allegheny: s.s.

I state that I am the Chief Executive Officer of The Efficiency Network and that I am authorized to make this affidavit on behalf of my firm, and its owners, directors, and officers. I am the person responsible in my firm for the prices(s) and the amount of this Quote.

I state that:

1. The price(s) and amount of this Quote have been arrived at independently and without consultation, communication or agreement with any other contractor, Offeror, or potential Offeror.

2. Neither the price(s) nor the amount of this Quote, and neither the approximate price(s) nor approximate amount of this Quote, have been disclosed to any other firm or person who is a Offeror or potential Offeror, and they will not be disclosed before the Quote submission date.

3. No attempt has been made or will be made to induce any firm or person to refrain from proposing on this contract, or to submit a Quote higher than this Quote, or to submit any intentionally high or noncompetitive Quote or other form of complementary Quote.

4. The Quote of my firm is made in good faith and not pursuant to any agreement or discussion with, or inducement from, any firm or person to submit a complementary or other noncompetitive Quote.

5. The Efficiency Network its affiliates, subsidiaries, officers, directors, and employees are not currently under investigation by any governmental agency and have not in the last four years been convicted or found liable for any act prohibited by state or federal law in any jurisdiction, involving conspiracy or collusion with respect to proposing and/or bidding on any public contract, except as follows:

   - See statement attached as Exhibit 1.

   Exhibit 1 - A former employee pled guilty to conspiracy to commit fraud in bidding on that public contract. The Company was not charged and had no knowledge of his actions

I state that The Efficiency Network understands and acknowledges that the above representations are material and important and will be relied upon by the Department of General Services in awarding the contract(s) for which this Quote is submitted. I understand and my firm understands that any misstatement in this affidavit is and shall be treated as fraudulent concealment from the Department of General Services of the true facts relating to the submission of this Quote.

Robert G. Campbell, President & Chief Operating Officer

SWORN TO AND SUBSCRIBED BEFORE ME THIS 28th DAY OF June, 2017

Notary Public

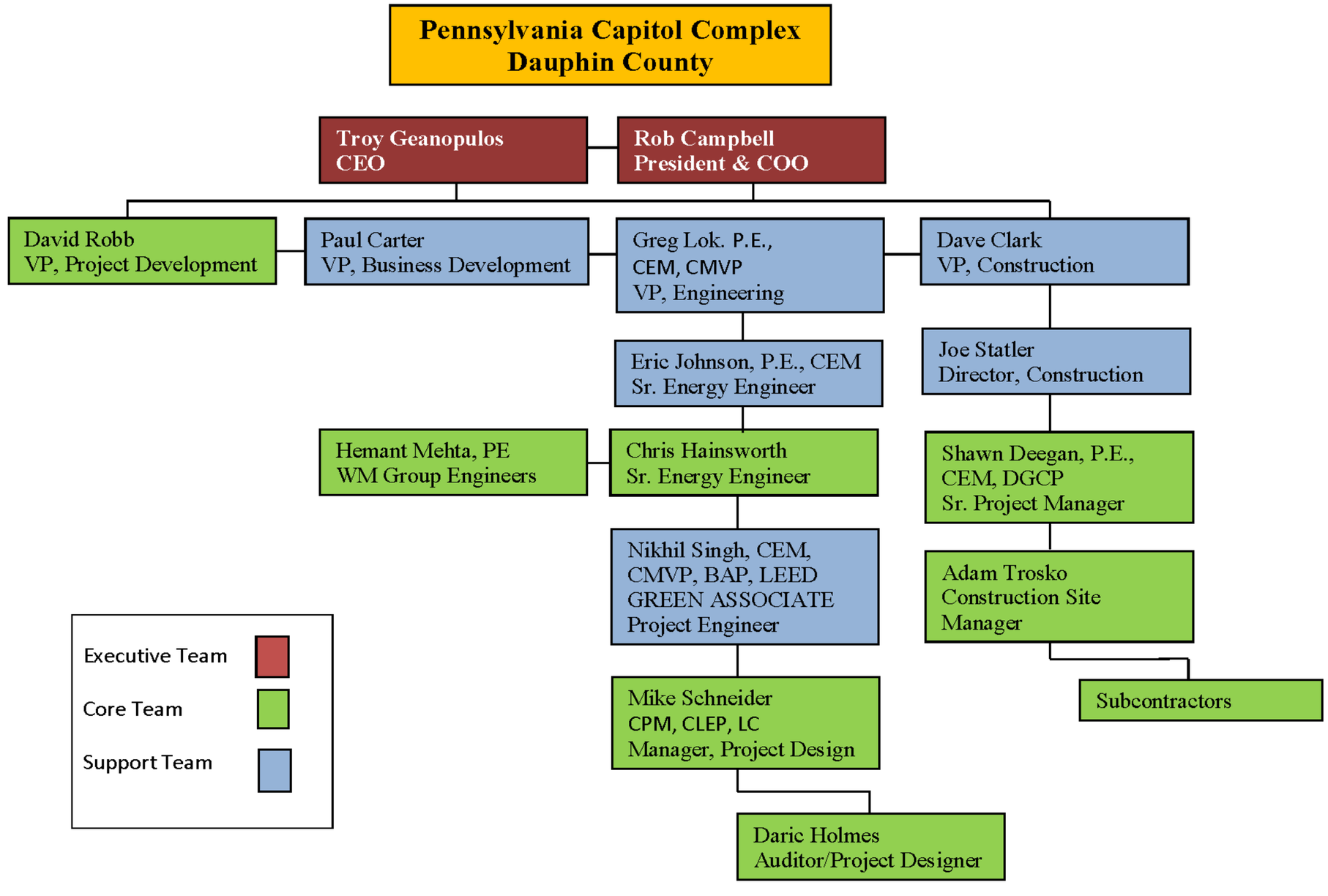
Christopher P. Niemiec, Vice President, Finance

My Commission Expires 07-03-19

COMMONWEALTH OF PENNSYLVANIA
NOTARIAL SEAL
Christopher P. Niemiec, Notary Public
City of Pittsburgh, Allegheny County
My Commission Expires July 3, 2019
MEMBER, PENNSYLVANIA ASSOCIATION OF NOTARIES

1. Project Management Team Overview (2-5.1)

A. Project Team Organizational Chart



All the identified core team members, carefully chosen from our staff of 35 professionals, have a successful history of developing and implementing projects together. In fact, very specifically, all but one have previously delivered similar projects to those contemplated here for the Commonwealth under current and previous employment. TEN is also the ESCO for the DGS Small GESA-1 and DGS Small GESA-2 projects, which not only demonstrates our team's comfort level working within state government facilities but also our familiarity with the GESA energy audit, construction and M&V requirements. These past projects, although in different buildings, also encompassed the diversity of Energy Conservation Measures (ECMs) contemplated here.

Greg Lok, (P.E., CEM, CMVP), Vice President of Engineering, Mr. Lok's responsibilities include managing the engineering group including design and M&V, developing the scope, cost and savings. As an industry-recognized energy efficiency engineering expert he is a proven team leader and project manager, adept at developing creative and cost-effective engineering solutions for a broad range of building types. In additional to his current responsibilities, Mr. Lok previously managed Constellation's MUSH (Municipal Governments, Universities, Schools, Hospitals) Energy Services team with over 35 professional designers and engineers encompassing projects from coast to coast.

Role for this project: Mr. Lok will be managing the engineering team as well as reviewing engineering designs and energy savings calculations. Mr. Lok will directly assist the engineering team when needed. Percentage of time: 10% during the audit.

Mr. Lok has worked on the Small GESA #1, Dauphin County, PA State Capitol, and Temple University, DPW-Polk Center, with various project team members including Dave Clark, Daric Holmes, Joe Statler and Rob Campbell.

Daric Holmes, Project Designer, audits, designs, and oversees field installations and testing of high-quality, cost-effective lighting and water conservation measures. His extensive field experience allows him to improvise and revise designs to best meet all situations. Having directly managed the electrical labor sub-contractor on the previous DGS lighting upgrades and most recently designed the Keystone and PJC LED upgrades, Mr. Holmes has a strong appreciation for what is required for this project and has incorporated it in his current role. With over 20 years of experience in lighting industry, including eight years of military service, Mr. Holmes is a strong asset to effective, well designed projects.

Role for this project: Mr. Holmes will be responsible for the audit and preliminary design of the LED lighting upgrades and lighting control opportunities. Percentage of time: 30% during the audit, 5% during construction.

Mr. Holmes has worked on the Small GESA #1, the PA State Capitol, Dauphin County and DPW-Polk Center projects with various project team members including Dave Clark, Joe Statler, Rob Campbell, and Greg Lok.

Mike Schneider, CPM, CLEP, LC, Manager of Project Design, researches, designs, and oversees field installations and testing of high-quality, cost-effective lighting and water conservation measures along with various energy saving and capital improvement measures. His extensive field experience allows him to improvise and revise designs to best meet all situations. Having worked with nearly 60 lighting manufacturers during his 15 years in the energy field, he knows the products, how they work, and the best applications for each option.

Role for this project: Mr. Schneider will be responsible for the final design of the LED lighting upgrades and lighting control opportunities. He along with Mr. Holmes will ensure consistent cost-effective design among both Capitol Complex and Keystone/PJC LED upgrades. Percentage of time: 15% during the audit.

Mr. Schneider has worked on the Small GESA #1, Small GESA #2, City of Harrisburg, Kutztown University, Cheyney University and Rachel Carson State Office Building with various project team members including Dave Clark, Joe Statler, Rob Campbell, Greg Lok, and David Robb.

Chris Hainsworth, Sr. Energy Engineer
Mr. Hainsworth is eager to understand the priorities, preferences, and facility complaints identified by his client, and then to assemble a scope of improvements and contractors best suited to those specific needs. With more than 30 years of experience, he excels at quantifying economics and concise descriptions. The satisfaction of each client is his aim. Because deficiencies and changing technologies have a significant economic impact on HVAC, central plant and distribution, process specialties, envelope, and all areas of controls, Mr. Hainsworth finds attention to the details of those systems usually garners his clients their most attractive returns. Of note, Mr. Hainsworth served as the energy engineer on both the recent Small GESA #1 and previous Constellation Capitol Complex GESA projects. He understands these unique buildings and systems well and will ensure modeling, design, savings and commissioning are consistent among both current projects to maximize performance without overstating savings.

Role for this project: Mr. Hainsworth will be responsible for further developing energy baselines, auditing the facilities, identifying and developing Mechanical / Thermal Building Solutions including, developing engineering designs and scopes of work, performing energy savings calculations, and review bid results / pricing. These responsibilities will also extend into the construction phase due to the close coordination required by engineering and our BAS and mechanical subcontractors to ensure proper installation and commissioning of these improvements. Percentage of time: 100% during the audit, 5% during construction.

Mr. Hainsworth has worked on the Small GESA #1, PA State Capitol, Community College of Allegheny County, Eastern Gateway Community College, Penn State with various project team members including Dave Clark, Joe Statler, Rob Campbell, Greg Lok and David Robb.

Nikhil Singh, (CEM, CMVP, BAP, LEED GREEN ASSOCIATE) Project Engineer, is an engineering and technical specialist with core skills in energy modeling, HVAC and controls re-tuning, data analysis, field testing and inspection of buildings, and energy audit report writing. He leads post-construction customer site audits, verifying energy efficiency strategies and calculating and reporting project performance.

Role for this project: Mr. Singh will be assisting the Lead Engineers (Mr. Hainsworth and Daric Holmes) and Greg Lok with implementing the measurement and verification plan. Percentage of time: 5% during the audit, 5% during construction, 5% during M&V.

Mr. Singh has worked on Small GESA #1, City of Harrisburg, City of Bethlehem, Temple University and United Steel Workers with various project team members including Dave Clark, Joe Statler, Mike Schneider, Shawn Deegan and David Robb.

Dave Clark, Vice President of Construction, is responsible for directing the project management staff, working on the development of new project design concepts and constructability, preparing scopes of work and bid specifications, and overseeing the project health and safety program. Particularly relevant is that Mr. Clark took a direct project management role in overseeing the Constellation / York installation of the new chillers under the last GESA project.

In addition to Mr. Clark's 30+ years of experience working in commercial and industrial facilities, he has accumulated more than 2000 hours of related education and training in professional management; building construction; mechanical, electrical and energy management systems and services; numerous college courses in business management. He also retains a national certification for General Contractor licensing in the states of AL, AK, GA, LA, MS, NC, SC, TN & WV.

Role for this project: Mr. Clark will collaborate with the engineering team on the development of project design concepts, constructability and maintenance; review scopes of work and bid specification, review subcontractor pricing and oversee the selection of subcontractors and construction management team. The important mechanical

requirements of this project warrant Mr. Clark's direct expertise in review of the design and constructability of the chiller plant ECMs. Percentage of time: 10% during the audit, 5% during construction.

Mr. Clark has worked on the Small GESA #1, PA State Capitol, DPW-Polk Center, Temple University and Dauphin County, with various project team members including Rob Campbell, Greg Lok, Joe Statler, Dave Robb, Nikhil Singh, Shawn Deegan and Daric Holmes.

Shawn Deegan, (P. E., CEM, DGCP), Sr. Project Manager, is responsible for all onsite project management and subcontractor supervision during construction. He ensures the worksite is safe and supervised in an effective and efficient manner. Mr. Deegan is the liaison between the construction team, engineers, and designers and the owners and stakeholders. In this role, he facilitates effective communication, safety decision-making and problem solving. With over 16 years of mechanical retrofit construction experience, Mr. Deegan is adept at project supervision, customer service, project development and management, building and installing.

Role for this project:
Mr. Deegan plans, coordinates, implements and concludes projects according to specifications, deadlines and budget, with an overall objective of customer satisfaction. Percentage of time: 25% during the audit, 70% during construction.

Mr. Deegan has worked on multiple phases at Temple University with various project team members including Dave Clark, Joe Statler, Rob Campbell, Mike Schneider, Nikhil Singh and Daric Holmes.

Adam Trosko, Construction Site Manager, will ensure daily site construction activities are supervised by TEN in conjunction with Shawn Deegan. Mr. Trosko's Architectural Engineering degree from Drexel University and construction management experience have already proven useful on the Small GESA #1 project currently under construction at the Keystone and PJC buildings as well as previous projects with the team at Temple University

Role for this project: Mr. Trosko will be responsible for daily coordination of subcontractors, inspections and commissioning, quality assurance and quality control. Percentage of time: 100% during construction.

David Robb, Vice President, Business Development, is responsible for leading TEN's development efforts and will serve as Program Manager for DGS Small GESA projects. With over 20 years of energy efficiency experience, he has a valuable combination of skills and expertise: a master's degree as well as hands-on experience in building construction management. He has extensive knowledge of facility auditing, performance measurement and verification, payback analysis and project development.

Role for this project: Mr. Robb will be DGS's program manager and main point of contact throughout the duration of the project. Mr. Robb's responsibilities will include working with DGS Representatives throughout the entire project from development through construction to M&V to ensure overall customer satisfaction. He will also coordinate the engineers, contract administrators, financial analysts, project managers and M&V specialists to execute deliverables and successful solutions for DGS.

Percentage of time: 40% during the audit, 5% during construction.

Mr. Robb has worked on the Small GESA #1, Small GESA #2, City of Harrisburg, Kutztown University, Temple University and Cheyney University with various project team members including Mike Schneider, Daric Holmes, Joe Statler, Rob Campbell, Dave Clark, Nikhil Singh and Shawn Deegan.

Rob Campbell, PE, MBA, President and Chief Operating Officer, is responsible for the day to day operations at TEN and manages the strategic planning and development goals of the clients. Mr. Campbell's primary responsibilities will involve coordination and assignment of resources and project personnel/subcontractors to ensure construction and engineering audit timelines are met. In this capacity, Mr. Campbell draws upon his over

25 years of energy efficiency experience in rolls from engineering, operations as well as financial and strategic management. As the President and CEO, he has the authority to execute quick decisions which enables TEN be to creative, flexible and responsive to client's needs. Mr. Campbell has been involved with all previously mentioned projects.

TEN's engineering and construction teams work closely with each other to develop the scopes of work that are competitively bid (or negotiated) to customer qualified vendors and contractors to ensure that the design intent is met, the project / system can be installed properly and maintained, and the construction team is very familiar with the project before installation begins. This seamless and transparent hand-off to construction ensures quality control including well planned procurement and timely delivery of material to facilitate an efficient and well managed installation. TEN's team is also open to our subcontractors' input when it improves the design and/or lowers the cost to provide a better and more sustainable solution for each customer.

Subcontractor Selection Process - TEN believes that it will provide the best value for the Capitol Complex's Energy Efficiency Program dollars. TEN's efficient cost structure and strong local presence will allow DGS to obtain a maximum amount of improvements for its available energy and operational savings. Further, TEN's independence from any particular subcontractor and manufacturer ensures that it is able to provide the most appropriate solutions that efficiently address specific needs. As a result, TEN can develop an objective and unbiased partnership with DGS by implementing the equipment and system upgrades that generate maximum returns.

The currently anticipated list of subcontractors includes Johnson Controls, Automated Logic, Hunt Consulting with whom our team has worked successfully in other DGS buildings including the Small GESA #1, the Capitol Complex GESA in 2009 and again in 2017. Hunt Consulting will complete the lighting installation work in conjunction with TEN's internal auditing and design team. Huckestein Mechanical is planned to support HVAC and chiller plant solutions in conjunction with Hemant Mehta, PE from WM Group who was instrumental in optimizing the Capitol Complex chilled water loop & plant in 2003 & 2005. Zavorski Masonry Restoration is planned to address building sealing and Solar Comfort the window film. DGS will have an opportunity to review the qualifications and additionally pre-qualify these potential sub-contractors.

Construction Management Approach

TEN's commitment to offering energy efficient solutions is evident based on the credentialed, high-caliber team assembled at TEN to deliver world-class energy efficiency – including a significant focus on performance contracting. **This is our exclusive focus.** There are few, if any, energy and utility situations TEN has not already encountered and successfully addressed. TEN has a significant amount of engineering and technical resources to support the project throughout the contract term.

When it comes time for installation, TEN's dedicated staff of experienced project and construction managers specialize in delivering guaranteed, energy efficient solutions as planned. After TEN has assisted DGS with competitively procuring equipment and materials (decided upon during the design phase), the installation can begin. During the project, TEN's onsite construction project managers will collaborate with our internal engineering team on specific design issues. The presence of TEN's onsite project management throughout the process is critical to ensuring overall project success for this significant initiative undertaken by DGS. TEN's project management is key to a quality installation, and we guarantee that there will be accountable TEN employees assigned to this project throughout each task required by DGS. Please refer to the next section for more detail.

Committed Team

The Efficiency Network commits the personnel identified on this project team to the GESA 2017-1 Pennsylvania Capitol Complex project and shall not alter the organizational structure without prior written authorization by the DGS.

2. Work Plan for This Project (2-5.2)

In this section, we have detailed the skills and steps necessary to the delivery of a successful project. Key among them is the engagement of TEN's project management team from the beginning of any audit and design process to ensure that DGS' objectives are addressed and that the solutions proposed are buildable. This process also includes gaining a clear understanding of phasing requirements and coordination of construction to minimize the effect on tenants. TEN has never asked a tenant to vacate their workspace for the upgrades contemplated under an energy performance project. We always adjust the project work flow to accommodate client schedules and regularly work 2nd and 3rd shift to avoid and distractions.

Please take note of TEN's cTEN application which provides daily effective communication to key project participants. This tool is used in addition to regular site supervision, project meetings, meeting minutes and look ahead schedules to avoid unnecessary impact on building occupants.

TEN THE EFFICIENCY NETWORK

THE EFFICIENCY NETWORK
CONSTRUCTION PROGRESS REPORT

Subcontractor:
Hunt Consulting

Location:
15-01-031 PA DGS Small GESA 1 - Keystone Building -5th Floor West Open Office Area

Weather:
Sunny

Report Date:
6/15/2017

Keystone 5th Floor West T5

6" Can light samples

Action Items that The Efficiency Network will need to address:
There are no Action Items to be addressed at this time.

Delays:
There were no delays.

Verbal instructions received:
There were no instructions received.

Visitors:
There were no visitors.

Work performed today:
Hunt Consulting Installed: (124) T5 RLRB Pendants in Open Office Areas (30) T8 RLRB in utility spaces / restrooms (2) 6" Can samples for review

Work to be performed following day:
Monday 6/19 2x2 Installation on 3rd Floor east OR T5 installation on 5th floor east confirmation to be provided monday pending delivery schedule

Reported by: Adam Trosko

Project Management Approach
TEN has a large and experienced lighting design team. Lighting is a dominant component of most every energy performance contract and is typically outsourced in a turnkey manner by ESCOs to third party lighting contractors. TEN takes a very different approach that creates a better and more predictable outcome, at a lower cost. At TEN all design, equipment procurement and construction management is performed by direct TEN employees instead of through a third-party lighting contractor. TEN only outsources installation labor. The TEN lighting process involves a great deal of sample installations and a focused design approval process that is a critical step given the long-term consequences that are associated with LED technologies. As we say, "the good news about LED is the life expectancy but the bad news about LED is life expectancy." (The point being that it is possible to suffer with a mistake for a long time.) It is absolutely critical to make the right, informed decisions about LED design and we are adamant that our approach, driven by internal resources that we control as opposed to unrelated contractors, is better and more cost-effective.

Accurate Reporting - Reporting to The Efficiency Network's (TEN) Director, Construction Services, TEN's on-site 30-hour OSHA Certified Project Manager is accountable for the management of all assigned project construction activities taking place in the building(s). The Project Manager (PM), through their on-site management, will ensure that the worksite is safe, supervised and managed in an effective and efficient manner. Maintaining and managing communications with and directing the activities of all subcontractors is key to the success of the project. Our project managers utilize our cTEN application to quickly and efficiently report progress, concerns and work scheduled to be performed the following day. This communication will be shared with both our Director of Construction Services and the DGS project representatives as another procedure to monitor quality control.

Timely delivery - TEN believes that quality control starts in the project development stage and continues all the way through construction and measurement and verification. An effective energy savings program requires interaction between engineering and construction management during design. We establish this interaction by involving the construction team during the development phase of the project to ensure the "constructability" of the solutions we propose. The ultimate success of any energy savings project is measured by the ability of the installed systems to achieve the projected savings targets and to meet environmental and comfort expectations over a sustained period, while the success of a brilliant design is predicated by its ability to be constructed. TEN takes a comprehensive approach to development and engineering to establish this critical balance. This approach is possible because TEN utilizes **in-house** engineering and construction management to develop and deliver each project.

Our engineering and construction teams work closely with each other to develop the scopes of work that are competitively bid (or negotiated) to customer qualified vendors and contractors to ensure that the design intent is met, the project / system can be installed properly and maintained, and the construction team is very familiar with the project before installation begins. This seamless and transparent hand-off to construction ensures quality control including well planned procurement and timely delivery of material to facilitate an efficient and well managed installation. TEN's team is also open to our subcontractors' input when it improves the design and/or lowers the cost to provide a better and more sustainable solution for each customer.

A perfect example of working within the customer's time constraints is our Penn State Beaver Stadium project because the significant element of this project was the timing. To be ready for the 2015/16 football season, TEN had to expedite delivery of materials and contractors' schedules. The Beaver Stadium project included the installation of a comprehensive LED lighting system upgrade with a wireless controls system - including exterior entry gates, concession walkway areas, loading docks, main concourses, ADA-accessible ramps, pedestrian ramps, and stairways. All were completed on budget and in time for the first game of the season! Key interaction and communication with the University was essential to ensure this critical timeline was met.

Community College of Allegheny County had a similar urgent need that TEN was able to accommodate through close coordination among our engineers, project managers, design-build mechanical contractor and development team. In this case the South Campus existing boilers and chillers were not expected to make it through another heating/cooling season, and the building had to remain occupied during the project. CCAC was able to avoid the cost of a rental chiller even with a tight turn around. The GESA contract was signed March 25, 2015 with the first chiller coming on line in May (two months later).

On-cost delivery – As described above, the integration of TEN's engineering and construction teams from the onset of development ensure that TEN's projects can be built on time and on budget. TEN excels at effective communication / accurate reporting, timely and on-cost delivery as well as technical excellence.

Technical Excellence - The Efficiency Network is comprised of professional staff, most of whom have been active in energy management for more than twenty years. TEN has a staff of experienced professionals who are very familiar with the unique aspects of designing and constructing energy services projects in numerous settings and have collective project experience more than $700 million. TEN takes a comprehensive approach to designing and constructing energy savings projects and performs all energy engineering and construction management in-house employs its own lighting auditing, design and project management professionals. These professionals keep directly in tune with the lighting marketplace in terms of product innovations, availability and pricing. We also negotiate product pricing directly with manufacturers and lighting representatives to minimize layers of markup. In this way, we are also able to provide the most appropriate design for our client's available savings. In contrast, most of our competitor's turnkey sub-contract their entire lighting audit, design, material procurement and construction.

Steps to Successful Program Delivery and Contractor Quality Control
Critical Path Schedule - The major general steps of a TEN implementation plan are as follows**:**

A draft Critical Path Method (CPM) schedule is attached further in the Technical Response. In addition to the more general narrative below, it sets forth the logical progression of the proposed project including notice of energy audit award, duration and submission date of the energy audit, full execution of the GESA contract, permits submission and approval dates, durations of on-site work, commissioning and training. Also addressed are coordination with local utilities, subcontractors, equipment suppliers and DGS/PA Capitol Complex facility personnel. Our construction team uses both Primavera (Required in the RFQ for DGS projects) and MS Project (which is preferred by many of our customers). If TEN is selected for this project, we commit to utilizing Primavera software and submitting future project schedules in that format.

Initial Project Startup / Notice of Award
Immediately upon award of the project, TEN will further develop the partnership approach with DGS and further identify the personnel required to efficiently execute this project with core team members, and DGS preferred equipment providers and subcontractors. Once all the members of the project team are identified, the expectations for the project and its implementation will be clearly documented and outlined. The project's implementation milestones will be established in the IGA/Final Proposal and in more detail in the project's regular construction meetings. These milestones will be confirmed regularly through clear lines of communication which have been established to facilitate a successful project implementation. At this point, we will coordinate with DGS on specific details such as site operations and logistics including lay down areas during construction.

Procurement
As the project scope is approved by DGS through the IGA/GESA, purchase orders will be pre-negotiated and ready for immediate issue for materials and subcontracts. During the IGA, TEN will carefully evaluate the pre-identified subcontractors and manufacturers to determine the most appropriate fit for the energy savings project scope. TEN's independence from any subcontractor or manufacturer ensures that it can provide the most appropriate solutions that efficiently address specific needs and goals. Thus, TEN can develop an objective and unbiased partnership with DGS by implementing the equipment and system upgrades that generate maximum returns. This approach also gives DGS the flexibility to select Small Diverse Business (SDB) contractors to optimize their desired participation goals. It should be noted that we have pre-qualified a team of SDB contractors for DGS consideration.

Construction
Regular meetings will be held with the DGS to establish construction guidelines and TEN will work with each DGS representative to minimize the impact of the construction activities on the facility's operations. Standard project management tools will be used to track progress. TEN prides itself on a proven track record of successful project implementations in varied settings which include everything from "after-hours" installations in offices and public areas to special access situations in restricted zones.

Construction services will be sourced through mutually agreed upon installation subcontractors who are additionally vetted based on the quality of their work and safety record. All subcontractors perform their work under the direction of our in-house construction project manager(s). TEN's construction project managers will continue to collaborate with our internal lighting design and engineering team on specific design issues. Our project management team will also be responsible for providing DGS with appropriate training and operating and maintenance (O&M) manuals, and overseeing project commissioning.

Following are items that need to be considered and addressed during the investment grade audit and final design to ensure a successful project for the contemplated core ECMs.

Potential Design Issues
- TEN's proposal for the Capitol Complex GESA project (GESA 2017-1) accounts for savings captured in the Small GESA #1 project. Our engineers specifically deducted the previous savings from the baseline prior to forecasting the impact of upgrades proposed for this project found in Volume II ECM-Cost Submission

- Our IGA evaluation will more deeply model the chilled water plant consumption, and will balance use and loads among connected buildings. We propose to identify the cooling capacity or load changes available for L&I through pure cooling enhancements, in tandem with offsets which may be practically achieved through LED lighting, lighting controls, film, caulking, and control upgrades not specifically targeting the chilled water system.
- We anticipate the availability of greater detail in records of chilled water production and distribution.
- The IGA will confirm structural detail beneath certain areas of the chilled water plant floor to support free cooling equipment.

Critical material and equipment / long lead items

- Review and approval of key lighting design and material during the IGA as to facilitate on-site work within 20 calendar days of execution of contract (per page 26 of RFQ).
- Installation or recommissioning of chilled water metering & cooling season data to aid in final system design.
- Accelerated design and shop drawing approval for the plate and frame heat exchangers, hot tap locations, and platform contemplated for strategic placement within the chilled water plant.
- Consideration of the longer lead-time required for delivery of the replacement motor and possibly the VFDs and heat exchangers, depending on timing of contract execution.

Phases of construction

- Seasonality of chilled water plant ECMs. We have priced hot taps for both the chilled and condenser water system connections as to minimize any requirement for plant shutdowns. Further, VFD conversion of the two condenser water pumps can be completed one at a time during winter operation and will be planned to minimize or eliminate altogether the need for a plant shutdown if the work can be executed safely.
- If replacement of sections of condenser water piping are sought as an addition to the scope, the IGA will be expanded to also include tie-in points and related changes to piping to be accomplished early in the construction process so that the entirety of the scope may proceed in an efficient and orderly manner.
- Building sealing solutions which involve work on the exterior are subject to weather constraints with regard to safe working conditions and temperature and moisture limitations for optimal application. The deployment schedule must remain cognizant of cure times and residual impact of sun and storm. Window tinting could be completed during second shift as not to disturb occupants.

Construction planning

- The TEN team has had good success identifying lay-down and storage areas within the Capitol Complex for the Small GESA #1 project and previously in the East Wing Garage to support the 2009 lighting project. While parking and logistics are more challenging during weekdays, there is far more flexibility on 2nd and 3rd shifts as well as weekends. Most mechanical, electrical and control work planned for the chilled water plant and mechanical spaces will be undertaken during normal business hours or on a four-10 basis. Changeovers will be scheduled sufficiently in advance to minimize disruption and to allow for adequate preparation by all parties.

Safety Plan, Management and Monitoring - In addition to pre-qualifying sub-contractors regarding their safety records, TEN will provide an individual experienced with safety programs in construction to serve as the Commonwealth's agent and representative in matters of construction safety, specifically one with experience which directly relates to state and local safety laws, including statutes, rules, regulations, and ordinances. Tasks will include the following:

a) Review the timeliness of safety and accident prevention procedures and review and accept Contractor Safety Programs;
b) If certain individuals are found to be continually in violation of safety requirements, direct the contractor to remove the individual employee, or to invoke any other contractual remedy deemed appropriate;

c) Observe and monitor Contractor compliance with OSHA, the Commonwealth, and local and state laws and regulations;
d) Periodically schedule and attend Foremen's 'tool box" safety meetings and evaluate effectiveness;
e) Review and accept Contractor emergency and safety plans and procedures;
f) Organize and participate in periodic site inspections and report on findings;
g) Coordinate the Commonwealth's general and specific safety concerns with the Project; and
h) TEN's involvement in the safety of the project shall in no way relieve or decrease a contractor's obligation for safety.

Quality Control

TEN believes that quality control starts in the development stage and continues all the way through construction and measurement and verification. An effective energy savings program requires a delicate balance between engineering and construction management. We establish this balance by involving the construction team during the development phase of the project to ensure the constructability of the solutions we propose. The ultimate success of any energy savings project is measured by the ability of the installed systems to achieve the projected savings targets and to meet environmental expectations, while the success of a brilliant design is predicated by its ability to be constructed. TEN takes a comprehensive approach to development and engineering to establish this critical balance. This approach is possible because TEN utilizes in-house design, engineering and construction management.

Our design, engineering and construction teams work closely with each other to develop the scopes of work that are competitively bid to qualified vendors and contractors to ensure that the design intent is met, the project/system can be installed properly and maintained, and the construction team is very familiar with the project before installation begins. This seamless and transparent hand-off to construction ensures quality control. TEN's team is also open to our subcontractors' input when it improves the design and/or lowers the cost to provide a better solution.

Inspections & Reporting

As part of our Quality Control program, continuous inspections during construction are performed to ensure compliance with the scope of work and the Commonwealth's requirements and safety. TEN's project managers and engineers along with the DGS representatives will inspect the construction of the energy conservation measures. Progress will be tracked on a daily and bi-weekly basis with results shared with the assigned DGS representatives and the Project Team.

Reporting to TEN's Director of Construction, the on-site 30-hour OSHA Certified Project Manager is accountable for the management of all assigned project construction activities taking place. The Project Manager (PM), through their on-site management, will ensure that the worksite is safe, supervised and managed in an effective and efficient manner for DGS. Maintaining and managing daily communications with and directing the activities of all subcontractors is key to the success of the project.

Project Closeout Process

Project Commissioning Process

Commissioning is one stage of TEN's quality control process. Commissioning will verify that the related equipment and systems are installed and functioning in accordance with the design intent. Commissioning assures that what has been purchased by DGS has in fact been provided. Proper commissioning is a key component of all energy conservation measures to ensure not only functionality and optimal operation but also guaranteed and sustainable savings.

Commissioning begins during the project design phase and continues after construction is complete. It requires thorough documentation of system design, construction quality, functional performance tests, and operation and maintenance requirements. The training of building operators and staff also is a key component of building commissioning since staff may be responsible for some equipment maintenance.

Project Acceptance
TEN's Project Manager will work in conjunction with the Commonwealth personnel to make sure all measures are performing as designed. Any deficiencies will be identified as punch list items and will be used to track and correct the deficiencies. Once DGS and Project Manager have signed off on the completion of the Project, it is technically turned over to the facilities operation personnel.

The Project Acceptance date marks the start of the workmanship warranties and the savings measurement period. Often initial savings are confirmed at this point and savings performance reviewed with our customer. In addition, a functional O&M Manual would be provided to help optimize facility operation to continue to provide significant energy savings and comfort benefits. TEN views its O&M Plan as a risk reduction strategy, which will help equipment run efficiently, function properly, and deliver its full life expectancy.

Operation & Maintenance Plan:
TEN's partnership approach continues throughout the contract term after the project's implementation to ensure that the savings guarantee and equipment operating parameters are realized. The ECM warranties will be well-documented in the project-specific operating manuals and TEN stands ready to assist DGS on any warranty issues. TEN's approach to cost-effective maintenance of the project is to train DGS staff whenever possible.

Training - Training is an important aspect of TEN's offering. On-site personnel need to understand the objectives of the energy savings program and equipment operation to meet those objectives. In that light, comprehensive training is usually held on-site, during the construction phase to familiarize the staff with the new systems. Most training is focused on familiarizing the facility personnel with the new equipment being installed, the equipment / system operation and regular maintenance. Most of the training takes place during start-up of the equipment, the commissioning process or at project completion. All training is coordinated by the project manager(s) and the operations representative.

Measurement and Verification (M&V)
TEN will provide a customized M&V plan for new and existing equipment in accordance with the International Performance Measurement Verification Protocol (IPMVP). Our experience with all options (A, B, C and D) enables us to delineate the cost and benefits of each approach which will help DGS in determining the optimal structure of the M&V plan. In general, it's viewed as more cost effective to invest in comprehensive M&V strategies for those ECMs that pose the greatest overall savings risk to the customer and use more straight forward M&V strategies for those ECMs that pose the least overall savings risk to the customer to preserve available savings to support a greater number of project building system improvements.

Potential Complications and Risks
Challenges always arise in construction; TEN believes it is our responsibility to minimize the challenges and/or complications by anticipating and avoiding them before they arise. TEN's project management team has years of experience doing just that. However, some challenges invariably still arise, and TEN is uniquely positioned to handle those too with our experienced site project managers and accessible local executive leaders that stay close to the progress of the projects which enable TEN to be flexible, responsive, and nimble to address issues before they become problems for our clients.

Working in Occupied Environments
Nearly all our projects have been completed in occupied buildings where careful coordination and frequent/clear communication have resulted in successful implementation with little to no tenant disruption. These include projects for office buildings, government facilities, universities, school districts, housing authorities, condominiums and hospitals. Each with varied access requirements including high security.

TEN's team has worked on many projects, Small GESA #1, Penn State University, Ohio University, Cheyney University, UPMC and others, and the typical challenges included minimizing disruptions in student/tenant occupied

buildings, tight timeframes, seasonal / weather concerns, coordinating cranes/lifts/equipment deliveries. TEN has experience with all these types of challenges. We have found most of the challenges can be avoided through solid project management and clear communications with the customer.

TEN has completed lighting installation in offices, courthouses, prisons, classrooms and even patient rooms without any issues due to the coordination and communication used by our site project managers. Our team is used to working shifts to minimize disruptions. Our team has completed comprehensive projects for Penn State where we had extremely tight deadlines and had to coordinate with other trades working in the same space when performing retrofits in their dormitories during the summer break. We completed an LED lighting upgrade for PSU Beaver Stadium that had to be substantially complete before the end August despite only receiving the contract in May. As you would expect, this required careful planning and a nuanced implementation schedule that allowed for potential material delivery delays (LED luminaires). As we anticipated, the material was two to three weeks late, but we were still able to exceed PSU's deadline by continuous follow up with the manufacturer on delivery dates and constant communication and coordination with our subcontractor as to when to increase the crew size.

Additional areas requiring special attention include our team experience coordinating crane lifts that required sidewalks and street closures without any issues. We have experienced environmental issues and developed control environments to capture and prevent the release of contaminants. At the PA Capitol Complex's original project, we were tasked with cutting out 1800 old lead-based painted steel windows. We designed a HEPA vacuum attachment to capture the dust particles during the cutting of the steel mullions eliminating the need for erecting large containment barriers substantially reducing the removal cost and accelerating the installation schedule.

ECM Opportunities

To verify the feasibility of the selected ECMs, experienced energy engineers, auditors, construction managers, project developers, and finance professionals from TEN all collaborate analyzing the energy/water efficiency opportunities and ultimately assuring DGS that the proposed ECMs have been explored in a prudent and professional manner and in accordance with the DGS Design Manual. This then results in a detailed summary of the final ECM opportunities being recommended for each project. As you would expect, we review and solicit feedback on our findings and recommendations with DGS during pre-established progress meetings during the Investment Grade Energy Audit to ensure the final Audit Report is on target. **The following steps are integral to taking the proposal cost and savings from 90% and 95% accuracy to guaranteed contract values.**

TEN's methodology for selecting energy conservation measures (ECMs) begins with a meeting with the PA Capitol Complex and DGS to discuss their goals and objectives. In this case, DGS specifically identified the following core ECMs for inclusion in the project:

<u>Electrical Measures</u>

- LED Lighting Upgrade / Sensors

<u>Facility Mechanical/Thermal Building Systems</u>

- Central Plant chiller sequencing/VFD controls
- Capitol Complex Chilled water loop flow control and delta-T management
- Central Plant winter – free cooling system
- Window film treatments
- Labor and Industry Building Sealing of Exterior Walls

As such, our initial RFQ energy audit and analysis began by investigating and developing these ECM objectives for the Commonwealth. During this process the energy consuming systems, equipment, and provided documentation were analyzed to understand their potential for energy savings either by retrofitting or replacing the existing equipment, and by further developing equipment and recommissioning strategies to make the overall business operation of the facilities more financially solvent. TEN's cost structure and approach to business typically allow us to deliver a greater amount of scope for our customer's available savings opportunity. In fact,

in this case, we have identified significant excess savings that can fund additional improvements beyond the core ECMs. We look forward to discussing our planned solutions in greater detail in the ECM and cost submission.

If selected for the Investment Grade Audit, TEN looks forward to reviewing our initial design recommendations with the Commonwealth and receiving your feedback to ultimately optimize the best value project to meet your objectives. Key to our work will be application of the standards contained in the **DGS Design Manual** as well as adherence to **DGS General Conditions and Administrative Procedures**. Similarly, we will conduct the energy audit and deliver the report as outlined in section 1.35 of the RFQ. Where acceptable to the Commonwealth we will also introduce tools that TEN has developed to aid our clients in more easily evaluating and communicating information about their projects. Many of these tools, some of which are discussed in this section, also streamline development and reduce project costs.

When TEN is invited to assist in optimizing equipment selection and system design, our team goal is purely to serve the end customer with a high-quality project implementation which saves operating costs (utilities and maintenance) while delivering optimal comfort and other required environmental conditions. TEN's independence from any particular manufacturer enables us to provide the most appropriate solutions that efficiently address specific needs.

In these instances, TEN's engineers have been able to diplomatically work with traditional MEP engineers and Building Automation System vendors to help in the selection of equipment and systems that can deliver lower life cycle cost as well as environmental controls sequences that go beyond the typical 'worst-case scenario' sequences we still find specified on some projects.

When all parties ensure the target is higher end-user satisfaction and lower operating costs then good dialog occurs and enhanced solutions are found.

3. RFQ Project Schedule (2-5.3)

Establishing a realistic and well thought out plan for construction is critical to delivering an economical and successful project to our clients and ensuring a profitable outcome and good reference for our company. TEN has demonstrated experience with both. While developing and flexibly adhering to the project schedule is critical to all our projects, the fast-tracked solutions delivered through our Allegheny County Community College-South Campus central plant and Penn State-Beaver Stadium projects are excellent examples of TEN's capability in planning and optimizing a schedule to meet critical client deadlines. Each of these projects is addressed in greater detail in the next section.

TEN's experience delivering timely projects ranges from complex central plants solutions, intricate Continuous Automated Commissioning (CAC) Strategies to relatively straightforward lighting retrofits for varied clients such as Temple University, City of Harrisburg, Carnegie Museums as well as industrial clients. Each rely on is to deliver projects on time so that projected savings are realized in advance of any required financing payments. Perhaps most importantly, TEN already has experience working within and meeting the timelines and objectives of DGS.

The previous section addressed the necessary steps of the work plan to achieve a successful project outcome. As not be repetitive, we'll focus our attention on areas of risk and opportunity that can arise during construction and how the TEN team works quickly with our clients to address each. On pages 13 and 14 of the previous section we also delineated important considerations in the areas of Design, Equipment and Material Procurement, Phasing, and Construction Planning. To the extent those items are also important to the scoring of this section, we'd appreciate your referencing them.

Investment Grade Audit – Risks/Opportunities

- Too short an IGA period. The RFQ currently contemplates a 60-day IGA period. We'd recommend a slightly longer duration to ensure optimal final site evaluation / analysis / design as well as meaningful interaction / feedback with facility personnel.
- Incomplete or inaccurate chilled water flow meter data. To make the best use of the IGA period (regardless of the ESCO ultimately chosen), we recommend that DGS directly engage JCI as soon as possible to clean and re-calibrate the existing chilled water flow meters. We have identified a price from JCI in Volume II to complete this work. Doing this work now will potentially provide useful summer data from the start of the IGA period expediting analysis and design. Granted, inaccurate data could be due to poor placement of the current meters but we recommend this initial approach to determine if additional metering is required. Alternately, if DGS prefers to wait, this scope could be incorporated into the IGA fee.
- Sample areas. Installation of meaningful sample areas for both lighting and window tinting are a necessity. The increased lumen efficiencies of LED lighting are dramatic and continually increasing. As such, it is easy for less experienced lighting designers to over illuminate a space (causing discomfort) and miss the facilities full savings potential. As a current example, the Health and Welfare Building has many areas where occupants or facility personnel have de-lamped fixtures installed in the 2001 capital upgrade. DGS will benefit from a thoughtful redesign of each buildings lighting verified through feedback on representative sample installations to yield an optimal environment for staff. There is also a unique opportunity to upgrade each buildings appearance if new fixtures are chosen. It is similarly important to secure buy-in with respect to the tint of the window film chosen and its impact on the space during both the daytime and evening as well as the reduced need to deploy existing blinds.
- Early discussion of M&V pre-measurements. It is important to discuss M&V options and DGS preferred approach for each ECM early in the IGA to insure sufficient time to collect necessary data to support those options. If this is left to late in the audit period, there may be less flexibility regarding approach or worst case inaccurate savings projections.
- IGA review & approval of fast-track ECM submittals such as lighting and window tinting to support a quick start after contract execution. In this manner, sub-contracts and material purchase orders can be pre-negotiated while DGS is procuring financing and circulating the agreement for approval.

- Pre-determination of site access, laydown areas, permit jurisdictions & their contact information to prepare for construction commencement.

Execution of the GESA Contract – Risks/Opportunities

- IGA review & approval of fast-track ECM submittals such as lighting and window tinting to support a quick start after contract execution. In this manner, sub-contracts and material purchase orders can be pre-negotiated while DGS is procuring financing and circulating the agreement for approval.
- Early submission of preliminary incentive applications to local utilities will ensure available incentives are reserved for this project. At this stage, the project moving forward is relatively assured.
- Coordination and preliminary review of the financing RFP to insure the proposed project is easily financeable from multiple financing companies. Without a good response, DGS could get a higher than expected interest rate or have to re-procure delaying the contract up to six weeks.
- Focused attention & quick turnaround of questions and documentation requests during this period are critical to maintaining momentum. Each financing company has its own preferences that aren't entirely standardized in the financing RFP. TEN is accustomed to working through this drill quickly in order to meet the contract closing deadline.

Construction Kickoff – Risks/Opportunities

- Re-affirm clear and concise communication expectations and document meetings from the onset.
- Begin process of regular schedule review including focus on two-week look ahead schedules to anticipate potential changes or opportunities that may occur as a result of regular customer input.

Submittal Review & Approval as well as Permit submission and approval – Risks/Opportunities

- We will preliminarily prepare as much submittal and permit information as possible in advance of receipt of NTP, however certain design-build submittal and permit activities will have to wait until the contract has been fully executed. Proper scheduling and review will insure this process moves along as quickly as possible.

Installation

- Our project schedule anticipates the seasonal nature of our ECM construction requirements. Through careful coordination with DGS, we may be able to improve upon certain parts of the schedule to yield larger savings earlier during construction.
- One area we have already contemplated involves connections to the existing piping for the free cooling ECM: through a specialized hot tap contractor, we can perform the initial tie-ins to the existing mains regardless of weather, allowing many elements of the work to be performed efficiently well before the system is to be cut over. Additionally, the hot tap process avoids much of the time and expense associated with the usual procedure for draining and re-filling the system.
- The winter timing of the condenser water pump VFD conversions ensures continued operation of the plant.
- Upon direction by DGS, we can investigate the potential for strategic changes to the condenser water loop which could make possible replacement of failing sections of the condenser water main in winter while still satisfying the cooling load.
- As many of our team have worked in the Capitol previously, we are accustomed to the seasonality of the legislative calendar and will plan installation work accordingly.
- Due to our breadth of expertise and sizable energy-specific team focus within the Pennsylvania region - including local management - TEN is able to quickly address issues that occur during construction. Our track record as a nimble ESCO demonstrates our ability to take advantage of opportunities which improve project outcomes when agreed to by both parties.

Start-up, equipment testing

- Where factory representative start-up, testing and balancing is required, it is critical to schedule these resources sufficiently in advance in or to maintain the schedule and resultant final commissioning and ECM acceptance.

Commissioning, training and post M&V measurements

- Efficient completion of post construction Act-129 submittals and required local utility inspections will expedite turn-around of incentives.
- At project completion, we can also submit the project for permanent capacity reduction payments through PJM. Optimal timing of the application can maximize the value of this market based program.

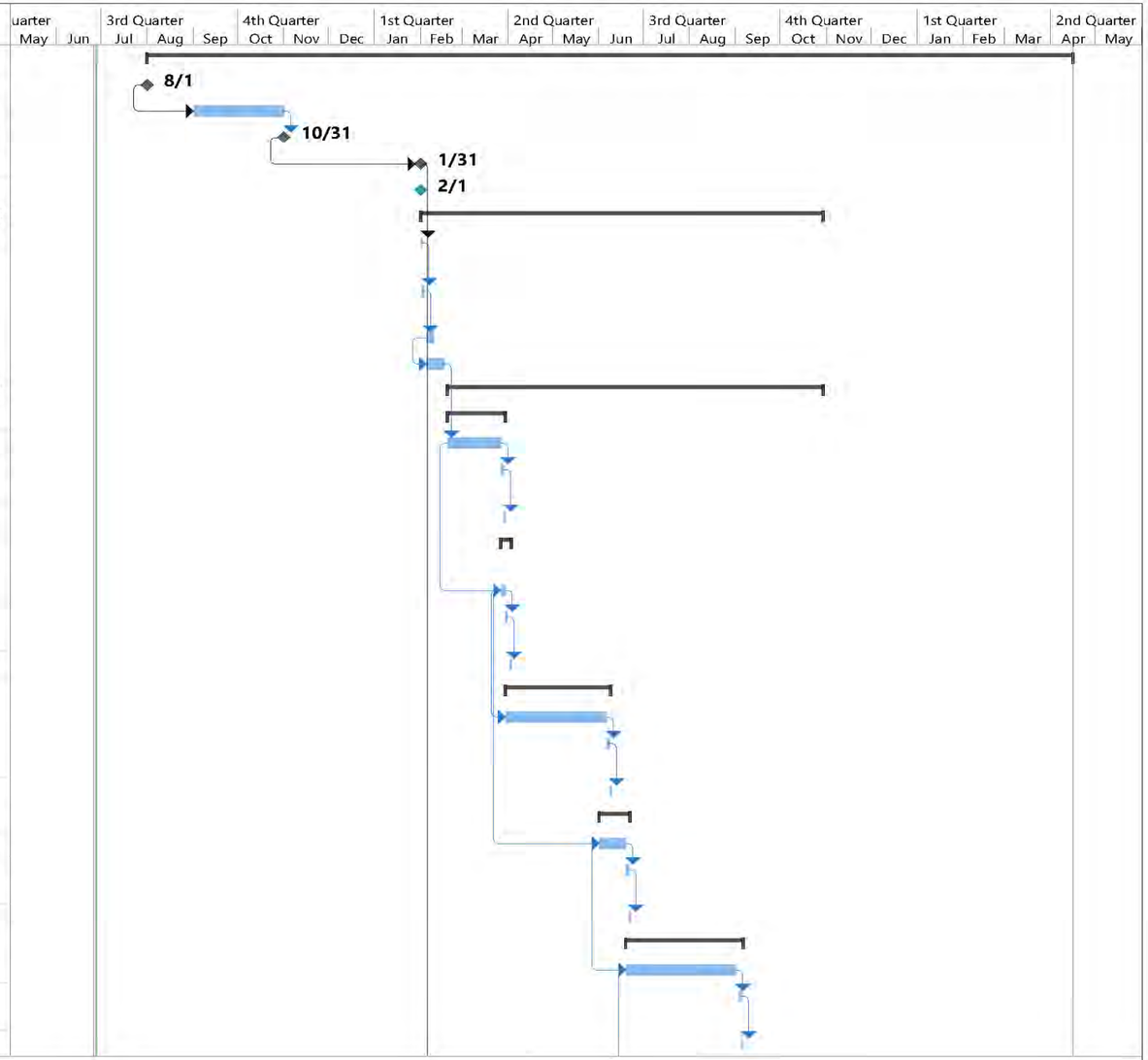
We at TEN value past experience which has proven that challenges and risks, such as may prevail here, are positively impacted by good and frequent communication between TEN, DGS, building occupants, our subcontractors & material suppliers, local utilities, permitting jurisdictions such as L&I, DEP and Hartford Insurance. Weekly sub-contractor and bi-weekly client meetings address the big issues efficiently; however, we find that brief daily reports through our automated cTEN application are equally important to our clients, in the ongoing collaboration which produces the most refined and successful results.

Additional Opportunities for Innovation / Schedule Compression / Flexibility

Following are ways DGS and TEN could work together to compress the project schedule, if desired.

- Construction kick-off meeting details will be addressed during the Investment Grade Audit to expedite movement to final design and construction after the GESA has been fully executed.
- Prior to GESA contact execution, TEN plans to pre-negotiate sub-contracts, material purchase orders, and disposal / recycling agreements for solutions not requiring final design so they can immediately be issued upon receipt of the sign contract.
- Periodic material deliveries and installation can begin within two weeks of GESA contract execution (for readily available lighting material).
- Contemplated installation contractors can stage material and remove waste daily to an offsite location minimizing impact to site storage areas.
- Similarly, recycling will be structured for frequent pickups, however it is preferred that the lamps remain on site until removed by the recycling company to maintain the chain of custody.
- In the event construction needs to be accelerated we have verified that a potential installation contractor has 18-20 cleared installation personnel and is able to commit 12 to this project with the ability to add more, if needed.
- Concurrent commissioning and measurement & verification activities can be employed near project completion to compress the installation schedule as well.

ID	Task Mode	Task Name	Duration	Start	Finish
1		**RFP PROCESS & IMPLEMENTATION**	**445 days**	**Tue 8/1/17**	**Mon 4/15/19**
2		Notice of Selection	0 days	Tue 8/1/17	Tue 8/1/17
3		Investment Gade Audit	43 days	Fri 9/1/17	Tue 10/31/17
4		IGA Report Deliverable	0 days	Tue 10/31/17	Tue 10/31/17
5		**GESA Execution-NTP**	0 days	Wed 1/31/18	Wed 1/31/18
6		CONSTRUCTION KICK OFF	0 days	Thu 2/1/18	Thu 2/1/18
7		**LED LIGHTING UPGRADES & SENSORS**	**193 days**	**Thu 2/1/18**	**Mon 10/29/18**
8		Prepare/Submit Customer Submittals for Review & Approval (In IGA)	1 day	Thu 2/1/18	Thu 2/1/18
9		Customer Submittal Approval (Approved in IGA)	1 day	Fri 2/2/18	Fri 2/2/18
10		Submission/Approval for Permits	5 days	Mon 2/5/18	Fri 2/9/18
11		Equipment Procurement	10 days	Mon 2/5/18	Fri 2/16/18
12		**Installation**	**181 days**	**Mon 2/19/18**	**Mon 10/29/18**
13		**North Office Bldg**	**29 days**	**Mon 2/19/18**	**Thu 3/29/18**
14		Installation	26 days	Mon 2/19/18	Mon 3/26/18
15		Start-up, Testing & Commissioning	2 days	Tue 3/27/18	Wed 3/28/18
16		Final Inspection	1 day	Thu 3/29/18	Thu 3/29/18
17		**Central Plant & Maintenance Tunnels**	**5 days**	**Tue 3/27/18**	**Mon 4/2/18**
18		Installation	3 days	Tue 3/27/18	Thu 3/29/18
19		Start-up, Testing & Commissioning	1 day	Fri 3/30/18	Fri 3/30/18
20		Final Inspection	1 day	Mon 4/2/18	Mon 4/2/18
21		**East Wing**	**51 days**	**Fri 3/30/18**	**Fri 6/8/18**
22		Installation	48 days	Fri 3/30/18	Tue 6/5/18
23		Start-up, Testing & Commissioning	2 days	Wed 6/6/18	Thu 6/7/18
24		Final Inspection	1 day	Fri 6/8/18	Fri 6/8/18
25		**East Wing Parking Garage**	**15 days**	**Fri 6/1/18**	**Thu 6/21/18**
26		Installation	12 days	Fri 6/1/18	Mon 6/18/18
27		Start-up, Testing & Commissioning	2 days	Tue 6/19/18	Wed 6/20/18
28		Final Inspection	1 day	Thu 6/21/18	Thu 6/21/18
29		**Labor & Industry**	**57 days**	**Tue 6/19/18**	**Wed 9/5/18**
30		Installation	54 days	Tue 6/19/18	Fri 8/31/18
31		Start-up, Testing & Commissioning	2 days	Mon 9/3/18	Tue 9/4/18
32		Final Inspection	1 day	Wed 9/5/18	Wed 9/5/18



PA DGS Capital Complex
RFP Response / Preliminary Schedule
Wed 6/28/17

Task	Project Summary	Manual Task	Start-only	Deadline
Split	Inactive Task	Duration-only	Finish-only	Progress
Milestone	Inactive Milestone	Manual Summary Rollup	External Tasks	Manual Progress
Summary	Inactive Summary	Manual Summary	External Milestone	

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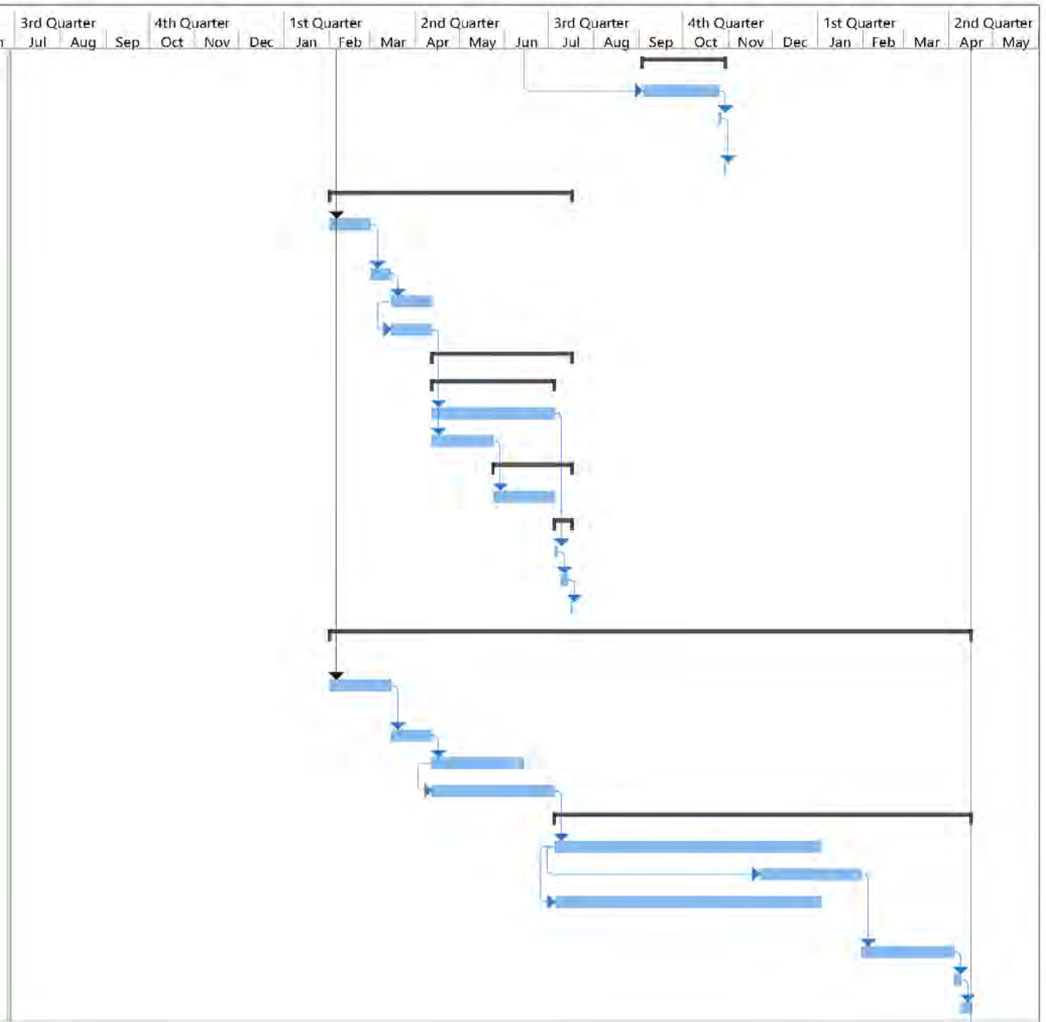
ID	Task Mode	Task Name	Duration	Start	Finish
33		**Health & Welfare**	**41 days**	**Mon 9/3/18**	**Mon 10/29/18**
34		Installation	38 days	Mon 9/3/18	Wed 10/24/18
35		Start-up, Testing & Commissioning	2 days	Thu 10/25/18	Fri 10/26/18
36		Final Inspection	1 day	Mon 10/29/18	Mon 10/29/18
37		**BUILDING ENVELOPE**	**118 days**	**Thu 2/1/18**	**Mon 7/16/18**
38		Prepare/Submit Customer Submittals for Review & Approval	20 days	Thu 2/1/18	Wed 2/28/18
39		Customer Submittal Approval	10 days	Thu 3/1/18	Wed 3/14/18
40		Submission/Approval for Permits	20 days	Thu 3/15/18	Wed 4/11/18
41		Equipment Procurement	20 days	Thu 3/15/18	Wed 4/11/18
42		**Installation**	**68 days**	**Thu 4/12/18**	**Mon 7/16/18**
43		**Labor & Industry Bldg**	**60 days**	**Thu 4/12/18**	**Wed 7/4/18**
44		Sealing	60 days	Thu 4/12/18	Wed 7/4/18
45		Window Tinting	30 days	Thu 4/12/18	Wed 5/23/18
46		**Health & Welfare Bldg**	**38 days**	**Thu 5/24/18**	**Mon 7/16/18**
47		Window Tinting	30 days	Thu 5/24/18	Wed 7/4/18
48		**Close Out**	**8 days**	**Thu 7/5/18**	**Mon 7/16/18**
49		Final Inspection	2 days	Thu 7/5/18	Fri 7/6/18
50		Commissioning	5 days	Mon 7/9/18	Fri 7/13/18
51		Training	1 day	Mon 7/16/18	Mon 7/16/18
52		**CENTRAL PLANT / CAPITAL COMPLEX CHW SYSTEM UPGRADES**	**313 days**	**Thu 2/1/18**	**Mon 4/15/19**
53		Prepare/Submit Customer Submittals for Review & Approval	30 days	Thu 2/1/18	Wed 3/14/18
54		Customer Submittal Approval	20 days	Thu 3/15/18	Wed 4/11/18
55		Submission/Approval for Permits	45 days	Thu 4/12/18	Wed 6/13/18
56		Equipment Procurement	60 days	Thu 4/12/18	Wed 7/4/18
57		**Installation**	**203 days**	**Thu 7/5/18**	**Mon 4/15/19**
58		Free Cooling System	130 days	Thu 7/5/18	Wed 1/2/19
59		CDW Pumps VFDs (2 UNITS)	50 days	Thu 11/22/18	Wed 1/30/19
60		CHW Loop Flow Control / Delta T Management	130 days	Thu 7/5/18	Wed 1/2/19
61		Start-up, Testing & Commissioning	45 days	Thu 1/31/19	Wed 4/3/19
62		Final Inspection	3 days	Thu 4/4/19	Mon 4/8/19
63		Training	5 days	Tue 4/9/19	Mon 4/15/19



PA DGS Capital Complex
RFP Response / Preliminary Schedule
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Task	Project Summary	Manual Task	Start-only	Deadline
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Milestone	Inactive Milestone	Manual Summary Rollup	External Tasks	Manual Progress
Summary	Inactive Summary	Manual Summary	External Milestone	

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4. Qualification Forms (2.5-4)

Qualified Personnel

The Efficiency Network is comprised of professional staff, most of whom have been active in energy management for more than twenty years. TEN has a staff of experienced professionals who are very familiar with the unique aspects of designing and constructing Energy Services Projects in numerous settings and have collective project experience more than $700 million. TEN takes a comprehensive approach to designing and constructing energy savings projects and performs all energy engineering and construction management in-house. In certain instances, where a unique skill set is required we will augment the project team with retained professionals overseen by our Professional Engineering managers. This comprehensive, in-house approach is one way we proactively utilize integrated project delivery and lean construction concepts inherent to our automated energy efficiency platform to deliver exceptional value to our clients. The core team identified section 2.5.1 was selected from TEN's current staffing of 35 employees specifically dedicated to our energy efficiency business. Should additional resources or specialized experience be required, TEN can easily draw from these additional employees or retained professionals as may be needed. All of the core project team members are physically located in our Pittsburgh and Philadelphia locations.

Offeror's Experience

TEN's team has significant industry-leading experience working with organizations to implement energy conservation and technology modernization projects over the past 25+ years, specifically including turnkey lighting, building envelope, HVAC systems, building automation, water conservation, and central plant solutions. This experience, especially with our numerous state and municipal customers, provides TEN with a wealth of understanding of the DGS's goals and expectations toward implementing sustainable, energy conservation upgrades. Further, our collective longevity in the ESCO marketplace leaves us keenly aware of the benefits of clear and concise operations and maintenance manuals along with initial and ongoing training to assist staff with the long-term operation of their facilities.

Chilled Water Plant Specialist

TEN has engaged Hemant Mehta, PE from the WM Group to augment our team in optimizing the operation of Capitol Complex Chilled Water Loop and Plant. Hemant is nationally renowned in this area of expertise. While we have worked with Hemant on successful solutions for Temple University, his specific background with the Capitol Complex will be extremely useful. Hemant completed the 2003 hydraulic study of the chilled water systems that identified the opportunity to optimize system pumping and improve chilled water system temperature differential which led to significant annual savings. Hemant and Chris Hainsworth have identified new opportunities which will yield a similar magnitude of savings today.

Continuity

TEN has the unique opportunity to bring the team experience of multiple projects to benefit the Capitol Complex current undertaking. We are currently implementing the Small GESA #1 project which encompasses thermal solutions at the Main Capitol, East Wing, Judicial Center and Ryan Office Building as well as comprehensive LED lighting upgrades within the Keystone and PJC buildings. The energy modeling, savings and load reductions directly impact the current RFQ ECMs and there is a great opportunity for continuity of design and construction among both projects. Further, most of the same team members who built the previous Capitol Complex GESA project

(excluding L&I and H&W) now reside at TEN which offers an immediate understanding of the requirements of carefully working within this environment. In addition to the chilled water plant, that project included the State Capitol, North Office Building, Irvis Building, Ryan Office Building Finance Building and Forum Building. Being on the National Register of Historic Places, it is both an office complex and a museum of Pennsylvania history and government. The complex is populated with art in plaster, tile, paint and glass. The developed ECM's and implementation plans need to preserve and protected this artwork while allowing for continual operation of the buildings for elected officials, administrative staff and the tens of thousands of visitors. ECM's of the previous project included lighting upgrades, lighting controls, EMS/Thermal solutions, water conservation, motors and VFDs DDC system expansion, central chilled water plant upgrade (replaced 2 – 2500 ton chillers), windows, steam traps and piping insulation.

Other notable projects include the following:

Community College of Allegheny County (CCAC)

The Community College of Allegheny County (CCAC) selected TEN to help the south Campus modernize its facilities while achieving ambitious energy efficiency and sustainability goals.

TEN collaborated with campus leaders and stake holders to develop a comprehensive project plan. Major features included modernization of major HVAC systems on a compressed timeline. Additional measures included LED Lighting retrofits, water conservation upgrades, central plant replacement, including boilers, chillers, pumps and domestic hot water system, and retro-commissioning of the air handling units (AHUs) and Unit Ventilators (UVs)HVAC controls expansion.

Dickinson College is a private, residential liberal arts college in Carlisle, PA. TEN recently completed the first phase of this project which consisted of a $1.8 million-dollar campus LED lighting upgrade project. This initial phase will save the College $206,000 annually. Additionally, TEN successfully secured more than $71,000 in utility rebates.

City of Harrisburg LED Street Lighting Conversion

TEN was selected by the City of Harrisburg over 10 other companies (including a shortlist of Johnson Controls, Siemens, and Honeywell) to convert the City's street lighting system to state-of-the-art LEDs. Now substantially complete except for LED lighting being installed on 2 bridges, the project encompasses well over 6,200 fixtures, and took about 6 months to install and commission the cobra heads and decorative fixtures.

TEN delivered to Harrisburg as part of the project a comprehensive asset inventory audit of the entire street lighting system, loaded onto Harrisburg's GIS system. By the end of this year, all the roadway and street lighting in Pennsylvania's state capital owned by the city, including bridge lighting, will be illuminated with LEDs, including a controls system capable of, at a minimum, dimming fixtures, troubleshooting maintenance, locating each fixture by GPS, and monitoring energy usage from a centralized location.

Temple University

Temple University has launched a multi-phase, three-year energy efficiency project that will modernize their campuses, enhance learning environments and deliver high-impact utility and environmental savings. TEN provides project design, planning, construction and commissioning expertise.

Phase 1 (complete) consists of new control systems that deliver Continuous Automated Commissioning. Energy efficiency measures (lighting, insulation etc.) in 12 building and two parking lots.

Phase 2 (complete) involves upgrades to HVAC systems, sub-metering and optimization software, extension of energy efficiency measures (variable speed drives, lighting, new hot water supplemental heating system) to multiple additional facilities.

Phase 3 (in construction) entails continuing campus-wide energy efficiency and sustainability measures, including major system modernization/upgrades.

Penn State University

TEN was selected to perform a multi-phased five-year design build energy program which began with Beaver Stadium concourse LED lighting upgrade and controls (966 fixtures). Additional projects included Medlar Field, Food Science, Leonard, Thomas Buildings and Abington and Research West Campuses.

Subsequent phases consisted of interior and exterior LED lighting upgrades, controls upgrade, cooling tower VFD upgrade, boiler replacement, RTU unit replacement, controls expansion, domestic hot water upgrade and HVAC replacement.

<u>Management Team</u>

In addition to the TEN's core project team outlined in Section 2.5.1, Project Management Team Overview, TEN's executive team is outlined below. All of TEN's personnel have extensive experience with GESA projects.

Troy Geanopulos, Chief Executive Officer

Mr. Geanopulos is responsible for assisting in TEN's business development efforts and strategy to address client needs and objectives. He has a valuable combination of skills and experience, which enables him to understand and discuss customer contractual needs and requirements, and extensive hands-on experience in recognizing customer project strategic through a vast career in energy efficiency. Mr. Geanopulos has over 20 years of energy related experience and has been employed with TEN for 5.5 years.

Mr. Geanopulos has founded and co-founded several energy efficiency companies over the past 20+ years, including TEN. The foundation for each of these companies has been customer satisfaction, performance, and value. At TEN, Mr. Geanopulos leads the company's strategic direction and the executive management team.

Education

- BA Dickinson College, Carlisle, PA
- Tepper School of Business – Entrepreneurial Leadership Forum
- Member, U.S. Green Building Council
- Member, Green Building Alliance

Rob Campbell, President and Chief Operating Officer

Mr. Campbell will manage the customer's goal development and strategic planning. His primary responsibilities will involve coordination and assignment of resources and project personnel/subcontractors to ensure construction and engineering audit timelines are met. Mr. Campbell has more than 25 years of energy related experience and has been employed with TEN for 5.5 years.

Education

- Master of Business Administration – Carnegie Mellon University
- B.S. in Mechanical Engineering – University of Toronto
- Professional Engineer, Association of Professional Engineers of Ontario

Christopher Niemiec, Vice President, Finance

Mr. Niemiec is accountable for the accounting and financial operations of TEN, including arranging funding for TEN's energy efficiency projects, the production of periodic financial reports, maintenance of TEN's accounting records, manages a comprehensive set of controls and budgets designed to mitigate risk, enhance the accuracy of TEN's reported financial results, and ensures that reported results comply with the accounting principles or international financial reporting standards. Mr. Niemiec has more than 11 years of energy related experience and has been employed with TEN for 4 years.

Education

- Master of Business Administration – Waynesburg University
- B.S. in Accounting – Waynesburg University
- Member, Construction Financial Managers Association.
- Member, Pittsburgh CFO Roundtable

United Steelworker Headquarters LEED Certification

The United Steelworkers (USW) proudly represents 1.2 million members and retirees who work in nearly every industry. The USW works for working families around the world. USW members are community, workplace and government leaders.

The USW pledged to improve the efficiency of their headquarters building as part of their Pittsburgh 2030 District commitment. Working with TEN, the USW achieved a 40% reduction in building energy and water consumption, and earned LEED certification. As you would expect, 40% savings encompassed a full complement of ECMs including deep central retrofits and even included elevator modernization.

LEED certification is an official recognition that a project complies with the requirements prescribed within the LEED rating systems as created and maintained by the U.S. Green Building Council - the LEED certification program is administered by the Green Business Certification Inc. The United Steelworkers Headquarters (USW) in Pittsburgh, PA was officially recognized as LEED Certified in April 2017. TEN aided USW to achieve a score of 44, which grants them the 'Certified' label in the Existing Buildings: Operations and Maintenance program. USW accomplished points in all categories which included; sustainable sites, water efficiency, energy and atmosphere, materials and resources, indoor environmental quality, and innovation in operations.

Financial Ability

TEN has provided their 2016 audited financials at the end of this document.

TEN's bonding program is provided by Great American Insurance Company which is A+ rated by A.M. Best. In the event of an award, TEN has reserved sufficient capacity for this project under its current program. Our current individual project limit is $15 million dollars and our aggregate project limit is $30 million dollars.

	Project Guarantee History	Dollar Amount
1.	United Steelworkers Headquarters	$3,552,748
2.	Community College of Allegheny County	$3,761,442
3.	Eastern Gateway Community College	$1,719,014
4.	Neshannock Township School District	$1,719,000
5.	Washington College	$1,047,000

Offeror's Resource Availability (Capacity)
(Average of the last 3 years gross sales) minus (the average of next 3 years committed backlog).
$13.2 million – $10.1 million = $3.1 million

It should be noted that TEN continues to grow and has added eight (8) qualified personnel in the last year. Further, final completion of the Small GESA #1 will occur about a month prior to anticipated construction kickoff for this project. TEN is confident it has the resources and qualified personnel to successfully deliver this project (GESA 2017-1) for the Commonwealth.

Statement of Readiness and Commitment of Resources
This serves as TEN's statement confirming the persons identified in this RFQ are available and will be committed to the Project for the time period(s) referenced in the above RFQ Project Schedule, and that the Resource Availability reported above will be committed to the Project, as referenced in the RFQ Project Schedule and Work Plan.

Offeror's Notification of Default and Debarment
TEN has never had a contract default or has been debarred since its existence.

Key Subcontractors

TEN has pre-qualified the following design firms and sub-contractors for DGS's consideration on this project. We have worked with WM Group, JCI, Automated Logic, Huckestein Mechanical and Hunt Consulting on numerous other projects.

- WM Group – Chilled Water Plant & Loop Optimization (IGA Design & Construction/Commissioning)
- JCI or Automated Logic – Controls (Construction)
- Huckestein Mechanical – Mechanical (Construction)
- Hunt Consulting – Lighting Installation (Construction)
- Zavorski Masonry Restoration – Building Sealing (Construction)
- Solar Comfort – Window Tinting (Construction)

Name of Subcontractor: WM Group Engineers		
1 (a)	**Experience with GESA Projects Greater than $5 million**	
	Date: 2003 and 2005	Location: Pennsylvania State Capitol Building Complex, Harrisburg, PA
	Owner/Owner Contact: Department of General Services	Project Amount: $825,000
	Description/Completed as Originally Scheduled: Hydraulic study of the chilled water systems serving the Capitol Building Complex was completed in 2003. Main items identified by the study for improvement were optimization of the system pumping and improvement of chilled water system temperature differential. In 2005, construction documents were completed to implement the recommendations from the study. The project reduced the annual energy cost by $320,000 with two years payback.	
1 (b)	**Experience with GESA Projects Greater than $5 million**	
	Date: 2011, 2012, and 2015	Location: Shippensburg University, Shippensburg, Pennsylvania
	Owner/Owner Contact: Shippensburg University, Lance Bryson, Associate Vice President for Facilities	Project Amount: $32 Million
	Description/Completed as Originally Scheduled: WM Group was retained to design a new efficient, reliable, cost-effective central cooling and heating system for the campus. Basis of design study was completed in 2011, followed by the heating cooling design in 2012, and construction in 2015. The project reduced the Energy Utilization index by 32%, electrical consumption by 12% and peak electrical demand by 4%. All this reduction where for the year with an 11% increase in cooling degree days.	
1 (c)	**Experience with GESA Projects Greater than $5 million**	
	Date: June 2013	Location: Purdue University, West Lafayette, Indiana
	Owner/Owner Contact: Purdue University, Dan Schuster, Plant Manager	Project Amount: -
	Description/Completed as Originally Scheduled: A number of different projects were successfully completed at Purdue University. Re-engineering of the Wade Plant Chilled Water System, Side Stream Sand Filter for Chilled Water System, Wade Condenser Water Reset, Design services for Free and Pre Cooling System at the Satellite Plant Chilled Water System, Re-engineering of the Satellite Plant Chilled Water System, Evaluation of the Causes of High Simultaneous Heating and Cooling and Poor CHW Delta T, BIRK Controls Optimization Implementation, Panel Conversions/Upgrades, and Controls and Programming Upgrades for HEAV, ME, MTHW, CARY, WTHR, FORD. The project reduced the annual energy cost by over Three million a year and reduced peak power by over one Mega Watt.	
1 (d)	**Experience with GESA Projects Greater than $5 million**	
	Date: February 2015	Location: Merck, Rahway, New Jersey
	Owner/Owner Contact: Merck and Company, Brenden Lunney, Site Contract Administrator	Project Amount: -
	Description/Completed as Originally Scheduled: A couple of projects were successfully completed at the Merck Rahway site. Engineering Services Related to NJ Clean Energy Fund Application for Installation of a Condensing Turbine, and Engineering Services for cost estimating and sensitivity analysis of steam condensing turbine generator. The project reduced energy cost by five million dollars per year with Three years simple payback.	

2	**Subcontractor's Superintendent's Qualifications (4-person limit)**
(a)	Name: Hemant Mehta, PE (Principal) Project Responsibilities: Project Manager Time with Firm: 17 years Experience with GESA projects: N/A Educational or technical training: Master of Science in Mechanical Engineering Any other information relevant to the evaluation of the individual: WM Group Engineers PC is led by President and Principal Hemant Mehta, PE. An expert in utility master planning, Mehta has vast experience optimizing the performance and improving efficiencies of existing utility plants, often through simple modifications. His recommendations have enabled many facilities to save millions in capital and operating costs. Mehta has managed more than 100 central utility projects throughout the world during his 35-year career. Mr. Mehta has worked on the Pennsylvania State Capitol Building Complex and is familiar with the operation. During the recent site visit he has already identified many opportunities to save energy. Presentations and Publications: "System Optimization: Is fear holding us back?" Hemant Mehta, PE, WM Group Engineers, for District Energy – 1st Quarter 2011. "Band-Aid Solutions' Often Cause More Problems without Overall Systems Review" Hemant Mehta, PE, and Christopher TSO, PE, WM Group Engineers. "Chilled Water Delta T Study" Hemant Mehta, PE, WM Group Engineers. "Consulting in the District Energy Field: Creative Thinking Leads to Novel Solutions" Hemant Mehta, PE, WM Group Engineers. "How to Convert and Optimize Primary/Secondary Pumping Systems to Variable Flow Primary Systems" Hemant Mehta, PE, WM Group Engineers, for 2008 IDEA International District Cooling Conference, Dubai. "Rules of Thumb: How They Change with the Changes in Technology" Hemant Mehta, PE, WM Group Engineers. "The Cost of Using 1970s Era Design Concepts and 'FEAR' in Chilled Water Systems" Hemant Mehta, PE, WM Group Engineers, for 2008 IDEA Campus Conference, Boston. "Yale University District Cooling Systems Capacity & Operations Improvements" Hemant Mehta, PE, WM Group Engineers. "Use of Operational Data for Diagnosing Plant Symptoms and Optimizing Plant Operation at no cost" Hemant Mehta, P. E., WM Group Engineers

Name of Subcontractor: Johnson Controls, Inc.		
1 (a)	**Experience with GESA Projects Greater than $5 million**	
	Date: 2003-2018	Location: Tennessee
	Owner/Owner Contact: State of Tennessee	Project Amount: $25M +
	Description/Completed as Originally Scheduled: Energy initiatives and projects within the following departments over the defined time period: Department of Correction, Environment and Conservation, Mental Health, Children Services, Commerce and Insurance, Agriculture, Labor, Safety, Military, Transportation, Revenue and the Tennessee Bureau of Investigation.	
1 (b)	**Experience with GESA Projects Greater than $5 million**	
	Date: 2016+	Location: Baltimore, Maryland
	Owner/Owner Contact: Baltimore County Public Schools	Project Amount: $45M
	Description/Completed as Originally Scheduled: Upgraded DDC controls throughout district, HVAC equipment, lighting, building envelope.	
1 (c)	**Experience with GESA Projects Greater than $5 million**	
	Date: 2016	Location: Harrisburg, PA
	Owner/Owner Contact: Pennsylvania State Police	Project Amount: $5M+
	Description/Completed as Originally Scheduled: Lighting, controls, electrical.	
1 (d)	**Experience with GESA Projects Greater than $5 million**	
	Date: 2016	Location: Hershey, PA
	Owner/Owner Contact: Penn State Health	Project Amount: $1M+
	Description/Completed as Originally Scheduled: Central Plant chilled water optimization	
2 (a)	**Subcontractor's Superintendent's Qualifications (4-person limit)**	
	Name: Tom Raney Project Responsibilities: Operations Manager Time with Firm: 35 Years Experience with GESA projects: 20+ Educational or technical training: JCI BAS/Equipment, energy, and project management training Any other information relevant to the evaluation of the individual:	
	Name: Matt Lodish Project Responsibilities: Project Team Leader	

	Time with Firm: 13 Years Experience with GESA projects: 5+ Educational or technical training: JCI BAS/Equipment, energy, and project management training Any other information relevant to the evaluation of the individual:
	Statement of Readiness and Commitment of Resources I, Don Marangoni Confirm the person(s) identified in this RFP are available and will be committed to the Project for the time-period(s) referenced in the attached RFP project schedule.
	Subcontractor's Workman's Compensation Experience Modification Rating 2014: 0.46 2015: 0.47 2016: 0.52

Name of Subcontractor: Zavorski Masonry Restoration, Inc.		
1 (a)	**Experience with GESA Projects Greater than $5 million**	
	Date: 12/16	Location: Temple University Main Campus Liacouras Parking Garage
	Owner/Owner Contact: Temple University Rudy King	Project Amount: $95,700
	Description/Completed as Originally Scheduled: Removing existing joint sealant at garage control and expansion joints, installing new backer rod and resealing all joints using a high-grade urethane sealant.	
1 (b)	**Experience with GESA Projects Greater than $5 million**	
	Date: 9/16	Location: Mayer Sulzberger Middle School Philadelphia, PA
	Owner/Owner Contact: School District of Philadelphia GC – United States Roofing Gerard Faia – 610-272-6600	Project Amount: $375,000
	Description/Completed as Originally Scheduled: Mortar joint repointing, joint sealant replacement, waterproofing.	
1 (c)	**Experience with GESA Projects Greater than $5 million**	
	Date: 8/15	Location: 1920 Commons Building University of Pennsylvania
	Owner/Owner Contact: University of Pennsylvania CVM Engineers – 610-989-3800	Project Amount: $59,600
	Description/Completed as Originally Scheduled: Replace joints sealants at metal wall panels. Completed on schedule	
1 (d)	**Experience with GESA Projects Greater than $5 million**	
	Date: Current	Location: Keystone Building – Harrisburg PA
	Owner/Owner Contact: State of Pennsylvania US Roofing – Hans Stitzinger 610-272-6600	Project Amount: $412,100
	Description/Completed as Originally Scheduled: Removing and resetting limestone coping stones. Resealing stone to stone joints and stone to metal flashing joints.	
2 (a)	**Subcontractor's Superintendent's Qualifications (4-person limit)**	
	Name: Tom Bissinger Project Responsibilities: Project Foreman Time with Firm: 4 years Experience with GESA projects:	

	Educational or technical training: Union Mason Any other information relevant to the evaluation of the individual: Currently the foreman on the Keystone Building in Harrisburg. Overseeing daily operation and managing of 5 men. Handles material and equipment purchasing for this project.
	Name: William Roeder Project Responsibilities: Project Foreman Time with Firm: 4 years Experience with GESA projects: Educational or technical training: Union Pointer / Caulker / Cleaner Any other information relevant to the evaluation of the individual: William has managed several of our largest projects in the past 2 years which all have finished on time and within budget.
	Name: John Quatrochi Project Responsibilities: Project Foreman Time with Firm: 5 years Experience with GESA projects: Educational or technical training: Union Pointer/Caulker/ Cleaner Any other information relevant to the evaluation of the individual: John has been a union caulker for over 25 years. He has a vast knowledge of caulking and waterproofing as well as the masonry side of our business.
	Name: Jason Keller Project Responsibilities: Project Foreman Time with Firm: 3 years Experience with GESA projects: Educational or technical training: Union Pointer / Caulker / Cleaner Any other information relevant to the evaluation of the individual: Jason is a well-rounded worker with vast experience in the caulking field. He takes a big interest in keeping our workers up to date on the latest materials and associated tools and equipment.
3 (a)	**Statement of Readiness and Commitment of Resources** I, Jack Zavorski Confirm the person(s) identified in this RFP are available and will be committed to the Project for the time-period(s) referenced in the attached RFP project schedule.
4 (a)	Subcontractor's Workman's Compensation Experience Modification Rating 2014: .939

	2015: .798 2016: .802
5 (a)	Notification of Default or Debarment Provide a listing including: N/A Owner: Project: Date and explanation of any contract default or debarment within the last five years:

Name of Subcontractor: Hunt Consulting		
1 (a)	**Experience with GESA Projects Greater than $5 million**	
	Date: TO BE COMPLETE 12/2017	Location: WASHINGTON DC (4 BLDGS)
	Owner/Owner Contact: AMERESCO – PRIME US GSA - CUSTOMER	Project Amount: 8.77M
	Description/Completed as Originally Scheduled: TURNKEY LIGHTING DESIGN AND INSTALLATION	
1 (b)	**Experience with GESA Projects Greater than $5 million**	
	Date: COMPLETED 2009	Location: HARRISBURG, PA (2 BLDGS)
	Owner/Owner Contact: CLT – PRIME PA DGS - CUSTOMER	Project Amount: 960K
	Description/Completed as Originally Scheduled: LIGHTING INSTALLATION IN PA DGS CAPITOL COMPLEX BUILDINGS	
1 (c)	**Experience with GESA Projects Greater than $5 million**	
	Date: COMPLETED 2013	Location: VARIOUS LOCATIONS, STATE OF MARYLAND
	Owner/Owner Contact: ENERGY SYSTEMS GROUP – PRIME MD STATE HIGHWAY – CUSTOMER	Project Amount: 4.69M
	Description/Completed as Originally Scheduled: TURNKEY LIGHTING DESIGN AND INSTALLATION	
1 (d)	**Experience with GESA Projects Greater than $5 million**	
	Date: COMPLETED 2014	Location: BALTIMORE, MD
	Owner/Owner Contact: CONSTELLATION – PRIME CITY OF BALTIMORE - CUSTOMER	Project Amount: 3.11M
	Description/Completed as Originally Scheduled: TURNKEY LIGHTING DESIGN AND INSTALLATION	
2 (a)	**Subcontractor's Superintendent's Qualifications (4-person limit)**	
	Name: HENRY HUNT, CLEP, CLMC Project Responsibilities: PM, TECHNICAL Time with Firm: 17+ Experience with GESA projects: 17+ YEARS IN ENERGY EFFICIENT LIGHTING UPGRADE PROJECTS Educational or technical training: JOURNEYMAN ELEC, CLEP, CLMC, OSHA	

	Any other information relevant to the evaluation of the individual:
	Name: MARK DAVIS Project Responsibilities: ME / QC Time with Firm: 10+ Experience with GESA projects: 30YEARS MASTER ELECTRICIAN, 15+ YEARS IN ENERGY EFFICIENT LIGHTING UPGRADE PROJECTS Educational or technical training: MASTER ELEC, OSHA 30, PPE TRAINER Any other information relevant to the evaluation of the individual:
	Name: WILLIAM RISINGER Project Responsibilities: SITE SUPERVISOR Time with Firm: 6+ Experience with GESA projects: 6+ YEARS IN ENERGY EFFICIENT LIGHTING UPGRADE PROJECTS Educational or technical training: JOURNEYMAN ELEC, OSHA Any other information relevant to the evaluation of the individual:
3 (a)	**Statement of Readiness and Commitment of Resources** I, Henry Hunt Confirm the person(s) identified in this RFP are available and will be committed to the Project for the time-period(s) referenced in the attached RFP project schedule.
4 (a)	Subcontractor's Workman's Compensation Experience Modification Rating 2014: 1.05 2015: .76 2016: .74
5 (a)	Notification of Default or Debarment N/A Provide a listing including: Owner: Project: Date and explanation of any contract default or debarment within the last five years:

Name of Subcontractor: Automated Logic Contracting Services		
1 (a)	**Experience with GESA Projects Greater than $5 million**	
	Date: 2004	Location: 1871 Old Main Drive Shippensburg, PA. 17257
	Owner/Owner Contact: Shippensburg University / William Lensie	Project Amount: Total project amount (14M) Controls portion (960K)
	Description/Completed as Originally Scheduled: Retrofit exiting pneumatic and outdated DDC HVAC controls to new DDC controls	
1 (b)	**Experience with GESA Projects Greater than $5 million**	
	Date: April 2006	Location: Rachel Carson State Office Building 400 Market Street Harrisburg, PA.170101
	Owner/Owner Contact: PA Department of General Services / Nike Clark	Project Amount: Total Project Cost (8.3M) Control Cost (204K)
	Description/Completed as Originally Scheduled: Retrofit obsolete building control system to the new Web-Based state of the arts control system.	
1 (c)	**Experience with GESA Projects Greater than $5 million**	
	Date: November 2006	Location: East Stroudsburg University 200 Prospect St, East Stroudsburg, PA.18301
	Owner/Owner Contact: East Stroudsburg University / Scott Heinrick	Project Amount: Total Project Cost (9.1M) Controls Cost (645K)
	Description/Completed as Originally Scheduled: Update to new Web-based control system	
1 (d)	**Experience with GESA Projects Greater than $5 million**	
	Date: October 2007	Location: PA State Office Complex Buildings NOB/SOB/Finance/Forum/East Wing
	Owner/Owner Contact: PA Department of General Services Nike Clark	Project Amount: Don't have Total Cost, Controls Cost (577K)
	Description/Completed as Originally Scheduled: Retrofit obsolete building controls to new Web-Based state of the arts control system	
2 (a)	**Subcontractor's Superintendent's Qualifications (4-person limit)**	
	Name: Randy Robertson Project Responsibilities: Project Manager Time with Firm: 10 Years Experience with GESA projects: Yes Educational or technical training: 25 years in HVAC controls business, Project Management training, JCI and ALC programing training. Any other information relevant to the evaluation of the individual:	
	Name: Dave Drake	

	Project Responsibilities: Project Manager Time with Firm: 11 Years Experience with GESA projects: Yes Educational or technical training: 30 years in HVAC controls business, Project Management training, several control system programing trainings. Any other information relevant to the evaluation of the individual:
	Name: Brad Thal Project Responsibilities: Project Manager Time with Firm: 10 Years Experience with GESA projects: Yes Educational or technical training: Associated Degree in Mechanical Engineering Technology, Job Specific; ALC Engineering I/O ALC Graphics Submittal, ALC View Builder and Microsoft Projects Any other information relevant to the evaluation of the individual:
	Name: Norm Hockley Project Responsibilities: Project Manager Time with Firm: 14 Years Experience with GESA projects: Yes Educational or technical training: 20 years in controls business. Attended Penn Tech for Electrical technology, Job Specific; Design programming in John Controls, Delta Controls and Automated Logic. Any other information relevant to the evaluation of the individual:
3 (a)	**Statement of Readiness and Commitment of Resources** I, *Henry Fernandez* Confirm the person(s) identified in this RFP are available and will be committed to the Project for the time-period(s) referenced in the attached RFP project schedule.
4 (a)	Subcontractor's Workman's Compensation Experience Modification Rating 2014: .628 2015: .641 2016: .645
5 (a)	Notification of Default or Debarment Provide a listing including: Owner: Project: Date and explanation of any contract default or debarment within the last five years:

Name of Subcontractor: Huckestein Mechanical Services, Inc.		
1 (a)	**Experience with GESA Projects Greater than $5 million**	
	Date: 2011	Location: Westmoreland County Courthouse Chiller/AHU
	Owner/Owner Contact: Westmoreland County Commissioners Greg McCloskey 724-830-3955 gmcclosk@co.westmoreland.pa.us	Project Amount: $614,945.00
	Description/Completed as Originally Scheduled: As part of a multi-million-dollar energy service (ESCO) project which included windows, lighting, and mechanical energy conservation measures (ECMs), Huckestein Mechanical Services, Inc. was selected by Constellation Energy to perform the mechanical scope of the project. The work—replacing air conditioning equipment during cooling season—was accomplished while the Courthouse continued operations, requiring creative project management of on-site resources, delivery schedules, and inventory storage. Crane lifts to remove old and set new equipment occurred on two separate weekends. Meticulous planning resulted in the building being without cooling for only three days, with virtually no disruption to the occupants.	
1 (b)	**Experience with GESA Projects Greater than $5 million**	
	Date: 2011	Location: Keystone Oaks School District
	Owner/Owner Contact: Schneider Electric Dave Kramer (412) 680-5743 david.kramer@schneider-electric.com	Project Amount: $600,000.00
	Description/Completed as Originally Scheduled: $600,000 service project to repair deteriorating existing equipment to extend its useful life and bring it to a maintainable standard; installed control, isolation, and thermal expansion valves and variable frequency drives to enhance energy efficiencies and allow for future replacement; assisted management in developing a 5-year capital plan to replace equipment in a fiscally manageable timeframe.	
1 (c)	**Experience with GESA Projects Greater than $5 million**	
	Date: 2013	Location: Greater Johnstown School District
	Owner/Owner Contact: Constellation Energy Ron Krhovsky Constellation 24 Summit Park Drive, Suite 103 Pittsburgh, PA.15275 Ronald.krhovsky@constellation.com	Project Amount: $1,070,233.00
	Description/Completed as Originally Scheduled: As a part of a multi-million-dollar energy service (ESCO) project which included roofing, lighting, plumbing, and mechanical energy conservation measures (ECMs), Huckestein Mechanical Services, Inc. was selected by Constellation Energy to perform the mechanical scope of the project. Mechanical ECMs in Huckestein's turnkey scope of work included: • installation of Variable Frequency Drives (VFDs) • premium efficiency supply fan motors • piping modifications • domestic hot water flue replacement • boiler burner modifications	

	• DDC controls • retro-commissioning Huckestein was awarded a follow-on change order which included: • rebuilding classroom unit ventilators, fan coil units, Air Handling Units, secondary hot water pumps, pneumatic air compressors • installing isolation valves, drain controls, back-flow preventers, piping drains • integrating new electronic to pneumatic thermostats and associated controls upgrades with the existing Johnson Controls energy management system	
1	**Experience with GESA Projects Greater than $5 million**	
(d)	Date: 2016	Location: Lawrence County Housing Authority
	Owner/Owner Contact: Gene DiGennaro, Executive Director Lawrence County Housing Authority 724-656-5100	Project Amount: $991,713.43
	Description/Completed as Originally Scheduled: Turnkey replace mechanical systems at (6) six facilities: • Sky View Towers (mechanical - boilers) • Lawrence Manor (mechanical - boilers) • McGrath Manor (mechanical - boilers) • Crescent Place (mechanical - boilers) • Harbor Heights (furnace replacements) • Lincoln Terrace (furnace replacements)	
2	**Subcontractor's Superintendent's Qualifications (4-person limit)**	
(a)	Name: Timothy O'Leary, Projects Superintendent Project Responsibilities: Safety, Field personnel oversight Time with Firm: 2 years Experience with GESA projects: 20 years Educational or technical training: Steamfitters Local 449 Any other information relevant to the evaluation of the individual: An additional is available bur not provided due to page limitations.	
	Name: Timothy Roos Project Responsibilities: Project manager Time with Firm: 3 years Experience with GESA projects: 20 years Educational or technical training: Steamfitters Local 449 Any other information relevant to the evaluation of the individual: An additional is available bur not provided due to page limitations.	
	Name: Fred Heubner	

	Project Responsibilities: Project Foreman Time with Firm: 2 years Experience with GESA projects: 15 years Educational or technical training: Steamfitters Local 449 Any other information relevant to the evaluation of the individual:
	Name: Mark Wolfgang Project Responsibilities: Professional Engineer Time with Firm: 1 year Experience with GESA projects: 10 years Educational or technical training: Professional Engineer Any other information relevant to the evaluation of the individual: An additional is available bur not provided due to page limitations.
3 (a)	**Statement of Readiness and Commitment of Resources** I, Wendy P. Staso Confirm the person(s) identified in this RFP are available and will be committed to the Project for the time-period(s) referenced in the attached RFP project schedule. Signature:
4 (a)	Subcontractor's Workman's Compensation Experience Modification Rating 2014: .819 2015: .745 2016: .721
5 (a)	Notification of Default or Debarment N/A Provide a listing including: Owner: Project: Date and explanation of any contract default or debarment within the last five years:

THE EFFICIENCY NETWORK, INC. AND SUBSIDIARY

AUDITED CONSOLIDATED FINANCIAL STATEMENTS

For the year ended December 31, 2016

SISTERSON
CERTIFIED PUBLIC
ACCOUNTANTS & CONSULTANTS

Sisterson & Co. LLP
310 Grant Street, Suite 2100
Pittsburgh, Pennsylvania
15219-2300

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INDEPENDENT AUDITOR'S REPORT

To the Board of Directors of
The Efficiency Network, Inc.
and Subsidiary

We have audited the accompanying consolidated financial statements of The Efficiency Network, Inc. and Subsidiary (a Delaware corporation), which comprise the consolidated balance sheet as of December 31, 2016, and the related consolidated statements of operations, stockholders' equity, and cash flows for the year then ended, and the related notes to the consolidated financial statements.

Management's Responsibility for the Consolidated Financial Statements

Management is responsible for the preparation and fair presentation of these consolidated financial statements in accordance with accounting principles generally accepted in the United States of America; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of consolidated financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility

Our responsibility is to express an opinion on these consolidated financial statements based on our audit. We conducted our audit in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the consolidated financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risk of material misstatement of the consolidated financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the consolidated financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of The Efficiency Network, Inc. and Subsidiary as of December 31, 2016, and the results of their operations and their cash flows for the year then ended in conformity with accounting principles generally accepted in the United States of America.

Sistrunk + Co. LLP

April 25, 2017

THE EFFICIENCY NETWORK, INC. AND SUBSIDIARY

CONSOLIDATED BALANCE SHEET

December 31, 2016

ASSETS

Current assets	
Cash	$ 1,817,283
Accounts receivable	5,240,596
Prepaid expenses and other current assets	795,907
Costs and estimated earnings in excess of billings (Note 3)	509,202
Total current assets	8,362,988
Property and equipment, net (Note 4)	16,596
Software development costs, net (Note 5)	1,926
Deferred tax asset, net (Note 10)	372,370
	$ 8,753,880

LIABILITIES AND STOCKHOLDERS' EQUITY

Current liabilities	
Accounts payable, including retention payable of $587,358	$ 4,035,529
Current portion of settlement payable (Note 7)	100,000
Accrued expenses	391,104
Billings in excess of costs and estimated earnings (Note 3)	788,855
Total current liabilities	5,315,488
Long-term liabilities	
Settlement payable, net of current portion (Note 7)	250,000
Total liabilities	5,565,488
Stockholders' equity (Notes 8 and 9)	
Series A convertible preferred stock, $0.000001 par value, 2,064,859 shares authorized, 1,893,359 shares issued and outstanding	2
Series B convertible preferred stock, $0.000001 par value, 2,200,000 shares authorized, 2,982,104 shares issued and outstanding	3
Common stock, $0.000001 par value, 8,500,000 shares authorized, 3,305,686 shares issued and outstanding	3
Additional paid-in capital	8,950,780
Accumulated deficit	(5,762,396)
Total stockholders' equity	3,188,392
	$ 8,753,880

The accompanying notes are an integral part of this consolidated financial statement.

THE EFFICIENCY NETWORK, INC. AND SUBSIDIARY

CONSOLIDATED STATEMENT OF OPERATIONS

Year ended December 31, 2016

Revenue	$ 21,143,896
Cost of revenue	17,153,808
Gross profit	3,990,088
Operating expenses	
Employee wages and benefits	2,057,036
Information technology	254,717
Consulting	249,438
Legal and accounting	232,845
Travel	151,569
Advertising and promotion	121,745
Rent	113,486
Office	81,890
Insurance	77,118
Amortization	68,550
Education and seminars	22,758
Depreciation	21,928
Miscellaneous	8,197
Total operating expenses	3,461,277
Income from operations	528,811
Other income (expense)	
Interest income	1,035
Other income	8,127
Interest expense	(1,820)
Total other income (expense)	7,342
Net income before income taxes	536,153
Income taxes (Note 10)	--
Net income	$ 536,153

The accompanying notes are an integral part of this consolidated financial statement.

THE EFFICIENCY NETWORK, INC. AND SUBSIDIARY

CONSOLIDATED STATEMENT OF STOCKHOLDERS' EQUITY

	Series A convertible preferred stock	Series B convertible preferred stock	Common stock	Additional paid-in capital	Accumulated deficit	Total
Balance, January 1, 2016 as previously reported	$ 2	$ 2	$ 3	$ 7,417,596	$ (6,244,510)	$ 1,173,093
Adjustment for overstatement of prepaid expenses due to classification error	--	--	--	--	(54,039)	(54,039)
Balance, January 1, 2016 as restated	2	2	3	7,417,596	(6,298,549)	1,119,054
Issuance of 782,104 shares of Series B convertible preferred stock, net of stock issuance costs of $11,297 (Note 8)	--	1	--	1,488,700	--	1,488,701
Issuance of 66,490 shares of common stock through exercise of stock options (Note 9)	--	--	--	17,287	--	17,287
Stock based compensation (Note 9)	--	--	--	27,197	--	27,197
Net income	--	--	--	--	536,153	536,153
Balance, December 31, 2016	$ 2	$ 3	$ 3	$ 8,950,780	$ (5,762,396)	$ 3,188,392

The accompanying notes are an integral part of this consolidated financial statement.

THE EFFICIENCY NETWORK, INC. AND SUBSIDIARY

CONSOLIDATED STATEMENT OF CASH FLOWS

Year ended December 31, 2016

Cash flows from operating activities	
Net income	$ 536,153
Adjustments to reconcile net income to net cash used in operating activities	
Depreciation and amortization expense	90,478
Stock based compensation expense	27,197
Increase (decrease) in cash from changes in	
Accounts receivable	(2,576,785)
Prepaid expenses and other current assets	(479,900)
Costs and estimated earnings in excess of billings	655,023
Accounts payable	1,123,039
Accrued expenses	205,990
Settlement payable	(100,000)
Billings in excess of costs and estimated earnings	331,158
Net cash used in operating activities	(187,647)
Cash flows from investing activities	
Purchases of property and equipment	(6,336)
Cash flows from financing activities	
Issuance of common stock in connection with exercise of stock options	17,287
Issuance of Series B convertible preferred stock, net of stock issuance costs	1,488,701
Net cash provided by financing activities	1,505,988
Net increase increase in cash	1,312,005
Cash, beginning of the year	505,278
Cash, end of the year	$ 1,817,283

The accompanying notes are an integral part of this consolidated financial statement.

NOTE 1 - NATURE OF BUSINESS

The Efficiency Network, Inc. ("TEN") began operations during 2012 as a next-generation provider of energy and water efficiency projects for existing buildings, primarily performed under fixed-price contracts. TEN is headquartered in Pittsburgh, Pennsylvania. Ten Connected Solutions ("TCS"), TEN's wholly owned subsidiary, was incorporated during 2016 and designs, finances, and implements street lighting solutions and smart cities technology projects.

NOTE 2 - SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Principles of consolidation

The consolidated financial statements include the accounts of TEN and TCS, collectively referred to as the ("Company"). All intercompany transactions and balances have been eliminated in consolidation.

Cash

The Company maintains its cash in bank accounts in amounts which at times exceed Federally insured limits. The Company does not believe it is exposed to any significant credit risk with respect to cash.

Accounts receivable and bad debt expense

The Company, in the normal course of business, extends credit to customers based on various terms. The Company does not require collateral for these trade accounts receivable.

The Company uses the direct write-off method to account for bad debts from trade accounts receivable, which is considered to approximate the allowance method. Bad debts, if any, from uncollectible trade accounts receivable are recognized when a receivable is considered worthless.

Accounts receivable as of December 31, 2016 included approximately $673,000 of retainage.

Property and equipment

Property and equipment are stated at cost. Depreciation is computed using the straight line method over the estimated useful lives of the assets ranging from three to five years.

Maintenance and repairs are expensed as incurred. Expenditures that significantly increase asset value or extend useful lives of property and equipment are capitalized. When an asset is sold or retired, the cost and related accumulated depreciation is eliminated from the accounts and any resulting gain or loss is recognized in income.

NOTE 2 - SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (continued)

Software development costs

The Company capitalizes software development costs in accordance with Financial Accounting Standards Board Accounting Standards Codification ("FASB ASC") 350. FASB ASC 350 provides guidance for the treatment of costs associated with computer software development and defines those costs to be capitalized and those to be expensed. Costs that qualify for capitalization are external direct costs, payroll, and payroll-related costs. Costs related to general and administrative functions do not qualify for capitalization and are expensed as incurred. The Company begins capitalization of program development costs when the project's preliminary project stage is completed and it is probable that the project will be completed.

The Company ends capitalization of software development costs when the project is substantially complete and ready for its intended use, and all substantial testing is completed. Software development costs are generally amortized over a period of three years, which represents the estimated useful life of the software, on a straight line basis.

Stock-based compensation

The Company recognizes compensation expense in an amount equal to the fair value of stock-based payments of all stock option awards. The fair value of each option granted is estimated on the date of grant using the Black-Scholes option-pricing model.

Revenue recognition

The Company recognizes revenue from fixed-price contracts on the percentage-of-completion method. Under the percentage-of-completion method, the relationship of actual costs incurred to total estimated costs of the contracts is applied to total income to be derived from the contracts. Costs include all direct material, subcontract costs, labor costs, and job-related overhead. General and administrative costs are charged to expense as incurred. Provisions for estimated losses on uncompleted contracts, if any, are made in the period in which such losses are determined.

Because of inherent uncertainties in estimating costs, it is at least reasonably possible that estimates used will change in the near term. Changes in job performance, job conditions, or estimated profitability, including those that might arise from final contract settlements, may result in revisions to costs and income. Such changes are recognized in the period in which the revisions are determined.

Advertising

The Company expenses advertising costs as they are incurred.

NOTE 2 - SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (continued)

Income taxes

The Company provides for taxes based on income as reported in the consolidated statement of operations. Deferred tax assets and liabilities are recognized for future tax benefits or consequences attributable to differences between the financial statement carrying amounts of existing assets and liabilities and their respective tax bases. Deferred tax assets and liabilities are measured using enacted tax rates expected to apply to taxable income in the years in which those temporary differences are expected to be recovered or settled. The effect on deferred tax assets and liabilities of a change in tax rates is recognized in income in the period that includes the enactment date. Valuation allowances are established when necessary to reduce deferred tax assets to amounts expected to be realized.

The FASB ASC on Income Taxes clarifies recognition, measurement, presentation, and disclosure relating to uncertain tax positions. The Company evaluates uncertain tax positions for recognition by determining whether evidence indicates it is more likely than not that a position will be sustained if examined by taxing authorities. As of December 31, 2016, the Company is unaware of any uncertain tax positions; however, were such matters to arise, they would be evaluated in accordance with existing accounting principles and accruals and disclosures would be made as required. The Company's tax returns for 2013 and beyond remain subject to examination by the Internal Revenue Service.

Use of estimates

The preparation of consolidated financial statements in conformity with accounting principles generally accepted in the United States of America requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the consolidated financial statements and the reported amounts of revenue and expenses during the reporting period. Actual results could differ from those estimates.

Subsequent events

The Company evaluates events and transactions occurring subsequent to the date of the consolidated financial statements for matters requiring recognition or disclosure in the consolidated financial statements. The accompanying consolidated financial statements consider events through April 25, 2017, the date on which the financial statements were available to be issued.

NOTE 3 - CONTRACTS IN PROGRESS

Costs and recognized earnings on contracts in progress are summarized as follows as of December 31, 2016:

Costs incurred on contracts in progress	$ 20,328,735
Recognized earnings	4,572,192
Costs and estimated earnings on contracts in progress	24,900,927
Less: billings to date	25,180,580
	$ (279,653)
Costs and recognized earnings in excess of billings on uncompleted contracts	$ 509,202
Billings in excess of costs and recognized earnings on uncompleted contracts	(788,855)
	$ (279,653)

As of December 31, 2016, the Company's backlog was approximately $17,880,000.

NOTE 4 - PROPERTY AND EQUIPMENT

Property and equipment consisted of the following as of December 31, 2016:

Business equipment	$ 95,001
Furniture and fixtures	30,621
	125,622
Less: accumulated depreciation	109,026
	$ 16,596

NOTE 5 - SOFTWARE DEVELOPMENT COSTS

Capitalized project development costs consisted of the following as of December 31, 2016:

Software development costs	$ 345,727
Less: accumulated amortization	343,801
	$ 1,926

NOTE 6 - LINE OF CREDIT

TEN has a revolving line of credit agreement with a bank with maximum allowable borrowings of $1,000,000. The line is collateralized by certain assets of the Company as defined in the agreement. Interest is payable at the prime rate, as defined, plus .5%, capped at 4.75%. The line is guaranteed by the founders of the Company. As of December 31, 2016, there were no outstanding borrowings against the line.

NOTE 7 - LITIGATION SETTLEMENT

TEN was named as a defendant in a lawsuit related to a non-compete agreement. The lawsuit was settled during 2015 for total damages of $700,000. As of December 31, 2016, the remaining amount outstanding of $350,000 is payable to the plaintiff in two annual installments of $100,000 and a final annual installment of $150,000. The remaining amount due has been recorded as settlement payable on the Company's consolidated balance sheet.

NOTE 8 - STOCKHOLDERS' EQUITY AND CONVERTIBLE NOTE PAYABLE

During 2016, the Company issued 782,104 of Series B Convertible Preferred Stock ("Series B") at a purchase price of $1.9179 per share in exchange for $1,499,998.

As of December 31, 2016, the Company's equity consisted of Series A convertible preferred stock ("Series A"), Series B, and common stock.

The Series A shares have a par value of $.000001 and the following features:

a. Convertible, at the stockholders' option or a mandatory conversion event, as defined, to the Company's common stock at the then-applicable conversion price (one-to-one as of December 31, 2016), based on the original issue price of $1.0574 ("Series A original issue price") per share.

b. Voting rights equal to the number of shares of common stock into which the Series A shares are convertible.

NOTE 8 - STOCKHOLDERS' EQUITY AND CONVERTIBLE NOTE PAYABLE (continued)

c. Upon liquidation, receive on a pari passu basis with the holders of Series B, in preference to the holders of the common stock, an amount equal to the Series A original issue price per share plus all cumulative dividends.

d. Cumulative dividends at 5% per annum on the Series A original issue price per share. Dividends are payable only upon a liquidation or conversion event, as defined. No dividends had been paid or accrued and dividends in arrears totaled $366,735 ($.1937 per share) as of December 31, 2016.

e. Automatically convert into common stock at the then-applicable conversion rate (1) if holders of a majority of the outstanding shares of Series A shares together consent to such a conversion, or (2) upon the closing of a firm commitment underwritten public offering of the Company's common stock in excess of $30,000,000.

The Series B shares have a par value of $.000001 and the following features:

a. Convertible, at the stockholders' option or a mandatory conversion event, as defined, to the Company's common stock at the then-applicable conversion price (one-to-one as of December 31, 2016), based on the original issue price of $1.9179 ("Series B original issue price") per share.

b. Voting rights equal to the number of shares of common stock into which the Series B shares are convertible.

c. Upon liquidation, receive on a pari passu basis with the holders of Series A, in preference to the holders of the common stock, an amount equal to the Series B original issue price per share plus all cumulative dividends.

d. Cumulative dividends at 5% per annum on the Series B original issue price per share. Dividends are payable only upon a liquidation or conversion event, as defined. No dividends had been paid or accrued and dividends in arrears totaled $501,105 ($.1680 per share) as of December 31, 2016.

e. Automatically convert into common stock at the then-applicable conversion rate (1) if holders of a majority of the outstanding shares of Series B shares together consent to such a conversion, or (2) upon the closing of a firm commitment underwritten public offering of the Company's common stock in excess of $30,000,000.

NOTE 8 - STOCKHOLDERS' EQUITY AND CONVERTIBLE NOTE PAYABLE (continued)

The common shares have a par value of $.000001 and the following features:

a. Upon liquidation, entitled to remaining assets subsequent to payment of all amounts due to preferred stockholders, based on the pro rata share of common shares held.

b. Voting rights equal to the number of common shares held.

c. Dividends, at the discretion of the Company's Board of Directors.

In connection with an issuance of convertible notes payable during 2014, the Company issued to the holder of certain convertible note payable, detachable stock purchase warrants to purchase a total of 171,500 shares of Series A at a purchase price of $.01 per share. A fair value of $179,645 was assigned to these warrants based on an estimate using the Black-Scholes option-pricing model. The warrants expire on March 11, 2024.

NOTE 9 - STOCK INCENTIVE PLAN

In April 2013, the Company's Board of Directors approved the Stock Incentive Plan. The plan is authorized to issue awards, consisting of stock options or restricted stock of up to 1,000,000 common shares. As of December 31, 2016, 1,000,000 shares of the authorized common stock are reserved for awards under the plan. The plan terminates on April 18, 2023. Stock options are subject to vesting and other limitations established by the Board of Directors, provided that the life of the grant be no more than ten years (not more than five years for an incentive stock option issued to an employee who owns more than 10% of the Company). This plan can issue both nonqualified and incentive stock options. Generally, stock options vest over a four-year period. Options under this plan are available to any employee, officer, director, consultant, or advisor of the Company. However, only employees of the Company may receive awards of incentive stock options.

The Board of Directors determines the exercise price of each option. Incentive stock options may not be granted at exercise prices below fair value of the common stock on the date of grant (110% of fair value for employees who own 10% or more of the Company). Nonqualified options are granted at an exercise price as determined by the Company's Board of Directors.

All nonqualified stock options are considered to be incentive stock options for financial reporting purposes.

NOTE 9 - STOCK INCENTIVE PLAN (continued)

Compensation expense was estimated using the Black-Scholes option-pricing model with the following assumptions:

Assumptions	2016
Value of common stock	$1.00 per share
Expected volatility	25.44%
Expected dividends	0%
Expected life	10 years
Risk-free interest rate	.767%

Expected volatility is the measure of change in the market price of common stock over the contractual term of an option. As the Company's stock is not traded on a regular basis, a measurement of volatility is not readily available. Therefore, the expected volatility was estimated based on the average historical volatility from the NASDAQ Clean Green Energy Index, which is believed by management to be the sector that best reflects the volatility of the Company's common stock. The historical period used for the calculation of expected volatility is comparable to the vesting period of the related options. Expected dividends represent expected annual dividends on common stock for the contractual life of the options.

The expected life represents the weighted-average remaining contractual life of the option before the option expires. The risk-free interest rate for the years during the contractual life of the option were the average implied yields at the date of grant from the zero-coupon U.S. Treasury securities with a maturity similar to the vesting period of the related option.

The following table summarizes information about stock options outstanding as of December 31, 2016:

	Options outstanding			Options exercisable	
Exercise price	Number outstanding	Weighted average remaining contractual term	Weighted average exercise price per option	Number exercisable	Weighted average exercise price per option
$ 0.2600	45,000	5.61 years	$ 0.2600	45,000	$ 0.2600
0.2600	15,000	6.40	0.2600	13,422	0.2600
0.4700	130,000	6.72	0.4700	104,965	0.4700
0.4700	20,000	7.69	0.4700	15,107	0.4700
0.4700	239,000	8.24	0.4700	100,915	0.4700
1.0000	5,000	8.74	1.0000	1,460	1.0000
1.0000	202,500	9.25	1.0000	--	1.0000
	656,500	8.02	0.6183	280,869	0.4291

NOTE 9 - STOCK INCENTIVE PLAN (continued)

The following tables summarize information about stock option activity during 2016:

Options	Number of outstanding options	Weighted average exercise price per option	Weighted average grant-date fair value per option
Outstanding as of January 1, 2016	485,000	$ 0.4129	$ 0.1583
Granted	262,500	0.8789	0.2909
Exercised	(66,490)	0.2600	0.1229
Cancelled	(24,510)	0.3885	0.1526
Outstanding as of December 31, 2016	656,500	0.6183	0.2152

Options	Number of nonvested options	Weighted average exercise price per option	Number of vested options	Weighted average exercise price per option
Outstanding as of January 1, 2016	282,019	$ 0.4557	202,981	$ 0.3622
Vested	(151,577)	0.4463	151,577	0.4463
Granted	262,500	0.8789	--	--
Exercised	--	--	(66,490)	0.2600
Cancelled	(17,311)	0.3546	(7,199)	0.4700
Outstanding as of December 31, 2016	375,631	0.7598	280,869	0.4291

Options	Number of nonvested options	Weighted average grant-date fair value per option	Number of vested options	Weighted average grant-date fair value per option
Outstanding as of January 1, 2016	282,019	$ 0.1728	202,981	$ 0.1517
Vested	(151,577)	0.1700	151,577	0.1700
Granted	262,500	0.2909	--	--
Exercised	--	--	(66,490)	0.1229
Cancelled	(17,311)	0.1448	(7,199)	0.1715
Outstanding as of December 31, 2016	375,631	0.2577	280,869	0.1679

NOTE 9 - STOCK INCENTIVE PLAN (continued)

The nonvested and vested options have a weighted average remaining contractual term of 8.67 years and 7.13 years, respectively, as of December 31, 2016. As of December 31, 2016, there was $71,863 of unrecognized compensation costs related to stock options. These costs are expected to be recognized over a weighted average period of approximately four years. The Company recognized $27,197 of compensation costs related to stock options during 2016.

NOTE 10 - INCOME TAXES

The Company's deferred tax asset consisted of following as of December 31, 2016:

Gross deferred tax assets	$	2,352,334
Less: gross deferred tax liabilities		(355)
Net deferred tax asset before valuation allowance		2,351,979
Less: valuation allowance		(1,979,609)
Net deferred tax asset	$	372,370

The deferred tax assets relate primarily to net operating loss ("NOL") carryforwards and federal research and development tax credits. As of December 31, 2016, the Company has NOL carryforwards for federal and state purposes of approximately $5,384,000 that begin to expire in 2033. As of December 31, 2016, the Company also has federal research and development tax credit carryforwards of approximately $20,000 that begin to expire in 2033. The Company has provided a valuation allowance for a portion of its deferred tax assets due to the uncertainty of realizing those benefits in future years. As such, no income tax benefit relative to NOL carryforwards and other timing differences is recorded in the 2016 consolidated statement of operations.

NOTE 11 - CUSTOMER CONCENTRATIONS

The Company had three contracts during 2016 on which the Company recognized $8,664,168, or 41%, of total revenue. The amounts due from these contracts included in accounts receivable as of December 31, 2016 was $1,795,632.

NOTE 12 - COMMITMENTS

The Company leases office space under a non-cancelable lease agreement expiring on December 31, 2016. As of December 31, 2016, future minimum lease payments under this non-cancelable lease are $88,097 during 2017; $105,716 during 2018; and $104,716 during 2018. Rent expense amounted to $113,486 for the year ended December 31, 2016.

NOTE 13 - DEFINED CONTRIBUTION PLAN

The Company sponsors a 401(k) profit sharing plan covering substantially all full-time employees who have attained the age of twenty-one and completed three consecutive months of employment. The plan is a "safe-harbor" plan, under which the Company may elect to contribute a minimum amount of 3% of each employee's compensation, as defined, in order to satisfy safe-harbor rules. The Company made no contributions to the plan for the year ended December 31, 2016.

PRESENTED TO
DEPARTMENT OF GENERAL SERVICES
06/29/2017 – 2:00 PM

PENNSYLVANIA CAPITOL COMPLEX

DAUPHIN COUNTY, PA

PROJECT NO. GESA 2017-1
CONTRACT NO. GESA 2017-1.1

VOLUME II ECM/COST SUBMISSION

TEN Headquarters
1501 Reedsdale St., Ste. 401
Pittsburgh, PA 15233

TEN DC/Baltimore
9025 Maier Rd., Ste. B
Laurel, MD 20723

TEN Philadelphia
40 West Evergreen Ave.
Philadelphia, PA 11918

855.429.1010 | **tensaves.com** | **info@tensaves.com**

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF GENERAL SERVICES
GSBPSAS-147 (2009 Ed.)

Bond No. N/A bid bond

CONSTRUCTION BID BOND

(Please Complete All Blanks)

KNOW ALL MEN BY PRESENTS, that we, The Efficiency Network, Inc. (hereinafter called the "Principal") as Principal and Great American Insurance Company a corporation duly organized under the laws of the State of Ohio and authorized to do business In Pennsylvania (hereinafter called the "Surety") as Surety, are held and firmly bound unto The Department of General Services, Harrisburg, Pennsylvania (hereinafter called the "Obligee"), in the sum of Ten (10%) Percent of the ECM/Cost Submittal Amount for the payment of which sum, well and truly to be made, we, the said Principal, and the said Surety, bind ourselves, our heirs, our administrators, successors, and assigns, jointly and severally firmly by these presents.

Sealed with our seals and dated this 29 day of June A.D.

Two Thousand and Seventeen.

WHEREAS the Principal has submitted a bid upon Contract
No. GESA - 2017-1
For Capitol Complex, Harrisburg, Dauphin County, PA
Guaranteed Energy Savings Project

NOW, THEREFORE, the conditions of these obligations are such that if the Principal shall not withdraw its bid prior to the expiration of the award period after the opening of the bids; and shall comply with all requirements set forth in the "Quote" and the "Instructions to Bidders;" and if the said contract be awarded to the Principal and the Principal shall, within such time as may be specified, enter into the contract in writing, and give bond, with Surety acceptable to the Obligee, covering the faithful performance of the said contract and payment of claims for labor, material, and equipment rental, all of which shall be supplied on the forms as specified by said Obligee; or if the Principal shall fail to do so, pay to the Obligee the lesser of the following amounts: 1) the amount of this bond as herein above set forth, or 2) the difference between the amount specified in the Principal's bid and such larger amount for which the Obligee may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be void; otherwise to remain in full force and effect.

THE EFFICIENCY NETWORK, INC. CORPORATE SEAL DELAWARE 2012

(WITNESS OR ATTEST IF A CORPORATION)

(CORPORATE SEAL)

April Visnick, Witness to Surety

PRINCIPAL
The Efficiency Network, Inc.
By:

SURETY
Great American Insurance Company
By:
Karen Bachy, Attorney-in-Fact

GREAT AMERICAN INSURANCE COMPANY®

Administrative Office: 301 E 4TH STREET • CINCINNATI, OHIO 45202 • 513-369-5000 • FAX 513-723-2740

The number of persons authorized by
this power of attorney is not more than FIVE

No. 0 20052

POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS: That the GREAT AMERICAN INSURANCE COMPANY, a corporation organized and existing under and by virtue of the laws of the State of Ohio, does hereby nominate, constitute and appoint the person or persons named below, each individually if more than one is named, its true and lawful attorney-in-fact, for it and in its name, place and stead to execute on behalf of the said Company, as surety, any and all bonds, undertakings and contracts of suretyship, or other written obligations in the nature thereof; provided that the liability of the said Company on any such bond, undertaking or contract of suretyship executed under this authority shall not exceed the limit stated below.

Name	Address	Limit of Power
ZACHARY L. MENDELSON KAREN BACHY KATHRYN J. FINDLAY MARK F. SUSCO KATHLEEN M. KUREMSKY	ALL OF PITTSBURGH, PENNSYLVANIA	ALL $100,000,000

This Power of Attorney revokes all previous powers issued on behalf of the attorney(s)-in-fact named above.

IN WITNESS WHEREOF the GREAT AMERICAN INSURANCE COMPANY has caused these presents to be signed and attested by its appropriate officers and its corporate seal hereunto affixed this 3RD day of MAY , 2016 .

Attest GREAT AMERICAN INSURANCE COMPANY

Assistant Secretary

Divisional Senior Vice President

DAVID C. KITCHIN (877-377-2405)

STATE OF OHIO, COUNTY OF HAMILTON - ss:

On this 3RD day of MAY , 2016 , before me personally appeared DAVID C. KITCHIN, to me known, being duly sworn, deposes and says that he resides in Cincinnati, Ohio, that he is a Divisional Senior Vice President of the Bond Division of Great American Insurance Company, the Company described in and which executed the above instrument; that he knows the seal of the said Company; that the seal affixed to the said instrument is such corporate seal; that it was so affixed by authority of his office under the By-Laws of said Company, and that he signed his name thereto by like authority.

Susan A. Kohorst
Notary Public, State of Ohio
My Commission Expires 05-18-2020

This Power of Attorney is granted by authority of the following resolutions adopted by the Board of Directors of Great American Insurance Company by unanimous written consent dated June 9, 2008.

RESOLVED: That the Divisional President, the several Divisional Senior Vice Presidents, Divisional Vice Presidents and Divisonal Assistant Vice Presidents, or any one of them, be and hereby is authorized, from time to time, to appoint one or more Attorneys-in-Fact to execute on behalf of the Company, as surety, any and all bonds, undertakings and contracts of suretyship, or other written obligations in the nature thereof; to prescribe their respective duties and the respective limits of their authority; and to revoke any such appointment at any time.

RESOLVED FURTHER: That the Company seal and the signature of any of the aforesaid officers and any Secretary or Assistant Secretary of the Company may be affixed by facsimile to any power of attorney or certificate of either given for the execution of any bond, undertaking, contract of suretyship, or other written obligation in the nature thereof, such signature and seal when so used being hereby adopted by the Company as the original signature of such officer and the original seal of the Company, to be valid and binding upon the Company with the same force and effect as though manually affixed.

CERTIFICATION

I, STEPHEN C. BERAHA, Assistant Secretary of Great American Insurance Company, do hereby certify that the foregoing Power of Attorney and the Resolutions of the Board of Directors of June 9, 2008 have not been revoked and are now in full force and effect.

Signed and sealed this 29 day of June , 2017 .

Assistant Secretary

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Energy Conservation Measures/Cost Submission (2.6)

TEN is pleased to submit the following Energy Conservation Measures (ECMs) for DGS consideration. This proposal was developed under the parameters identified in the RFQ inclusive of bulletins 1-6 received by TEN. The proposed project is self-funding with significant excess positive cash flow through guaranteed savings within 20 years.

Key features of the proposal include:

- Facility Mechanical / Thermal Building System upgrades including:
  - Plate and frame heat exchanger located optimally within the central plant to facilitate winter free cooling and reduce operational run-time and wear on existing chillers which will extend their useful life.
  - Free cooling and condenser water upgrades to variable volume have been planned for installation without the need for a major plant shutdown; if all aspects of the existing system follow convention and are fully operational, it is highly probable the upgrades can be performed without shutting down.
  - Hemant Mehta, PE who analyzed, recommended and tuned the Capitol Complex variable volume pumping system between 2003-2006 is a member of the TEN team and will be directly involved in retro-commissioning the chilled water plant system to improve loop flow control and Delta T management.
  - While Hemant has identified a potential 4 million annual ton hour reduction through retro-commissioning, we have only forecasted a 2 million annual ton hour reduction at this juncture, due to our limited time on site. We have also begun work through the Small GESA #1 project which will yield ~ ½ million annual ton hours. The potential to capture the remaining 1.5 million annual ton hours will be investigated during the IGA and could generate additional positive cash flow to support additional projects.
  - Window film along with LED lighting upgrades will additionally reduce the cooling load within the chilled water loop connected to L&I and free up capacity to better address L&I space temperatures during the peak cooling season.
- Thoughtful, well-designed LED lighting upgrades will generate significant savings and also have the opportunity to upgrade the building appearance if the primarily new luminaires option is chosen.
- The current cash flow generates significant excess saving which could support at least $2.6 million of additional scope. A summary of potential additional ECMs begins on page 25, Additional ECMs for Consideration.

#	Energy Conservation Measure (**All Options**)	Install Cost	Annual Energy Savings - $	Annual kWh Savings	Annual kW Savings	Annual mmBTU Savings	Wtr / Swr Kgal Savings
1a	LED Lighting BASE Upgrade (**North Office Building**)	$ 286,838	$ 11,147	173,492	56	(34)	
1b	LED Lighting BASE Upgrade (**Tunnels**)	$ 13,105	$ 963	13,907	3	-	
1c	LED Lighting BASE Upgrade (**Chilled Water Plant**)	$ 8,339	$ 1,664	24,038	3	-	
1d	LED Lighting BASE Upgrade (**East Wing**)	$ 565,756	$ 37,373	581,647	180	(114)	
1e	LED Lighting BASE Upgrade (**East Wing Parking Garage**	$ 139,326	$ 15,743	227,359	25	-	
1f	LED Lighting BASE Upgrade (**Labor & Industry**)	$ 691,703	$ 42,723	664,912	227	(130)	
1g	LED Lighting BASE Upgrade (**Health & Welfare**)	$ 483,302	$ 31,025	482,862	164	(94)	
2	Central Plant Winter - Free Cooling System	$ 1,766,751	$ 102,857	1,588,547	-	-	(974)
3	Condenser Water Upgrade to Variable Volume (VFD)	$ 399,764	$ 59,694	862,093	610	-	
4	Retro-Commissioning (CHW loop flow control & ΔT Mgmt)	$ 1,028,657	$ 248,291	983,896	4,258	5,744	4,575
4 (add)	Metasys BMS Upgrade (Chilled Water Plant)	$ 380,346	$ -	-	-	-	
5a	Window Film - L&I	$ 92,913	$ 2,739	29,296	-	28	
5b	Window Film - H&W	$ 270,926	$ 7,969	87,387	-	75	
6	Building Sealing (L&I)	$ 214,429	$ 1,864	2,833	5	65	
	Installation Total	$ 6,342,157	$ 564,052	5,722,269	5,529	5,540	3,601

Add Capitalized Construction Interest	$ 237,831
Total Financed Amount	**$ 6,579,988**

Notes:

1. Lighting scope can be expanded to primarily new fixtures for an additional $630,000.

The energy rates used to calculate savings are $0.0692 / kWh and $25.52 / MMBTU for steam and $8.67 / Kgal for water and $5.68 / kgal for sewer charges.

Annual Financial Projections

The cash flow on the next page illustrates that the proposed project will pay for itself within 20 years (after construction) when modeled at a 3% interest rate. The net present value of the excess cash flow over 20 years is $2,578,370 based on a 3% discount rate. The columns in the cash flow represent the following:

A. Annual energy costs without improvements
B. Annual energy costs with improvements
C. Annual energy cost savings (A-B)
D. Payments for financing equipment
E. Payments for monitoring and maintenance services
F. Net annual benefit
G. Cumulative cash flow
H. Net Present Value of cash flow

Note: The payments in column D of the cash flow include the repayment of $237,831 in capitalized interest cost based on a fifteen (15) month construction period.

Additional Project Funding (not factored into the cash flow)

- PPL Act 129 Incentives estimated as $113,087 which will be paid directly to DGS and could be used as an owner controlled contingency fund.
- Annual lighting Material Savings estimated as $55,960 per year
- PJM Permanent Capacity Reduction Payments. (Determined by annual auction price and paid out over four years.)

TEN will prepare the necessary documentation for these additional funding streams and present them to DGS for signature and submission.

Energy Conservation Measure Descriptions

The following pages describe the technical feasibility, suitability, reasonableness, comprehensiveness and acceptability of the proposed ECMs. Quality of the proposed equipment was considered and is one of the key reasons TEN has identified an option to replace all 2x4, 2x2 and 1x4 luminaires with new LED luminaires s. Our unique approach to in-house lighting audits, design and typical material procurement provides TEN (and our customers) numerous advantages including lower material costs, installation labor flexibility and ultimately the opportunity to optimize project designs within available savings.

Investment Grade Audit

A comprehensive Investment Grade Audit (IGA) estimate is located on page 28 of this volume. It describes the scope of the anticipated IGA including all systems identified in this proposal. TEN commits to complete the IGA within the 60 days identified within the RFQ, however we recommend DGS consider extending the duration slightly to allow for more interaction with facility personnel.

Per Section 4.3 of the RFQ, the total energy savings projected in the final scope of work will be at least 95% of the savings projected in the Quote, the actual ECM costs shall be with 10% of the costs listed in the CEA, and the project will be self-funded over the financial term of the project (maximum term of 20 years).

Prior to completing the selection of the ESCO, we also suggest DGS consider engaging JCI to clean and calibrate the existing chilled water system flow meters at a cost of $17,000. This will help discern if additional meter modification is required and possibly provide useful summer load flow data to kick off the IGA.

Project Cash flow

Year	Annual Energy Costs (Before) A	Annual Energy Costs (After) B	Annaul Energy Savings C=(A-B)	Annual Financing Payments D	Annual M&V Payments E	Net Annual Benefit F	Cumulative Cashflow G
1	$ 5,080,957	$ 4,516,905	$ 564,052	$ 437,909	$ 19,750	$ 106,393	$ 106,393
2	$ 5,131,767	$ 4,562,074	$ 569,693	$ 437,909	$ 19,750	$ 112,034	$ 218,427
3	$ 5,183,084	$ 4,607,695	$ 575,389	$ 437,909	$ 19,750	$ 117,730	$ 336,157
4	$ 5,234,915	$ 4,653,772	$ 581,143	$ 437,909	$ -	$ 143,234	$ 479,391
5	$ 5,287,264	$ 4,700,309	$ 586,955	$ 437,909	$ -	$ 149,046	$ 628,437
6	$ 5,340,137	$ 4,747,313	$ 592,824	$ 437,909	$ -	$ 154,915	$ 783,352
7	$ 5,393,538	$ 4,794,786	$ 598,753	$ 437,909	$ -	$ 160,844	$ 944,196
8	$ 5,447,474	$ 4,842,734	$ 604,740	$ 437,909	$ -	$ 166,831	$ 1,111,027
9	$ 5,501,948	$ 4,891,161	$ 610,787	$ 437,909	$ -	$ 172,878	$ 1,283,906
10	$ 5,556,968	$ 4,940,072	$ 616,895	$ 437,909	$ -	$ 178,986	$ 1,462,892
11	$ 5,612,538	$ 4,989,473	$ 623,064	$ 437,909	$ -	$ 185,155	$ 1,648,047
12	$ 5,668,663	$ 5,039,368	$ 629,295	$ 437,909	$ -	$ 191,386	$ 1,839,433
13	$ 5,725,350	$ 5,089,762	$ 635,588	$ 437,909	$ -	$ 197,679	$ 2,037,112
14	$ 5,782,603	$ 5,140,659	$ 641,944	$ 437,909	$ -	$ 204,035	$ 2,241,147
15	$ 5,840,429	$ 5,192,066	$ 648,363	$ 437,909	$ -	$ 210,454	$ 2,451,601
16	$ 5,898,833	$ 5,243,986	$ 654,847	$ 437,909	$ -	$ 216,938	$ 2,668,539
17	$ 5,957,822	$ 5,296,426	$ 661,395	$ 437,909	$ -	$ 223,486	$ 2,892,025
18	$ 6,017,400	$ 5,349,391	$ 668,009	$ 437,909	$ -	$ 230,100	$ 3,122,126
19	$ 6,077,574	$ 5,402,885	$ 674,689	$ 437,909	$ -	$ 236,780	$ 3,358,906
20	$ 6,138,350	$ 5,456,913	$ 681,436	$ 437,909	$ -	$ 243,527	$ 3,602,433

NPV of Cashflow (column F): $2,578,370

Project Monitoring and Maintenance Services

The measurement and verification of the proposed ECMs is anticipated to be conducted according to the M&V plan identified on page 13 of the Technical Submission. Onsite measurements, field work and report generation will be prepared by Nikhil Singh a Certified Measurement and Verification Professional (CMVP) and Certified Energy Manager (CEM) in conjunction with Greg Lok, his supervisor who is also a CMVP and PE. The proposed M&V plan includes IPMVP options A, B, C & D and is more specifically addressed on page 30 of this volume.

It is anticipated that DGS will incorporate the upgraded systems into their preventative maintenance routines which includes maintenance as a means of ensuring availability and maximizing revenues. TEN's project management team will be available to facilitate warranty claims or repair work as necessary. Project training is included in the installation cost of the project.

Baseline Utility Data (per RFP)

The tables following summarize utilities as provided in the request for quote and supplemented with additional information through Bulletins 1-6. This information was then analyzed to aid in identifying areas for energy savings and to ensure we did not over-project savings in any one area of the Complex. The resulting analysis also served as the starting point for bottom-up and top down savings calculations.

PA State Capitol - Harrisburg	Labor & Industry	Health & Welfare	North Office	Capitol East Wing	Central Plant
SF	483,161	315,462	223,946	702,245	26,076
UTILITY EXPENSE - $ / YR					
Electric $/yr	$ 608,352	$ 218,521	$ 210,863	$ 873,630	$1,035,093
Water $/yr	$ 56,522	$ 51,643	$ 20,613	$ 152,034	$ 180,725
Sewer $/yr	$ 15,671	$ 12,459	$ 2,736	$ 59,821	$ 77,530
Steam $/yr	$ 305,189	$ 153,115	$ 390,463	$ 655,977	$ -
total $/yr	$ 985,734	$ 435,738	$ 624,674	$1,741,463	$1,293,349

Details of this analysis and all savings calculations can be found as an attachment to the proposal, placed there to ensure compliance with the page limitations of this section.

PA State Capitol - Harrisburg	Labor & Industry	Health & Welfare	North Office	Capitol East Wing	Central Plant
SF	483,161	315,462	223,946	702,245	26,076
ENERGY - BTU / SF / YR and WATER / SEWER GAL / SF / YR					
Electric Btu/sf/yr	62,044	34,133	46,397	61,302	1,956,019
Water gal/sf/yr	6	7	2	16	697
Sewer gal/sf/yr	6	7	2	16	564
Steam Btu/sf/yr	24,522	20,535	67,690	36,265	-
total Btu/sf/yr	86,565	54,669	114,087	97,567	1,956,019

The table above determines the raw Energy Usage Index (EUI) for steam and electricity, as well as annual gallons / sf for water / sewer. Steam usage for the North Office and Capitol East Wing is allocated in DGS records on a fixed percentage basis, being provided by a single steam service to the Central Plant. The Central Plant steam service provides heat to several additional buildings as well.

Likewise, electricity consumption metered to the central plant is used to generate and distribute cooling via the capitol chilled water loop. Subsequent analysis provided in the addendum includes estimates of the square footage served by central plant a) steam and b) chilled water utilities.

The individual chilled water service interfaces at each building are monitored, but metering has been called into question. Chilled water consumption overall is anticipated to be roughly 15 kBtu / sf, which would be in addition to the Btu/sf figures shown above. The steam and chilled water figures are presently imprecise; we would anticipate a more accurate determination during the next phase of the project after access is gained to submetering for the various services. Nonetheless, the use indices demonstrate the most promising avenues for savings, and suggest that thermal savings at both L&I and H&W may be slim.

The core ECM savings on the following pages are based on this analysis.

Existing Conditions

Existing Lighting Systems

A preliminary lighting walkthrough was conducted by TEN at the Capitol Complex which included the North Office Building, the East Wing and East Parking Garage, Health & Welfare, Labor & Industry, chilled water plant and the tunnels. The primary interior lighting consists of fluorescent lighting technologies including second generation T8 linear lamps and low ballast factor electronic ballasts and High Intensity Discharge (HID) lamps and magnetic transformers. Compact fluorescent medium based screw-in lamps and fluorescent plug-in fluorescent lamps are also prevalent to the facilities interior. Most exit signs sampled were LED or previously retrofitted with LED kits, therefore they will not be considered for upgrade.

Proposed Solution

High Efficiency LED Lighting Upgrade

To maximize the overall electric savings, TEN proposes to optimize the existing lighting systems at the Capitol Complex for interior areas. This will help to achieve a cost effective, long-life and high efficient lighting system.

The project scope includes the following:

The main components regarding each area included in our lighting scope are open floor plan and individual offices, restrooms, mechanical rooms, hallways and stairs, common spaces, and parking garage. Each of the buildings with these specific lighting systems are as follows;

*Proposed **Base** Lighting Solutions (Primarily TLED Retrofit)-*

We have identified the TLED Retrofit as the base lighting solution to optimize cost and savings during the competitive phase of the project. An alternate (highly recommended) option is to replace all 2x4, 2x2 and 1x4 luminaires with new LED luminaires consistent with the Small GESA #1 lighting design which is addressed later in the section.

- In areas where existing linear fluorescent T8 lamps and luminaires are serviceable and in good working order, will be retrofitted with a high efficient 15w linear LED lamp with external driver lighting system*.
- Retrofit 2x2 recessed troffer luminaires which contain U-bend style lamps with a 2 lamp 2x2 reflector panel kit and new 10w linear LED lamps and high efficient external driver*.
- 2x4 luminaires with 3 or 4 lamps will be de-lamped using a 2 lamp 2x4 reflector panel kit and new 15w linear LED lamps and high efficient external driver*.
- The parking garage area has existing 2-lamp T8 luminaires. The existing fluorescent electronic ballast is cold weather rated for lower ambient temperatures. TEN will be retrofit with a high efficient 15w linear LED lamp with external driver lighting system*.
- Supplemental lighting in common area such as corridors and elevator lobby areas consists of recessed downlights, spot type flood lights, and compact fluorescent lighting. These lighting luminaires have a mix of incandescent and fluorescent plug-in lamp technology. TEN proposes to retrofit with new high efficient LED screw-in type lamps for all medium base applications and a recessed retrofit LED kit for quad pin based recessed can applications.

- In areas that have existing T5 linear lamp technology, TEN proposes to retrofit this luminaire type with a high efficient 25-watt LED T5 linear lamp and external driver lighting system.
- Most of the exterior lighting has already been converted to LED except for some wall packs on Labor & Industry which TEN will address during the final design.
- Sample installations will secure staff buy-in and verify building specific design considerations and best practices / lessons learned from the Small GESA #1 project.

Coordination for all site construction activities includes TEN's construction team personnel along with the Capitol Complex facilities personnel. This includes a proposed construction schedule of installation, duration of construction activities, and notifications to occupied tenant spaces where lighting construction will occur. Logistics associated with product deliveries, product material storage, disposal and recycling of existing lighting material will also be coordinated with TEN's construction team personnel and the Capitol Complex facilities personnel.

TLED Retrofit Approaches (Types A, B and C)
* To better understand linear LED lamp retrofits, it is necessary to understand that there are three different types of LED linear tube options that are designated under the Underwriters Laboratories (UL) certification UL 1598.

A) BALLAST COMPATIBLE - INTEGRAL DRIVER: In the Ballast Compatible LED T8, the driver is incorporated into the tube and designed to replace existing fluorescent lamps without removing the existing ballast. The Ballast Compatible LED T8s will only work with certain ballasts.
B) DIRECT WIRE - INTEGRAL DRIVER: The driver is a device that regulates the power to an LED. Think of it as a ballast that is required to operate fluorescent lamps but for LEDs. In the Direct Wire T8, the driver is incorporated into the tube. The fluorescent ballast is removed and line voltage is wired direct to the existing sockets.
C) DIRECT WIRE - SEPARATE DRIVER: The driver is located separately from the LED tube, much like a fluorescent ballast.

A) BALLAST COMPATIBLE - INTEGRAL DRIVER (NOT Recommended)
The ballast compatible "A" has the driver internal to the TLED; this creates more heat which is the main "killer" of LEDs.

Uses a fluorescent ballast to run LEDs but is not as efficient as using a LED driver to run LEDs. Lamp performance is influenced by ballast efficiency and ballast factor will increase or reduce light output.

Best if LED lamp and fluorescent ballast are both new and made by the same manufacture to avoid warranty issues, finger pointing when problems arise, short ballast life (when using old existing), and compatibility issues.

Ballast Factor will change light output and wattage.

Careful of snap back (T8 lamps can be put back in and negate savings).

B) DIRECT WIRE - INTEGRAL DRIVER (NOT Recommended)
The hardwire line voltage "B" has the driver internal to the TLED but creates more heat which is the main "killer" of LEDs.

Internal drivers weigh more and with cheaper all plastic TLEDs they can sag and (in some cases) fall out of the sockets.

Strict safety measures are necessary as installers could be exposed to line voltage while connecting sockets to power wires as well as maintaining failures, as high as 277 volts. It's a common practice to place a finger on the lamp pins while you are trying to install it, and this becomes a risky endeavor with ballast-bypass wiring.

There is a safety concern if these lights are re-lamped with T8 fluorescent lamps, especially if there is 277 volts at the sockets.

May need new sockets if instant-start (shunted) sockets exist (extra material and labor cost). This is best achieved by purchasing a pre-wired socket/wiring kit for each luminaire at an additional cost.

Dimming is currently not available.

You still must get into the luminaire to remove the existing fluorescent ballast and hardwire direct voltage so labor should be close to the same as Type "C" external driver.

Unfortunately, there's no industry-standard wiring schematic for ballast-bypass linear LEDs. Different manufacturers have a variety of approaches that the installer must consider. These could be positive on one side and negative on the other or positive and negative on the same side and other sockets just support the lamp.

NEC code requires color coded wire for line voltage. This means new wiring rather than using red, blue, or yellow existing socket wires. Most contractors are tempted to use the existing wire.

Some utilities have stopped approving this type of retrofit for rebates.

C) DIRECT WIRE – SEPARATE DRIVER (Recommended & Proposed)
The external driver is more efficient; this is a matched set up made to work with each other (higher lm/W).

External driver systems may have a longer warranty period (7 years rather than 5 years).

Driver and lamp run cooler because they are separate.

This system will generally last longer/longer lamp life because of the cooler operation.

The Efficiency Network recommends and has proposed Type C for the Capitol Complex for the reasons listed above.

Quantity Summary of Proposed Lighting Upgrades (Primarily TLED Solution)

Retrofit Type	Quantity
New Interior LED Retrofit Kits	1320
New Exterior LED Luminaires	5
High Efficient Electronic Instant Start LED Drivers	17841
TLED Linear LED Lamps 2', 3', 4' (Includes T8 & T5 LED Lamps)	43634
Screw-in LED Lamps	1213

Baseline Lighting Consumption and Proposed Savings

Building	Total kWh Savings	Total kW Savings	Existing Ltg kWh	Proposed Ltg kWh	Existing Ltg kW	Proposed Ltg kW	Addl. Clg. Sav. kWh	Addl. Clg. Sav. kW
North Office Building	173,492	56	364,289	203,648	124	68	12,851	4.1
Tunnels	13,907	3	31,230	18,353	7	4	1,030	0.2
Chilled Water Plant	24,038	3	46,504	24,246	5	3	1,781	0.2
East Wing	581,647	180	924,286	385,724	298	123	43,085	13.3
East Wing Parking Garage	227,359	25	507,322	296,804	58	34	16,841	1.8
Labor & Industry	664,912	227	1,099,967	484,308	447	196	49,253	16.8
Health & Welfare	482,862	164	798,148	351,054	322	141	35,768	12.2
Total	**2,168,216**	**657**	**3,771,746**	**1,764,138**	**1261**	**570**	**160,609**	**48.6**

Note: Total lighting kW savings have been reduced by a diversity factor depending on pre-hours and applied to interior lighting. Exterior lighting has no kW savings because they are not on during peak demand.

Due to the expedited nature of the initial lighting audit and the time available to complete take offs from the lighting schedules provided by bulletin, we chose to compile the initial lighting audit by luminaire groups, by facility. An abbreviated lighting audit line by line for the primarily TLED retrofit including pre & post luminaire codes, descriptions, wattage, hours and diversity can be found in the attachments. In general, savings are calculated as:

- kWh Savings = (existing luminaire kW * burn hours) – (post luminaire kW * burn hours)
- kW Savings = (existing luminaire kW) – (post luminaire kW), then reduced by a diversity factor to account for the fact that not all luminaires are 100% on at any given time.
- Additional savings are also applied for cooling and heating penalties as well as lighting controls.

Area	Burn Hours
Public Hours	2860
Offices	2000/2500/2860
Mechanical Spaces	1092
Court Rooms / Legislative	2500
Security / Corridor / Elevator Lobbies	8760
Garage	8760
Exterior	4380

*Proposed **Alternate** Lighting Solutions (Primarily New LED Luminaires)-*

In consideration of the project's excess cash flow, we strongly recommend DGS consider a redesign and replacement of 2x4, 2x2 and 1x4 luminaires with new LED panels consistent with the Small GESA #1 lighting design. The estimated additional cost to provide these new luminaires is $630,000.

- New LED luminaires will upgrade the appearance of these buildings and provide additional longevity to the Capitol Complex lighting systems as opposed to retrofitting those luminaires already retrofit in 2009 or installed in 2001.
- Improvements will be consistent with upgrades currently underway at the Keystone and PJC buildings.
- Sample installations will secure staff buy-in and verify building specific design considerations and best practices / lessons learned from the Small GESA #1 project.
- Lighting savings for the new luminaire option won't change dramatically from that already proposed so we have omitted the additional savings table in the interest of brevity.

Quantity Summary of Proposed Lighting Upgrades (Primarily New Luminaire Option)

Retrofit Type	Quantity
New LED Panels 2x4, 2x2, 1x4	12101
New Interior LED Retrofit Kits	1320
New Exterior LED Luminaires	5
High Efficient Electronic Instant Start LED Drivers	5740
TLED Linear LED Lamps 2', 3', 4' (Includes T8 & T5 LED Lamps)	10880
Screw-in LED Lamps	1213

Maintenance Impact

By implementing these retrofits, the Capitol Complex will realize additional savings in the reduction of replacement materials, either through the extended warranties, reduced energy usage of proposed LED luminaires, lamps and drivers, as well as increased operating life of new equipment. PPL Utility rebate incentives will be realized but not guaranteed based on the proposed LED lighting upgrade as per the utility rebate incentive program and current available funds.

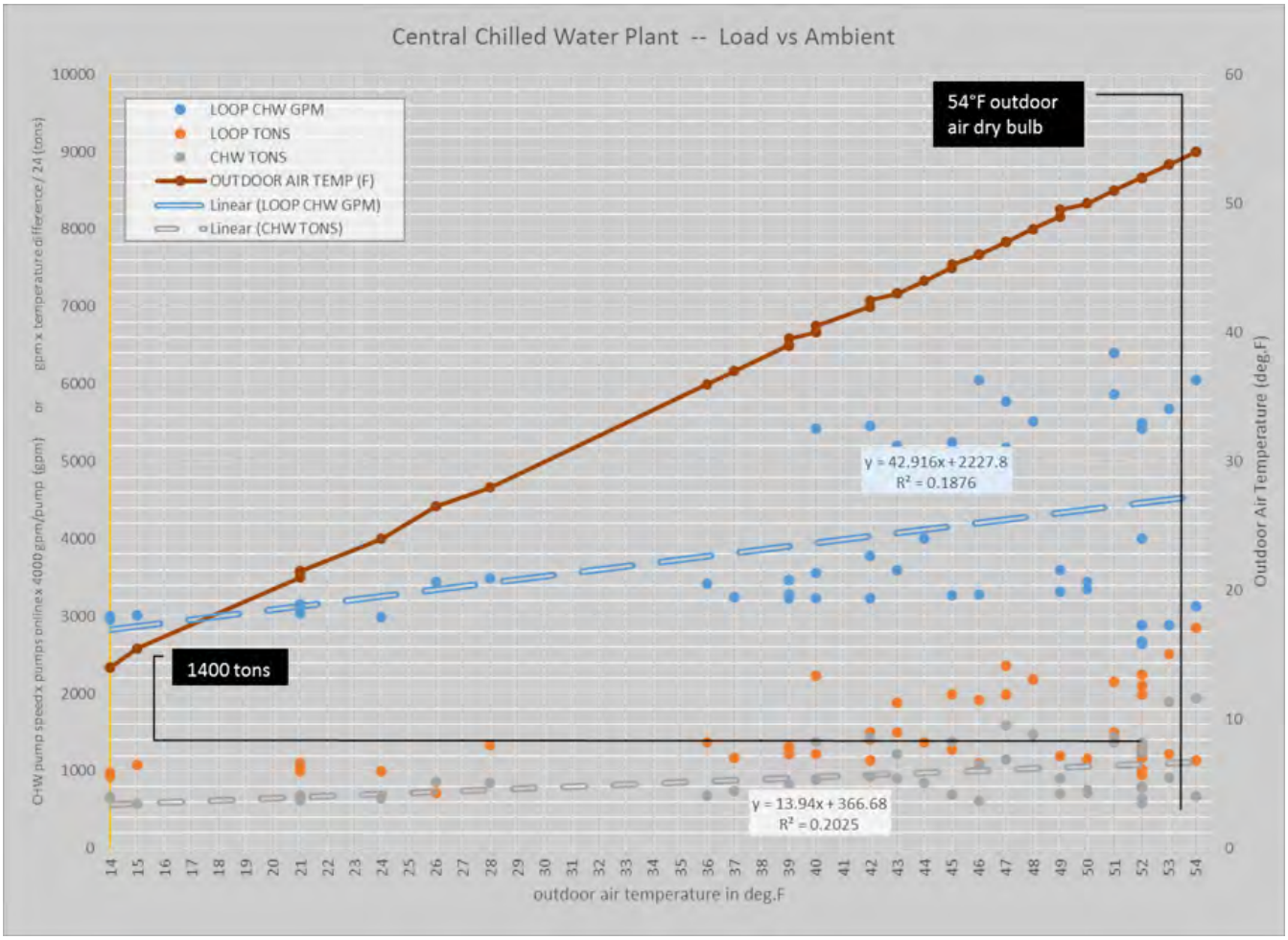
Training

Training will be provided by Shawn Deegan and Adam Trosko and will address warranty procedures as well as maintenance that may be required by DGS. Due to the long life of the product being installed, it may be some time before significant maintenance is required. TEN will deliver to DGS comprehensive operations and maintenance manuals including an electronic video of the training provided.

Measurement and Verification

Lighting upgrade measurement and verification is anticipated to be completed through a pre-and post-measurement of luminaire kW as it relates to a meaningful sampling of typical luminaire types and retrofit locations and their associated burn hour groups.

Existing Conditions
The capitol complex chilled water system load includes systems and equipment for which the cooling requirement is largely fixed or just partly driven by outdoor temperatures.



Plant sequencing data for cold-weather is charted in the above data plot.
Regressions are provided for flow and tonnage.

Since the chilled water plant has no other means than the chillers to remove heat from the loop, circulation by the loop pumps is always accompanied by at least one chiller even in the coldest of weather. Year-round chiller operation is costly in terms of utilities and maintenance. An economizer cycle could satisfy all or most of the plant cooling load as temperatures outside fall to winter levels. The plant's economizer system was removed a decade ago after damage by freezing.

Proposed Solution
TEN proposes to provide a means of removing waste heat from the chilled water system when ambient conditions are conducive.

Our turnkey solution includes all elements of the work for a fully operative free-cooling sub-system. Configured in series with the existing cooling towers and pumps, the new system will increase approach by just 2°F to garner as many hours of free cooling as possible. On the chilled water side, the new equipment will be positioned to pre-cool. As outdoor conditions warm, the pre-cooling sequence expands the utility of the new sub-system while

benefitting from the inertia of the campus loop. Change-over will be automatic, as the BMS sequentially disengages free cooling and, on rising tower water temperature, engages mechanical refrigeration, ensuring necessary changes to isolation valve positions and tower leaving water setpoints.

The project uses multiple exchangers due to limitations on moving large components into the plant. Equipment, piping, fittings, etc. will be rigged through the access side of the tower air inlet by crane. An adequate footprint for positioning and servicing the new apparatus necessitates the erection of a new platform designed to not interfere with routine use of the gantry for maintenance. We will additionally insulate for chilled service new and existing condenser water piping in the free cooling flow path.

Scope:

- Design ECM and furnish submittals for approval;
- Submit for permits;
- Furnish crane, operator, set-up, safety barricades, perform all picks;
- Prep and set new piers for superstructure;
- Furnish, install and paint new grated structural steel platform and railing;
- Modify the existing staircase to accommodate the proposed Structural Steel Platform.
- Furnish and install new steel staunchions to support new chilled and condenser water piping;
- Furnish and install four new Kelvion BYF-150 Vertical Frame plate heat exchangers, including frame designed for service and cleaning, gasketing, plates, and insulating covers designed for removal and re-installation for periodic maintenance;
- Hot tap 16" condenser water piping into existing condenser water mains; provide, support and insulate new piping to- and from-new plate frames
- Hot tap 12" chilled water piping into existing chilled water mains; provide, support and insulate new piping to- and from-new plate frames
- Provide and install and insulate body of a new isolation valve on each tap;
- Provide and install two (2) automatic back-wash strainers, each 12" flanged 150# C.I. bodies with 6" IPS back-wash piping to the new stainless-steel baskets. Core drill foundation wall for positioning below grating as necessary to collect debris (acorns) upstream of tower sump. Include insulation, support, butterfly valves for isolation, fittings, motorized control valve, power, cabling, differential pressure switch and automatic controller in NEMA 4 enclosure.
- Provide and install electric motorized control valves for the free cooling subsystem to be sequenced by the plant control system;
- Provide, cable, install, program and commission new monitoring and control points to sequence the new free cooling subsystem through the plant control system;
- Insulate sections of the existing condenser water loop which will be driven to free-cooling temperatures;
- Insulation to be 2" Fiberglass ASJ w/Zeston Fittings for the installed pipe, valves and fittings;
- Water Balance; Flush and fill installed piping.
- Chemically treat the closed loop system.
- Factory start-up, commission, as-built, training, warranty.

This ECM installs sufficient capacity to accomplish up to 1800 tons of heat transfer.

Maintenance Impact

1. Apparatus for the new system has been designed to remove acorns and other debris from the cold inlet flow. The system back-flushes automatically on rising differential. Passages within the plate heat exchanger are smaller in size than the condenser tube bundles, so filtering for the plate exchangers require a tighter mesh, and back-flush frequency will be greater than that of the existing system. Utility savings projections for this ECM include an estimate of the additional water & sewer charges.

2. Periodic dis-assembly, cleaning, and re-assembly of each plate frame will be required.
3. Free Cooling will reduce run time on the chillers, which represents a quantifiable reduction in contracted maintenance expense. Chiller run time savings also extend the life of the chillers. Chiller run-time savings vastly exceed the labor & gasket expense to periodically clean the new exchangers. Project economics take no credit for this savings.

Training

Training will be provided by Shawn Deegan and Adam Trosko to address warranty procedures. As periodic cleaning is required by the new heat exchangers, and inspection / maintenance by the new strainers, Shawn and Adam will provide the instruction required for both tasks and present the information so as to fully develop the procedures outlined in the manufacturer's training materials. TEN will deliver to DGS comprehensive operations and maintenance manuals including an electronic video of the training provided.

Measurement and Verification

IPMVP Option C provides a comprehensive confirmation of savings achieved for this ECM as part of the greater project proposed for the Complex at large. IPMVP Option B is well suited to quantifying savings from the particular ECM alone, Option B would have to overcome significant challenges to accurately account for the cascade effect of other changes proposed to the Complex.

Existing Conditions
Circulation of the condenser water from the tower sump, through the loop to the chillers and then on to the tower distribution is performed by one or more 200 horsepower (hp) vertical turbine pumps built to move 7,410 gpm while generating a differential of 86 feet. Power consumption by any of the condenser water pumps cannot be altered, regardless of the large swings to the chiller heat rejection load. As our analysis tabulates, heat rejection requirements during the winter are a fraction of the capacity of one chiller.

Proposed Solution
Adjusting flow in the condenser system to better approximate the heat rejection requirement could reduce pumping power expenses. TEN proposes the installation of variable frequency drives (VFDs) and controls for the purpose of reducing pump speed whenever the reduction in pump power will demonstrably exceed any change in chiller power consumption.

The ECM scope has two parts, (A) and (B), due to the difference in voltages and the available operating ranges impacted.

ECM 3 Part A: one (1) 460V VFD installation for existing 460V condenser water pump motor
TEN proposes to convert to variable volume the motor of the lone existing 460V condenser water pump by replacing the soft start with a new VFD.

Open loops such as the plant's tower circuit cannot operate in low or moderate speed ranges due to the system's static head requirement. While dynamic head falls with the square of velocity, water will not reach the high point of the system at low pump speeds. TEN anticipates the loop will not operate satisfactorily below a minimum frequency on the order of 42 to 47 Hz. We propose to use the VFD to adjust motor speed in proportion to heat rejection requirements, from full speed down to the minimum speed threshold.

Savings are projected for operating the VFD-equipped condenser water pump motor at times when only one (1) chiller is on-line.

At this preliminary junction, we do not advocate operation of the VFD-regulated pump at less than 100% speed in combination with any of the constant volume pumps in the same system.

Scope:

- Design ECM and furnish submittals for approval;
- Submit for electrical permit;
- Furnish crane, operator, set-up, safety barricades, perform all picks and remove demolished materials;
- Furnish and install one new 200 H.P. ABB ACH550 480-V 3_PH w/ Soft Start By-pass;
- Remove soft start and wire new VFD in replacement;
- Provide, pull and install all necessary electrical conductor, mechanical protection, electrical specialty;
- Specify, install as necessary automation sensing point for condenser loop feedback;
- Interface new VFD to existing Metasys
- Water balance
- Factory start-up, commission, as-built, training, warranty

ECM 3 Part B: one (1) additional VFD for one (1) existing 4160V condenser water pump motor
Despite the lower amperage, 4160V VFDs are much more expensive than 460V VFDs. There are several approaches to reduce the higher cost of VFD upgrades to 4160-volt equipment. For the strategy TEN proposes, the total price to install a VFD to modulate the speed of one additional condenser water pump will be roughly double that of the 460-volt motor discussed in part (A) of this ECM.

When running in parallel with the VFD proposed for the existing 460V motor, our preliminary estimates suggest this second VFD pump, in parallel to the VFD upgrade described in part (A), can produce savings across nearly the full range of 2-chiller operations. Control for ECM part B will modulate both pumps at the same rate.

Fitting a second condenser water pump with a VFD will provide a back-up for the VFD pump in ECM A.

Scope:

- Design ECM and furnish submittals for approval
- Submittals for electrical permit;
- Furnish Crane, operator, set-up, safety barricades;
- Remove one (1) existing 4160V vertical turbine motor
- Furnish and install one (1) new 200 H.P. ABB ACH550 480-V 3_PH w/ Soft Start By-pass;
- Furnish and install one (1) new TECO Westinghouse VHP2004 200H.P. 1800 RPM 445TP Frame 460/3/60 vertical turbine motor
- Provide one (1) Motor Frame Adapter Plate to adapt the new frame size to the old motor frame
- Provide factory motor representative to accomplish the motor retrofit alignment and balance verification.
- Provide demolition of the existing combination starters to enable the installation of the proposed Pump VFD Application.
- Provide one (1) 300 KVA 4160 x 480-volt transformer for the power supply conversion for the proposed motor replacement.
- Provide 5 kV power wiring, power conduit, 600-amp fused disconnect to enable the installation of the service disconnect which will serve as the means of protection for the proposed 300 KVA Dry Transformer.
- Provide labor, material and subcontracting to install the 460-V 3-PH power wiring from the VFD location on the Mezzanine Level to the Lower Level Pump location.
- Dynamic balance
- Specify, install as necessary automation sensing point for condenser loop feedback;
- Interface new VFD to existing Metasys
- Water balance
- Factory start-up, commission, as-built, training, warranty

At this preliminary junction, we do not advocate operation of the VFD-regulated pumps at less than 100% speed in combination with a constant volume pump in the same system.

Maintenance Impact

1. The new VFDs will require periodic cleaning of the heat sinks, filter replacement (if equipped), and re-torque at each main lug.
2. The VFD inherent soft start algorithm will extend the life of the motors.
3. The State shall have right of first refusal to the 4160-motor displaced by this ECM

Training

Training will be provided by Shawn Deegan and Adam Trosko and will address warranty procedures as well as maintenance that may be required by DGS. Because VFDs have become so prevalent, important aspects of routine maintenance, filters, heat sinks and lug torque, are sometimes neglected; Shawn and Adam will ensure that all necessary maintenance procedures are explained and critical elements highlighted. TEN will deliver to DGS comprehensive operations and maintenance manuals including an electronic video of the training provided.

Measurement and Verification

IPMVP Option C provides a comprehensive confirmation of savings achieved for this ECM as part of the greater project proposed for the Complex at large. IPMVP Option B is well suited to quantifying savings from the particular ECM alone, Option B would have to overcome significant challenges to accurately account for the cascade effect of other changes proposed to the Complex.

Existing Conditions
In collaboration with Hemant Mehta, President of WM Group, TEN has performed a preliminary evaluation of the chilled water plant and distribution. This effort included an initial walk-thru and three 3-hour follow-up site analyses in the plant, evaluation of plant utilities, tabulation more than 7,000 data points from plant operations and service logs, construction of plant power simulations for warm and cold seasonal operations, and review of available documentation of the plant and loop design, renovation, sequencing, structural limitations, operating conditions, historical adaptation and changes.

Overall, the recent variable primary upgrade and the project to replace 2 chillers appear to have improved reliability and produced operational and utility savings.

Allowing for the difference in loading after-hours and on weekends, the records suggest the plant is being sequenced so as to fulfil the competing objectives of 1) satisfying legitimate loads in a 2) cost-effective manner while 3) preserving the long-term viability of the infrastructure.

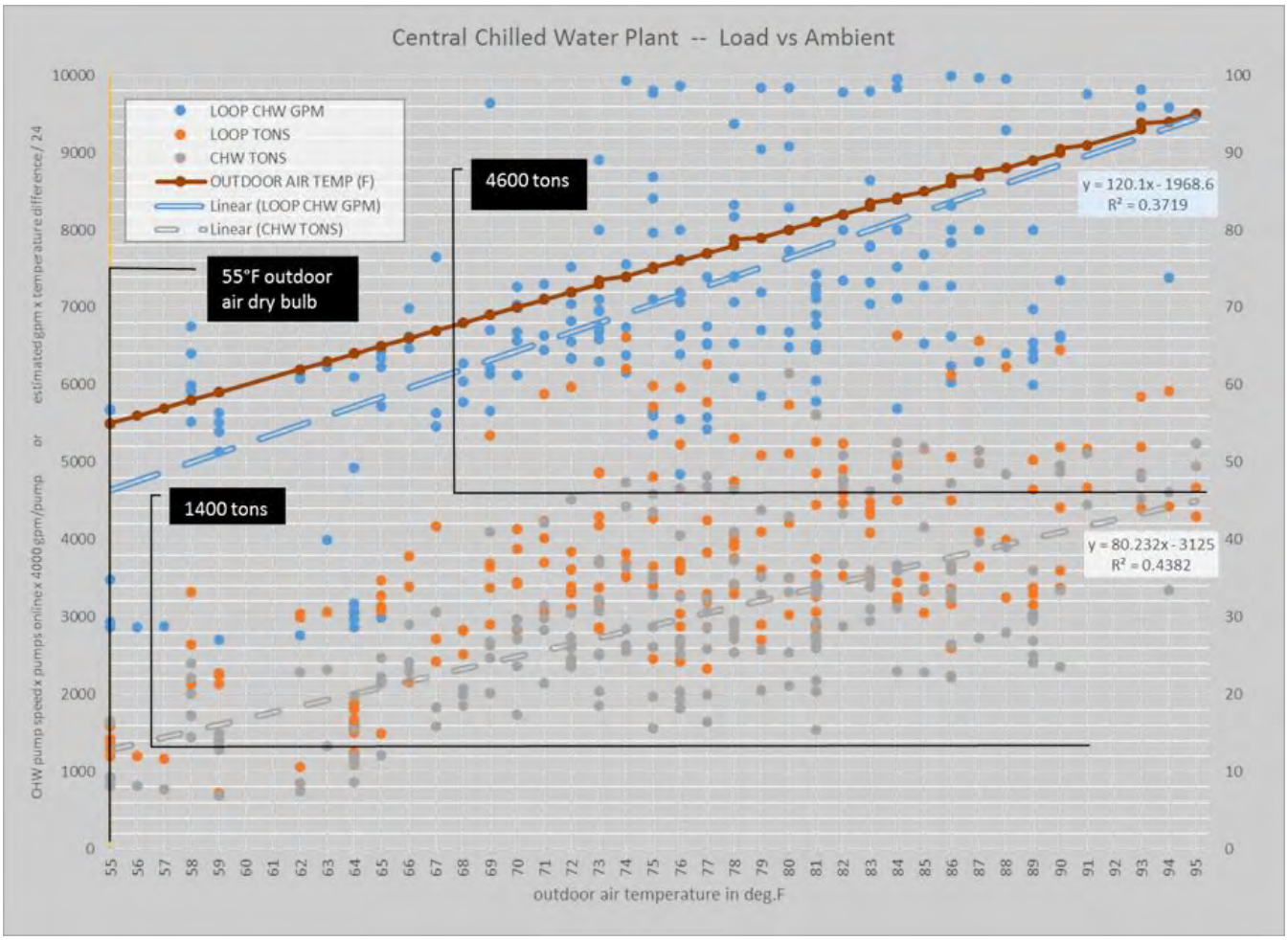
Our initial analysis also finds room for improvement on several fronts. Much of the problem stems from technologically outdated configurations or the need to acquire the tools necessary for optimal system management.

Proposed Solution
Several ECMs identified previously demonstrate viable returns for investment into equipment upgrades. TEN further proposes investment into retro-commissioning and controls, along with the potential for repairs and so forth, both at the plant level and to the capitol building systems.

Beyond a shortfall in peak cooling at the Labor and Industry building (discussed subsequently with "ECMs Requiring Further Investigation"), the two most pressing components of unnecessary expense pertain to a) load to the campus loop; and b) flow in the campus loop. Sequencing which impacts campus load and flow raises power, cooling, and steam expenses in the buildings themselves and further impacts utilities at the central plant. TEN envisions four major retro-commissioning tasks:

1) Central plant – sequence changes to reduce power consumption; possible metering improvements
2) Building interfaces – confirm / ensure interface controls, metering and monitoring are performing according to intent
3) Building interfaces – analysis of flow and temperature data vs building size to determine which buildings are the sources of excessive flow or loading
4) Building systems – analysis of building systems to identify necessary upgrades including control valves, sequence changes and related BMS or other upgrades.

On a preliminary basis, TEN proposes a retro-commissioning team composed of Hemant Mehta, principal of WM Group, along with WM Group auditors; TEN development engineers, designers and auditors, interfacing with representatives of Johnson Controls, Inc., Automated Logic Corp., and various metering and BMS suppliers.



Plant sequencing data for warm-weather is charted in the above data plot.
Regressions are provided for flow and tonnage.

Metering deficiencies were noted by the State in regard to the chilled water plant and loop. TEN firmly believes that accurate metering is required to fully optimize the operation, since reliable feedback on building loads is a necessary tool to on-going load management.

We propose a scope which presently includes a sum of $½ million in anticipated out-of-pocket expense for upgrades presently undefined. Experience has demonstrated that resolving excessive cooling loads and chilled water flows, along with attending high rates of heat (steam) consumption, often require repairs, changes to sequencing, additional points, control or meter replacement. Sometimes re-configuration of branch services or the installation of small task systems is found necessary. TEN has estimated savings for coincident conditions evident in the sequencing of the plant and the serviced loads. WM Group has also preliminarily inspected the operation; based on experience, WM Group anticipates savings levels could easily exceed the TEN estimates. An increase in capitalized savings represents additional upgrades which may be performed at this time.

At this preliminary juncture, our scope includes the installation of a Chilled Water System Optimizer by Automated Logic. This system will monitor the power consumption of the chillers and major plant auxiliaries in real time. In conjunction with additional power monitoring points for meters on driving loads, the optimizer will determine when and to what extent resets and related control strategies can deliver a reduction in utility expenses. Meters to be interfaced as driving loads shall be determined during the IGA, although we preliminarily envision feedback from the Main Capitol and East Wing, Irvis and Labor & Industry as most critical to an effective and

practicable long term plan. Interface to the additional building feedback points would be installed from the $½ million out-of-pocket retro-commissioning budget.

It is important to recognize that the retro-commissioning effort will trace problems from the chilled water plant to the buildings and systems which are producing wasteful conditions – which potentially may exist in any or all of the capitol complex buildings or zones served by the central chilled water loop. As a consequence, the slate of buildings addressed under the retro-commissioning scope could be substantially larger than the several identified in the RFQ. Issues with simultaneous heating and cooling, 3-way valve configurations, bypasses, envelope issues, task cooling loads, and pressurization problems (such as in the Main Capitol and Labor & Industry buildings) all may impact cooling load and drive flow and expenses higher than would be the case in a fully commissioned system.

TEN's analysis of potential savings first adjusts the utility baseline to account for the small GESA project the State awarded TEN in 2015 and which is now under construction.

Maintenance Impact
TEN's proposed retro-commissioning project will reduce run time on the chillers, translating to reduced wear and tear, a savings in maintenance requirements, and possibly reduced service intervals. Materials and repairs should be affected. The cost of chemical treatment needed by the tower water system may also be affected. The overall impact of these changes represents a quantifiable reduction in contracted maintenance expense but has not been included in the project economics at this time.

Training
Training will be provided by Shawn Deegan, Adam Trosko, Chris Hainsworth and Hemant Mehta in tandem with representatives from the control system manufacturer and will address interface procedures, general interrogation, temporary and permanent adjustments, and so forth. Training will also cover system components that differ from the configurations now in place throughout the complex. Warranty procedures will also be addressed. TEN will deliver to DGS comprehensive operations and maintenance manuals including an electronic video of the training provided.

Measurement and Verification
IPMVP Option C provides a comprehensive confirmation of savings achieved for this ECM as part of the greater project proposed for the Complex at large. Finite savings determinations may be found possible for a subset of measures after specifics of the load reductions are confirmed in the IGA.

ECM 4 Adder: Chilled Water Plant – Metasys BMS Upgrade

Existing Condition
The plant control system needs thorough retro-commissioning as provided by the base ECM. The State may desire the improved versatility of a new control system. Some economies may be realized by performing the two projects together.

Proposed Solution
This adder has been identified for DGS consideration. Upgrading the control system for the plant provides state of the art algorithms to monitor, alarm, sequence and optimize plant operations. This scope does not include replacement of failed end devices; problems of that nature pertain specifically to the repair fund identified in the base ECM.

Furnish and install upgrade of existing Metasys network controllers to accommodate the new sequencing for the plant.

1. Provide programming and logic verification for the following:
    - Define all hardware objects, software objects, control objects, trends, totalizations, and schedules that were existing in the NCM.
    - Convert GPL/JCBasic to LCT/SCT.
    - Define user view to mimic the PMI Network Map.
2. Perform the following conversions on NCM-7 and NCM-20 and NCM-29. Arrange the point list to provide chiller operation through (1) main controller to avoid disruption of the entire plant when doing maintenance on a single controller.

    - Chiller 1 NCE.
    - Chiller 2 NCE.
    - Chiller 3 NCE.
    - Chiller 4 NCE.
    - Chilled Water System NCE.
    - Condenser Water System NCE.
    - Cooling Tower NCE.
    - Bearing Cooling System NCE.
    - Three (3) Additional DX replacements with NCE controllers.
3. Demo and remove panels no longer in use; pull wiring out of panel, terminate, and tag junction box as out of use.
4. source BACnet MSTP from the main control panel to each chiller for BACnet integration.
5. Validate system points.
6. Provide revised and new engineered control drawings.
7. Review engineering and programming sequence with Controls Supervisor prior to implementation.
8. Provide training of new system, including overview of engineered drawings and programming.

This proposal assumes the State will furnish and install Ethernet (CAT5) cable/network and IP address for any NCE where not presently existing. The system has 11 NCE panels. Eleven (11) IP addresses are required. Remaining Controllers to be FEC's and IOM's. We assume any necessary switches, routers, etc. required for the network will be furnished and installed by the State. If desired by the State, TEN can provide an adder to furnish and install CAT5 as required.

No savings are specifically associated with this adder.

Maintenance Impact
This ECM should enhance the routine operation of the plant and reduce the diagnostic effort associated with older control systems which have been adapted and changed over time.

Training
Training will be provided by Shawn Deegan and Adam Trosko in tandem with representatives from Johnson Controls and will address interface procedures, general interrogation, temporary and permanent adjustments, and so forth. Training will also cover system components that differ from the configurations now in place throughout the complex. Warranty procedures will also be addressed. TEN will deliver to DGS comprehensive operations and maintenance manuals including an electronic video of the training provided.

Measurement and Verification
No savings, and thus no M&V, are anticipated for this adder.

Existing Condition
The windows of the Labor and Industry Building and the Health and Welfare Building were replaced less than a decade ago with new aluminum double pane windows with a 1" air space and a low-E pyrolytic coating. The windows are in good condition and provide good thermal performance, but the low-E coating is not sufficient to prevent excessive and uncomfortable levels of solar gain under sunny days.

The rate of gain in both buildings is problematic, but more severe in Labor and Industry, due to deficient capacity in the chilled water system during peak periods.

Proposed Solution
TEN proposes to apply passive solar control film to the inside panes of windows receiving significant summer gain.

The broad faces of the Labor and Industry Building and the Health and Welfare Building are prominent city landmarks. While enhancing the thermal properties of the windows has a positive impact on utility expenses and comfort within the building, we anticipate final aesthetics of these larger facades will be a major determination of the success of the retrofit.

With aesthetics in mind, our initial selection is geared to avoid the deep silver / highly reflective exterior appearance. TEN's preliminary selection also preserves much of the coated window's evening visual performance, particularly from the interior, as ambient illumination levels decrease. Optivision 25 from the Sungard Architectural series appears to satisfy the criteria we believe will be most critical to the acceptance and long-term performance of the project.

1) No degradation to the lifespan of the windows. Optivision 25 has a Solar Absorption percentage of 44% making it safe for installation on annealed glass. An absorption rate of 50% is considered the maximum threshold for non-tempered installations, due to the potential for thermal stress fracture. A rate of 44% vastly reduces any potential for thermal stress, particularly in non-tempered or annealed glass. (A number of tempered panes were noted during the site analyses.) Any absorption percentage below 50%, in this case, 44%, is considered safe for installation.
2) Improvement / no degradation to external appearance. The Exterior Reflectivity (ER) percentage of Optivision 25 is low for this film category. This lower ER will be slightly less aggressive in regard to solar rejection but is tailored to a film which performs well without a deeply mirrored finish.
3) Minimal interior reflectivity. Optivision 25's interior reflectivity is among the lowest in category for DR class "Night Neutral" films. At just 14% Interior Reflectivity, views from inside both buildings will be enjoyable throughout the day and into the evening hours.
4) Reduction in cooling load at a reasonable price. Optivision 25, relative to more expensive name brands such as 3M's "Night Neutral" Series, yields comparable performance. Optivision 25 delivers similar long-term utility objectives but with substantially less upfront investment.
5) UV Rejection. In addition to the above, Optivision 25 will also reject upward of 99% of the UV rays entering the space. This will protect furniture, floors, artwork, computers, equipment and personnel from the damaging effects of over exposure. Less UV translates to longer lifespan, less fading of floors, carpets, furniture and personal effects; not neglecting of course protection and greater comfort for the occupants who sit in direct sunlight.

Optivision 25 is one of a small group of "best fit" films that can save money in the long run while immediate, pronounced benefits will be evident in improved comfort for occupants and a reduction in peak cooling load in both buildings. The installation would be minimally intrusive, would not require massive equipment movements, could be completed at any hour and in a relatively short timeframe.

- Schedule the work to proceed in such a manner as to minimize disruption to occupants;
- Provide a formal request for occupants to remove personal belongings from the immediate area of the work;
- Move small and wheeled items which would limit access and replace after the installation is complete
- For windows at grade on which a film is presently in place, remove and dispose of the existing film before the installation of new materials.

TEN assumes the State will move any State furnishings or equipment found to be too large, weighty, complex, or delicate, or of a volume or quantity beyond that which can be accomplished routinely by our crew.

ECM A: Health and Welfare Building
This ECM installs film on the room face of the interior panes of 10,590 square feet of windows on the following faces:

- East-North-East
- South-South-East
- West-South-West

The film ECM specifically excludes all (8,516 square feet) windows on the North-North-West face of the Health & Welfare building.

ECM B: Window Film – Labor and Industry Building
This ECM installs film on the room face of the interior panes of 30,879 square feet of windows on the following faces:

- East-North-East
- South-South-East
- West-South-West

The film ECM specifically excludes all (24,786 square feet) windows on the North-North-West face of the Labor & Industry building.

Maintenance Impact
The film will be adhered to the interior glass, so exterior cleaning is not affected by this upgrade. Cleaning to the interior face should be restricted to non-abrasive cleaners and those which do not contain caustic chemicals. A full description is appended to this proposal and training, with all supporting materials, will be provided.

Training
Training will be provided by Shawn Deegan and Adam Trosko and will address warranty procedures as well as specifics of the cleaning procedure noted above. As the film proposed is similar to those already in use in some State buildings, maintenance with regard to damaged or partially removed sections will also be reviewed. TEN will deliver to DGS comprehensive operations and maintenance manuals including an electronic video of the training provided.

Measurement and Verification
Utility savings from this ECM are relatively small, and typically would be proven via IPMVP Option A or Option D. Undertaken as part of the larger Capitol effort, IPMVP Option C provides a comprehensive confirmation of savings achieved for this ECM.

ECM 6 Envelope Caulking – Labor and Industry Building

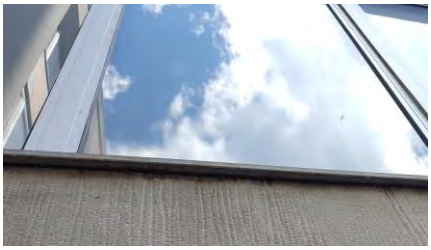
Infiltration rates were at one time a particular problem in the Labor and Industry building. Some years ago, the high infiltration rate caused a coil to freeze and burst in frigid weather.

The problem was found to arise from the crack between the rough opening of the windows and the sill. After the coil incident, the state undertook a program to insert fiberglass batting below the sills throughout the building. The work was undertaken indoors, so much as was accessible via the opening into the wall space through the terminal unit enclosure.

Most exterior joints have not been re-caulked and lengths of crack may remain open to draft in some areas, due either to insufficient original caulking or possibly deterioration. Most joints which could be inspected from grade through the use of tele-photo imaging equipment appear to be sound. In general, the joints we inspected were in fair condition, the caulk still adhering to both sides of the crack and resilient in appearance.

This ECM will replace the caulk in horizontal crack below the sills on each floor of the North and South faces of the Labor and Industry Building.

- provide, erect, secure and maintain sidewalk canopy protection at the entrances for pedestrian protection.
- provide, erect, secure and maintain swing stage scaffolds to access all work areas.
- Remove any existing joint sealant materials at the joints between the metal window sills and the stone wall panels.
- Solvent wipe all surfaces to remove any standing dust and debris.
- Install closed cell backer rod and or bond breaker tape to back side of joints to prevent 3 side adhesion.
- Re-seal these joints using a high-grade silicone joint sealant material.
- Joint sealant color to be selected by the State from the manufacturer's standard color chart.
- Tool joints smooth with a slight concave finish.
- Clean up all debris on a daily basis.



Maintenance Impact
The lines caulked will seal against wind, snow and rain infiltration. Maintenance effort should be eased somewhat when servicing HVAC components in the perimeter terminal units, since rust and corrosion should not continue to worsen under the influence of weather and condensation as was the case previously in the area open to the outdoors.

Training
Training will be provided by Shawn Deegan and Adam Trosko and will address warranty procedures as well as the nature of the sealant and compatibilities. Due to the long life of the product being installed, no significant maintenance is anticipated. TEN will deliver to DGS comprehensive operations and maintenance manuals including an electronic video of the training provided.

Measurement and Verification
Utility savings from this ECM are relatively small, and typically would not be cost-effective to measure or verify. Undertaken as part of the larger Capitol effort, IPMVP Option C provides a comprehensive confirmation of savings achieved for this ECM.

Several ECMs pose operational or utility benefit which may be of significant value though not delivering a satisfactory return based purely upon measured utilities, or for which sufficient data is not available in the span of this initial response. TEN has completed an initial evaluation of these ECMs and could incorporate them in the final project after further investigation during the IGA. The currently proposed project generates excess cashflow that could support $2.6 million of additional scope without the need for additional savings. Additional savings could expand the project even further.

Lighting Sensors, including Occupancy and Daylight Harvesting Technologies
The increased efficiency achieved by the LED conversions consumes much of the savings that would ottherwise be available to offset the installation cost of additional occupancy and daylight harvesting sensors within these buildings. As such this ECM would extend the overall lighting payback. For this reason, we have not proposed the core energy conservation measures at this time. TEN would be pleased consider this potential ECM further during the IGA.

Replace Chiller
Replacing the oldest of the three York chillers with a new 2500-ton chiller would improve reliability. Very high efficiencies can be obtained for a premium, and in the case of the Capitol plant the higher efficiency could garner a quantifiable reduction in kW per ton under all operating conditions.

Although the York in question is probably on-line less than 700 hours annually, the best return for the replacement occurs when operating the newest chiller as the lead – first on and last off – whenever mechanical cooling is required. However, the preceding free cooling ECM reduces chiller run time in cold weather, so savings for this measure will be substantially less than would be the case under the present operation. Moreover, peak load is likely reduced during the most extreme weather, possibly to no more than two chillers in many cases.

Regarding the investment, the monumental expense associated with finding floor space, performing work in the congested environment, moving equipment of this size through the roof opening installed in 2009, and the sheer cost of a 2500-ton chiller are expected to push the return for this individual ECM beyond the financed threshold for this project. This ECM may be nonetheless attractive for a broad variety of reasons and can be evaluated by TEN in the IGA if the State desires.

Circuit Controllers - Wireless
Recent innovations have brought wireless controllers into the realm of widespread commercial application, with modules now available for split phase applications and amperage ratings sufficient to switch line voltage for larger plug loads. Software enhancements now permit settings and schedules to be adjusted for groups of modules rather than individual units, making campus-wide deployment manageable over an extended term.

These controllers do not presently have a track record suggesting useful life beyond several years.

Applications which would seem prime targets for pilot deployment include the window-mounted AC units in Finance and Forum.

Labor & Industry Building – Cooling Capacity Shortfall
L&I is at the end of the Finance/Judicial/L&I loop. Flow to L&I is about 1200 gpm when cooling load to the capitol complex is not high. As temperature outdoors rises, load in the buildings upstream increases and flow to L&I drops. Anecdotal data suggests peak summer conditions may see L&I flows drop to a range of 800-900 gpm. During very warm weather, the shortfall in flow is said to cause hot side (building side) leaving temperatures to rise into the mid-50s, with an attending loss of comfort conditions and inertia throughout the main building.

If this information is correct, additional exchange capacity is not the answer unless the L&I plate frame is unduly restrictive.

The 2003 study mentioned an option being considered at that time:

> 5. Creating a new loop in the distribution system connecting the 14"mains near the Keystone building with the 10"mains between the Justice building and the Labor & Industry building only provides additional flexibility in the system and does not provide any significant benefit in pumping energy savings.

Generally, demand-side improvements provide a return on investment; supply-side changes often increase consumption. Both conditions appear to hold true regarding supply and demand strategies in this instance. Short term remedies may include the following:

1) sequentially shed system loads in L&I, Finance & Judicial as L&I secondary CHWS falls short of setpoint;
2) increase main loop CHWP pressure setpoint only when deemed absolutely necessary

Long term solutions are likely a combination of the following:

1) Move forward with retro-commissioning projects throughout the capitol in general and in the Finance / Judicial / Labor & Industry buildings specifically. Retro-commission and re-balance all errant air handling equipment served by this particular branch of the central CHW loop;
2) Apply solar control film to the south- and west-oriented faces of the Labor & Industry and Health & Welfare building windows;
3) Assuming chiller and pump capacity are sufficient and more capacity is still required, extend the Keystone loop to feed L&I as discussed in the 2003 evaluation.

If desired by the State and a sufficiency of excess capitalized savings exists, TEN can evaluate and design the solution to supplement cooling to the Labor and Industry building. We envision the best solution as one which first resolves other problems within the system now manifested as the shortfall in cooling at L&I. L&I systems and equipment, and possible upgrades, would also be evaluated with the objective to develop the solution with the lowest life cycle cost. Localized cooling of various types may also be considered, along with competing alternates to pipe additional capacity and reduce load.

Cooling Tower Evaporation Credit

Sewage records for the central plant do not track directly with water consumption. The ratio of sewage to water use is highest in summer months, and lowest in winter. For towers of this age, a year's worth of water consumption at the plant – roughly 18,000 kgal – is less than would be expected for the combination of evaporation, drift, and blow-down, even at higher cycles of concentration. The difference between water and sewage bills amounts to an average of just 3500 kgals; a figure much too small to account for evaporation and drift at the plant loads we observed.

The most likely scenario has the water and sewer records representative of throughput to the plant ***and*** several capitol buildings, taking into account 1) recovery of district condensate to the cooling towers; and 2) an evaporation credit.

In the event the plant is not credited for evaporation but such is acceptable to the State and the city of Harrisburg, we can develop the metering construction scope and project economics to address this ECM.

Heating Water / Reheat Water Upgrade to Variable Volume

The central plant has a steam supply, heat exchange capacity and fully redundant pumping to furnish winter heat and summer reheat to many of the buildings on the campus chilled water loop. The buildings served by the campus

heating loop also have local hot water generation for redundancy. The central plant heating water loop is presently offline due to a failed tube bundle.

The heating loop is normally in operation on a continuous basis in all seasons. The continuous operation of a 200 hp heating water pump at constant volume represents a substantial power expense. Depending on the building interfaces and terminal equipment, conversion of the main pumps to variable flow could be a worthwhile ECM.

In a similar vein, replacement of the failed tube bundle may be a tandem consideration in the execution of this ECM.

Heat Source for Heating Water and Re-Heat Water
Allowing for the difference in efficiency, the fuel cost associated with hot water heat for a natural gas-fueled high efficiency condensing boiler is roughly one-third to one-quarter that of the present steam unit cost. If the entirety of the $1.8M spent in 2016 calendar year for the steam supply to the Central Plant hot water distribution, along with Labor & Industry and Health & Welfare, were all for hot water to be displaced by large centralized condensing boilers, a reduction in utilities on the order of $1M to $1 ¼M annually may be realized.

Replacement Condenser Water Piping
The State has mentioned concerns that the thickness of the condenser water piping in the central plant has eroded and is therefore in danger of failure. The distribution piping below the access grating in the plant-side intake would be most susceptible to deterioration from the outside. Replacement of the piping has negligible utility impact unless leakage is present; no leakage was evident during our inspection of the plenum or return sump.

If desired by the State and a sufficiency of excess capitalized savings exists, TEN can undertake the testing to confirm problem sections and implement the replacement. TEN would design the solution so as to minimize plant disruption and incorporate temporary cooling only as necessary, along with changes to the plant needed to ensure continuity of service while completing the replacement.

Other items DGS may wish to consider for inclusion in this project include:

- New LED light luminaires rather than retrofit (interior and/or exterior) ~ $630,000
- Building envelope improvements beyond the under sill caulking at L&I
- Continuous Automated Commissioning (CAC) Analytics Platform
- Fault Detection Analytics (ie: SkySpark)
- Installation of the stored windows in the first two floors of the Finance Building

Investment Grade Audit (IGA) Pricing Methodology

TEN's standard approach to business is to provide transparent pricing. We apply this approach when pricing the Investment Grade Audit as demonstrated below in addition to the project as a whole. In this manner, we openly demonstrate our approach to delivering best value to our customers.

Again, TEN performs the auditing, design engineering, energy calculations, project development, construction management (including site project management), commissioning and measurement and verification services in-house. We know that many Energy Services Companies have started to subcontract out much of the engineering, using in-house engineers just to review the consultants' work. This would minimize their engineering costs shown in the Management Labor fees, but would increase their hard costs.

Companies that self-perform some of the actual installation work will also have an advantage in minimizing their Management Labor fees, since most of their engineering, project management and/or mark-up could be buried in the hard costs. One might argue that those who self-perform some of the work can provide a lower cost structure to their customer, since that work may not be marked up as much. We would argue that even though that could be the case, we generally find that our competitive process drives the hard costs down, enabling us to provide a lower overall cost, while giving each customer more control in selecting manufacturers, contractors, M/WBE participation, etc. The key point to remember is that when companies know they are competing, the prices come down.

a. Explanation in terms of dollars not percentages

Based on the size of the facilities in question, the complexity of the building systems and goals and objectives (number and type of ECMs), TEN has budgeted the following time and the resources needed to complete the tasks identified in the Investment Grade Audit Report. Following is a summary of these costs which anticipate a 60 turnaround as defined in the RFQ. Based on the timelines provided by DGS, we anticipated the audit would begin on September 1st and be delivered on October 31st. We suggest that DGS consider a 90-day turn to yield additional interaction and feedback between the ESCO and facility personnel. While we fully expect to invest $119,000 in developing an accurate IGA, TEN would be willing to evenly share the risk of a project not moving forward with the Commonwealth under a $60,000 IGA back out fee.

Task Name	Hours	Function	Billing Rate	Cost
Familiarize with blueprints, commissioning reports, etc.	10	Sr. Energy Engineer	$ 145	$ 1,450
Lighting Survey	80	Lighting Designer	$ 122	$ 9,760
Mechanical and electrical survey	40	Sr. Energy Engineer	$ 145	$ 5,800
Review and analyze utility bills	36	Sr. Energy Engineer	$ 145	$ 5,220
List the ECMs - Lighting and Lighting Controls (Design)	24	Lighting Designer	$ 122	$ 2,928
List the ECMs - Mechanical / Thermal	16	Sr. Energy Engineer	$ 145	$ 2,320
Construct spreadsheet of intital opportunities	24	Sr. Energy Engineer	$ 145	$ 3,480
Run lighting through lighting database, produce costed outputs	80	Lighting Designer	$ 122	$ 9,760
Scopes of work to contractors / vendors	40	Sr. Energy Engineer	$ 145	$ 5,800
Contractor walk-through	80	Sr. Construction Mgr.	$ 120	$ 9,600
Rebate analysis	8	Energy Engineer	$ 138	$ 1,104
Produce ECM write-ups and supporting tables - lighting	16	Lighting Designer	$ 122	$ 1,952
Produce ECM write-ups and supporting tables - Thermal incl. financials	32	Sr. Energy Engineer	$ 145	$ 4,640
Audit Report	24	Sr. Energy Engineer	$ 145	$ 3,480
Edit remainder of report & QC	36	Admin Support	$ 66	$ 2,376
M&V Plan	24	M&V Specialist	$ 138	$ 3,312
Assemble sample product documents	8	Energy Engineer	$ 138	$ 1,104
Management Review	30	VP Construction	$ 164	$ 4,920
Design Consultants		Chilled Water System		$ 40,000

Energy Audit Price:	**$ 119,006**

b. Discussion of how the methodology will comply with the format in the Energy Audit Report template

TEN has all the expertise in-house to perform the Energy Audit and has also engaged Hemant Mehta, PE from WM Group who has specialized experience in optimizing chilled water plants around the country including the variable flow design implemented for the Capitol Complex in 2006. Our senior energy engineers average twenty years in the energy engineering field and have designed many successful energy saving projects. TEN also has internal lighting and water conservation design expertise. Having the best design and construction talent in-house enables us to provide the most financially attractive designs, competitive secured pricing for those designs to yield the lowest responsible hard costs before reasonable management fees are applied to successfully implement the project. This approach equates to the best value for the Agencies.

TEN will perform the Investment Grade Audit with in-house engineers (augmented by Hemant Mehta). The IGA will include but not be limited to the following tasks:

- Analyze utility bills and establish and baseline
- Physically audit and inspect mechanical and electrical systems to determine, sizing, loads, efficiency, operating conditions and hours of operations
- Analyze energy consumption for major equipment and system
- Develop list of ECMs to review with Agency
- Develop scopes for works
- Perform energy calculations, methodology, assumptions
- Estimate incentives and rebates
- Estimate environmental costs or benefit (emissions reduction)
- Develop and commissioning plan and a M&V plan

Guaranteed M&V Pricing Methodology

1. Detailed explanation of Guaranteed Savings Measurement and Verification pricing methodology

a. Explanation in terms of dollars, not percentage

TEN proposes to initially meet with DGS representatives to discuss the cost benefit analysis of each measurement and verification option for each measure and then determine the M&V plan. This discussion will include how the measurements will be taken and for how long (option B) or how the utility information will be obtained (option C) to determine the tasks required and the hours needed to perform the agreed upon plan. TEN then will review the plan, scope of work, the personnel that will be performing the work. TEN's team, including Nikhil Singh, and Greg Lok have extensive expertise in developing and performing measurement and verification plans; however, we, in conjunction with DGS, determine what tasks TEN will perform and the scope. We believe that this approach will not only provide DGS some control in arriving at M&V cost, but also will reflect the actual cost to perform the work vs. just a percentage of hard costs, since the cost of the project does not always correlate to the complexity and cost to measure and verify the results. At this juncture, we have estimated the annual M&V cost as follows.

b. Methodology Compliance with the DGS Design Manual, General Conditions and the IPMVP.

TEN follows the International Performance Measurement & Verification Protocol (IPMVP), the industry standard for development and implementation of M&V plans in energy savings projects. IPMVP provides four Options for determining savings (A, B, C and D). We will additionally review each ECM and M&V approach to ensure compliance with DGS's Design Manual and General Conditions prior to the final M&V selections and cost benefit analysis identified above.

c. Reasonableness and Transparency of the Pricing Methodology

TEN will outline the tasks and time to complete tasks for the final selection of the M&V option for each ECM and apply our disclosed hourly rates, and then review with DGS. TEN will utilize their automation tools when possible to minimize time and cost of M&V services, if approved by DGS.

ECM	IPMVP Option	Annual M&V Cost
LED Lighting Upgrade	A	$ 5,000
Chilled Water Plant Free Cooling	B/C	$ 4,000
Condenser Water Upgrade to Variable Volume	B/C	$ 3,000
Retro Commissioning	C	$ 6,000
Metasys BMS Upgrade (Chilled Water Plant)	N/A	$ -
Window Film	D	$ 1,750
Envelope Caulking	N/A	$ -
	Total:	**$ 19,750**

Facility	Area	Space	Room#/ ID#/ Dwg#	Comments	Additional Comments	Pre Fixture Qty	Existing Fixture Type	Wattage Table	Hours Pre	Pre Watts/ Fixt	Post Fixture Qty	Post Design Code (Fixture)	Post Lamp Design Code (Wattage Table)	Post Description	Post Watt/ Fixt	% Contribution to Demand Charge	Hours Post	Base kW	Retro Proposed kW	kW Difference	Retro Demand Savings (kW)	Total Demand Savings (kW)	Base kWh	Retro Proposed kWh	Retro kWh Saved	Total kWh Saved
NORTH OFFICE BUILDING	6th	600	HALLWAY	RL41-SS	Relamp w/ (1) GE-00257 / F28T8/SP41/UMX/ECO	10	A41/T8L	F41SSILL	8,760	23	10	LEDT8	LEDT8/4'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 12W Lamp	12	.95	8,760	0.235	0.119	0.116	0.110	0.110	2,056	1,041	1,015	1,015
NORTH OFFICE BUILDING	6th	600	HALLWAY	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	16	2X4/BLANK	F42SSILL-R	2,860	41	16	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.650	0.380	0.270	0.256	0.256	1,858	1,087	771	771
NORTH OFFICE BUILDING	6th	600	HALLWAY	CC1X3/SI-MINI	Relamp w/ (1) 3 watt Cold Cathode Lamp--TCP 8A03CL	3	I1X15/BLUE-EMERG	CCFC3/1	8,760	3	3	LEDSI	LED3W	Surface Mounted Install LED Screw-in Lamp LED Light Fixture. (1) 3W	3	.95	8,760	0.008	0.009	(0.001)	(0.001)	(0.001)	71	78	(7)	(7)
NORTH OFFICE BUILDING	6th	600	HALLWAY	EXLED	LED Exit sign	2	EXLED	LED2W	8,760	2	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	2	.95	8,760	0.004	0.004	-	-	-	33	33	-	-
NORTH OFFICE BUILDING	6th	600	ELEVATOR 1	LB21L-QHE	Relamp & Reballast w/ (1) GE-45748 / F17T8/SP41/ECO Lamp & (1) GE-49706/GE132MAX-L/ULTRA ballast	8	S21	F21LL	8,760	14	8	LEDT8	LEDT8/2'/8W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (1) 8W Lamp	8	.95	8,760	0.116	0.063	0.052	0.050	0.050	1,012	555	457	457
NORTH OFFICE BUILDING	6th	600	ELEVATOR 2	LB21L-QHE	Relamp & Reballast w/ (1) GE-45748 / F17T8/SP41/ECO Lamp & (1) GE-49706/GE132MAX-L/ULTRA ballast	8	S21	F21LL	8,760	14	8	LEDT8	LEDT8/2'/8W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (1) 8W Lamp	8	.95	8,760	0.116	0.063	0.052	0.050	0.050	1,012	555	457	457
NORTH OFFICE BUILDING	6th	600	ELEVATOR 3	LB21L-QHE	Relamp & Reballast w/ (1) GE-45748 / F17T8/SP41/ECO Lamp & (1) GE-49706/GE132MAX-L/ULTRA ballast	8	S21	F21LL	8,760	14	8	LEDT8	LEDT8/2'/8W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (1) 8W Lamp	8	.95	8,760	0.116	0.063	0.052	0.050	0.050	1,012	555	457	457
NORTH OFFICE BUILDING	6th	600	ELEVATOR 4	LB21L-QHE	Relamp & Reballast w/ (1) GE-45748 / F17T8/SP41/ECO Lamp & (1) GE-49706/GE132MAX-L/ULTRA ballast	8	S21	F21LL	8,760	14	8	LEDT8	LEDT8/2'/8W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (1) 8W Lamp	8	.95	8,760	0.116	0.063	0.052	0.050	0.050	1,012	555	457	457
NORTH OFFICE BUILDING	6th	601	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	3	A42FLANGE/REF	F42SSILL	2,860	43	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.130	0.071	0.059	0.056	0.056	372	204	168	168
NORTH OFFICE BUILDING	6th	601	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	3	A42FLANGE/REF	NONE	2,860	0	3	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	6th	601	OFFICE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	A42FLANGE/REF	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
NORTH OFFICE BUILDING	6th	601	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	18	A42FLANGE/REF	F42SSILL	2,860	43	18	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.780	0.428	0.352	0.334	0.334	2,230	1,223	1,007	1,007
NORTH OFFICE BUILDING	6th	601	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	18	A42FLANGE/REF	NONE	2,860	0	18	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	6th	602	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	6	A44FLANGE	F42SSILL	2,860	43	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.260	0.143	0.117	0.111	0.111	743	408	336	336
NORTH OFFICE BUILDING	6th	602	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	6	A44FLANGE	NONE	2,860	0	6	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	6th	602	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	6	A44FLANGE	F42SSILL	2,860	43	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.260	0.143	0.117	0.111	0.111	743	408	336	336
NORTH OFFICE BUILDING	6th	602	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	6	A44FLANGE	NONE	2,860	0	6	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	6th	602	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	6	A44FLANGE	F42SSILL	2,860	43	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.260	0.143	0.117	0.111	0.111	743	408	336	336
NORTH OFFICE BUILDING	6th	602	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	6	A44FLANGE	NONE	2,860	0	6	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	6th	602	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	6	A44FLANGE	F42SSILL	2,860	43	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.260	0.143	0.117	0.111	0.111	743	408	336	336
NORTH OFFICE BUILDING	6th	602	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	6	A44FLANGE	NONE	2,860	0	6	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	6th	602	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	6	A44FLANGE	F42SSILL	2,860	43	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.260	0.143	0.117	0.111	0.111	743	408	336	336
NORTH OFFICE BUILDING	6th	602	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	6	A44FLANGE	NONE	2,860	0	6	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	6th	603-609	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	37	A42FLANGE/REF	F42SSILL	2,860	43	37	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	1.603	0.879	0.724	0.688	0.688	4,584	2,514	2,070	2,070
NORTH OFFICE BUILDING	6th	603-609	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	37	A42FLANGE/REF	NONE	2,860	0	37	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	6th	603-609	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	42	A42FLANGE/REF	F42SSILL	2,860	43	42	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	1.819	0.998	0.822	0.780	0.780	5,204	2,854	2,350	2,350
NORTH OFFICE BUILDING	6th	603-609	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	42	A42FLANGE/REF	NONE	2,860	0	42	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	6th	603-609	OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	28	2X4/BLANK	F42SSILL-R	2,860	41	28	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	1.137	0.665	0.472	0.448	0.448	3,252	1,903	1,350	1,350
NORTH OFFICE BUILDING	6th	610	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	6	A42FLANGE/REF	F42SSILL	2,860	43	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.260	0.143	0.117	0.111	0.111	743	408	336	336
NORTH OFFICE BUILDING	6th	610	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	6	A42FLANGE/REF	NONE	2,860	0	6	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	6th	610	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	9	A42FLANGE/REF	F42SSILL	2,860	43	9	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.390	0.214	0.176	0.167	0.167	1,115	612	503	503
NORTH OFFICE BUILDING	6th	610	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	9	A42FLANGE/REF	NONE	2,860	0	9	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	6th	610	OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	8	2X4/BLANK	F42SSILL-R	2,860	41	8	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.325	0.190	0.135	0.128	0.128	929	544	386	386
NORTH OFFICE BUILDING	6th	611-612	OFFICE	CKB22LL/REF	TROF KIT) & white reflector (2) GE-45748 / F17T8/SP41/ECOT8 lamps & (1) GE-49707/GE232MAX-L/ULTRA Low Power Instant Start Ballast	3	B24FLANGE/SS	F22ILL-R	2,860	26	3	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.079	0.048	0.031	0.029	0.029	225	136	89	89
NORTH OFFICE BUILDING	6th	611-612	OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	47	2X4/BLANK	F42SSILL-R	2,860	41	47	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	1.909	1.117	0.792	0.752	0.752	5,459	3,194	2,265	2,265
NORTH OFFICE BUILDING	6th	611-612	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	21	A42FLANGE/REF	NONE	2,860	0	21	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	6th	611-612	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	21	A42FLANGE/REF	F42SSILL	2,860	43	21	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.910	0.499	0.411	0.390	0.390	2,602	1,427	1,175	1,175
NORTH OFFICE BUILDING	6th	611-612	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A42FLANGE/REF	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
NORTH OFFICE BUILDING	6th	611-612	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	2	A42FLANGE/REF	NONE	2,860	0	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	6th	611-612	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	3	A42FLANGE/REF	F42SSILL	2,860	43	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.130	0.071	0.059	0.056	0.056	372	204	168	168
NORTH OFFICE BUILDING	6th	611-612	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	3	A42FLANGE/REF	NONE	2,860	0	3	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	6th	611-612	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	28	A42FLANGE/REF	F42SSILL	2,860	43	28	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	1.213	0.665	0.548	0.520	0.520	3,469	1,903	1,566	1,566
NORTH OFFICE BUILDING	6th	611-612	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	28	A42FLANGE/REF	NONE	2,860	0	28	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	6th	613	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	3	A42FLANGE/REF	F42SSILL	2,860	43	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.130	0.071	0.059	0.056	0.056	372	204	168	168
NORTH OFFICE BUILDING	6th	613	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	3	A42FLANGE/REF	NONE	2,860	0	3	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	6th	613	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	9	A42FLANGE/REF	F42SSILL	2,860	43	9	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.390	0.214	0.176	0.167	0.167	1,115	612	503	503
NORTH OFFICE BUILDING	6th	613	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	9	A42FLANGE/REF	NONE	2,860	0	9	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	6th	699	STAIRWELL BY 612	i1x120PAR38/flood	Flood Fixture w/ (1) 120w Incandescent PAR38 Lamp	8	i1x120PAR38/flood	I120/1	364	114	8	LEDSI/PAR38	LEDS14/1	Surface Mounted Install LED Screw-in PAR38 Lamp Light Emitting Diode Lamp, Screw-in, (1) 14W lamp	13	.50	364	0.912	0.101	0.811	0.406	0.406	332	37	295	295

Facility	Area	Space	Room#/ ID#/ Dwg#	Comments	Additional Comments	Pre Fixture Qty	Existing Fixture Type	Wattage Table	Hours Pre	Pre Watts/ Fixt	Post Fixture Qty	Post Design Code (Fixture)	Post Lamp Design Code (Wattage Table)	Post Description	Post Watt/ Fixt	% Contribution to Demand Charge	Hours Post	Base kW	Retro Proposed kW	kW Difference	Retro Demand Savings (kW)	Total Demand Savings (kW)	Base kWh	Retro Proposed kWh	Retro kWh Saved	Total kWh Saved
NORTH OFFICE BUILDING	6th	699	STAIRWELL BY 612	RL42-SS	Relamp w/ (2) GE-00257 / F28T8/SP41/UMX/ECO	13	A42X/T8L	F42SSILL	8,760	43	13	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	8,760	0.563	0.309	0.254	0.242	0.242	4,933	2,706	2,227	2,227
NORTH OFFICE BUILDING	6th	699	STAIRWELL BY 612	LB44L-QHE-18'	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast -18' CEILING	4	A44X	F44SSILL-R	8,760	78	4	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	8,760	0.310	0.190	0.120	0.114	0.114	2,720	1,665	1,055	1,055
NORTH OFFICE BUILDING	6th	698	STAIRWELL BY 602	i1x120PAR38/flood	Flood Fixture w/ (1) 120w Incandescent PAR38 Lamp	8	i1x120PAR38/flood	I120/1	364	114	8	LEDSI/PAR38	LEDS14/1	Surface Mounted Install LED Screw-in PAR38 Lamp Light Emitting Diode Lamp, Screw-in, (1) 14W lamp	13	.50	364	0.912	0.101	0.811	0.406	0.406	332	37	295	295
NORTH OFFICE BUILDING	6th	698	STAIRWELL BY 602	RL42-SS	Relamp w/ (2) GE-00257 / F28T8/SP41/UMX/ECO	13	A42X/T8L	F42SSILL	8,760	43	13	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	8,760	0.563	0.309	0.254	0.242	0.242	4,933	2,706	2,227	2,227
NORTH OFFICE BUILDING	6th	698	STAIRWELL BY 602	LB44L-QHE-18'	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast -18' CEILING	4	A44X	F44SSILL-R	8,760	78	4	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	8,760	0.310	0.190	0.120	0.114	0.114	2,720	1,665	1,055	1,055
NORTH OFFICE BUILDING	6th	697	WOMENS RR	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	2	C42FLANGE	F44SSILL-R	2,860	78	2	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.155	0.095	0.060	0.057	0.057	444	272	172	172
NORTH OFFICE BUILDING	6th	697	WOMENS RR	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	3	C42FLANGE	F42SSILL-R	2,860	41	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.122	0.071	0.051	0.048	0.048	348	204	145	145
NORTH OFFICE BUILDING	6th	697	WOMENS RR	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	C22FLANGE/SS	F22ILL-R	2,860	26	1	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.026	0.016	0.010	0.010	0.010	75	45	30	30
NORTH OFFICE BUILDING	6th	697	WOMENS RR	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	1	V42	F44SSILL-R	2,860	78	1	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.078	0.048	0.030	0.029	0.029	222	136	86	86
NORTH OFFICE BUILDING	6th	697	WOMENS RR	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	V22	F22ILL-R	2,860	26	1	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.026	0.016	0.010	0.010	0.010	75	45	30	30
NORTH OFFICE BUILDING	6th	696	MECHANICAL ROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	H42	F42SSILL-R	1,092	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.50	1,092	0.041	0.024	0.017	0.008	0.008	44	26	18	18
NORTH OFFICE BUILDING	6th	695	MENS RR	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	6	C42FLANGE	F42SSILL-R	2,860	41	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.244	0.143	0.101	0.096	0.096	697	408	289	289
NORTH OFFICE BUILDING	6th	695	MENS RR	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	C22FLANGE/SS	F22ILL-R	2,860	26	2	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.052	0.032	0.021	0.020	0.020	150	91	59	59
NORTH OFFICE BUILDING	6th	695	MENS RR	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	V42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
NORTH OFFICE BUILDING	6th	695	MENS RR	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	V22	F22ILL-R	2,860	26	1	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.026	0.016	0.010	0.010	0.010	75	45	30	30
NORTH OFFICE BUILDING	6th	694	MECHANICAL ROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	H42	F42SSILL-R	1,092	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.50	1,092	0.041	0.024	0.017	0.008	0.008	44	26	18	18
NORTH OFFICE BUILDING	6th	693	JANITOR CLOSET	cir32	Circleline Fluorescent Fixture w/ (1) 32w Circleline lamp and (1) standard ballast	1	cir32	FC32/1	1,092	36	1	LED/DRUM/KIT/8"	LED12W	Surface Mounted Retrofit Existing Drum with 8" LED Kit LED Light Fixture. (1) 12W	12	.50	1,092	0.036	0.012	0.024	0.012	0.012	39	13	26	26
NORTH OFFICE BUILDING	PENT	701	PENTHOUSE	CF1X26/SI	Relamp w/ (1) 26 watt Compact Fluorescent Screw-In lamp--GE-15836/FLE26HT3/2/827	12	I1X150/B	CFC26/1	1,092	23	12	LEDSI/A	LEDS11/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 11W lamp	10	.50	1,092	0.282	0.119	0.163	0.081	0.081	307	130	178	178
NORTH OFFICE BUILDING	PENT	701	PENTHOUSE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	23	H42	F42SSILL-R	1,092	41	23	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.50	1,092	0.934	0.546	0.388	0.194	0.194	1,020	597	423	423
NORTH OFFICE BUILDING	PENT	701	PENTHOUSE	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	1	H42	F44SSILL-R	1,092	78	1	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.50	1,092	0.078	0.048	0.030	0.015	0.015	85	52	33	33
NORTH OFFICE BUILDING	5TH	500	HALLWAY	RL41-SS	Relamp w/ (1) GE-00257 / F28T8/SP41/UMX/ECO	10	A41/T8L	F41SSILL	8,760	23	10	LEDT8	LEDT8/4'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 12W Lamp	12	.95	8,760	0.235	0.119	0.116	0.110	0.110	2,056	1,041	1,015	1,015
NORTH OFFICE BUILDING	5TH	500	HALLWAY	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	16	2X4/BLANK	F42SSILL-R	2,860	41	16	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.650	0.380	0.270	0.256	0.256	1,858	1,087	771	771
NORTH OFFICE BUILDING	5TH	500	HALLWAY	CC1X3/SI-MINI	Relamp w/ (1) 3 watt Cold Cathode Lamp--TCP 8A03CL	3	I1X15/BLUE-EMERG	CCFC3/1	8,760	3	3	LEDSI	LED3W	Surface Mounted Install LED Screw-in Lamp LED Light Fixture. (1) 3W	3	.95	8,760	0.008	0.009	(0.001)	(0.001)	(0.001)	71	78	(7)	(7)
NORTH OFFICE BUILDING	5TH	500	HALLWAY	EXLED	LED Exit sign	2	EXLED	LED2W	8,760	2	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	2	.95	8,760	0.004	0.004	-	-	-	33	33	-	-
NORTH OFFICE BUILDING	5TH	502	OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	5	2X4/BLANK	F42SSILL-R	2,860	41	5	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.203	0.119	0.084	0.080	0.080	581	340	241	241
NORTH OFFICE BUILDING	5TH	502	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	7	A44D2FLANGE	F42SSILL	2,860	43	7	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.303	0.166	0.137	0.130	0.130	867	476	392	392
NORTH OFFICE BUILDING	5TH	502	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	7	A44D2FLANGE	NONE	2,860	0	7	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	5TH	502	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A44D2FLANGE	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
NORTH OFFICE BUILDING	5TH	502	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	8	A44D2FLANGE	F42SSILL	2,860	43	8	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.347	0.190	0.156	0.149	0.149	991	544	448	448
NORTH OFFICE BUILDING	5TH	502	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	8	A44D2FLANGE	NONE	2,860	0	8	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	5TH	502	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	9	A44D2FLANGE	F42SSILL	2,860	43	9	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.390	0.214	0.176	0.167	0.167	1,115	612	503	503
NORTH OFFICE BUILDING	5TH	502	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	9	A44D2FLANGE	NONE	2,860	0	9	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	5TH	502	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	18	A44D2FLANGE	F42SSILL	2,860	43	18	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.780	0.428	0.352	0.334	0.334	2,230	1,223	1,007	1,007
NORTH OFFICE BUILDING	5TH	502	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	17	A44D2FLANGE	NONE	2,860	0	17	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	5TH	502	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	16	A44D2FLANGE	F42SSILL	2,860	43	16	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.693	0.380	0.313	0.297	0.297	1,982	1,087	895	895
NORTH OFFICE BUILDING	5TH	502	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	16	A44D2FLANGE	NONE	2,860	0	16	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	5TH	502	EXECUTIVE OFFICE	I15X25/CHA	Chandelier w/ (15) 25w Incancescent Lamps	1	I15X25/CHA	I25/15	2,860	238	15	LEDSI	LED8W	Surface Mounted Install LED Screw-in Lamp LED Light Fixture. (1) 8W	8	.95	2,860	0.238	0.119	0.119	0.113	0.113	679	340	339	339
NORTH OFFICE BUILDING	5TH	502	EXECUTIVE OFFICE	CF1X15BR30/SI	Relamp w/ (1) 15 watt Compact Fluorescent R30 Screw-In--GE-80893/FLE15/2/R30XL827	11	I1X90/R	CFC15/1	2,860	14	11	LEDSI/R30	LEDS10/1	Surface Mounted Install LED Screw-in R30 Lamp Light Emitting Diode Lamp, Screw-in, (1) 10W lamp	9	.95	2,860	0.149	0.099	0.050	0.047	0.047	426	283	143	143
NORTH OFFICE BUILDING	5TH	502	EXECUTIVE OFFICE RESTROOM	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	V22CO	F22ILL-R	2,860	26	1	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.026	0.016	0.010	0.010	0.010	75	45	30	30
NORTH OFFICE BUILDING	5TH	502	EXECUTIVE OFFICE RESTROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	C42FLANGE	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
NORTH OFFICE BUILDING	5TH	503	OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	2	2X4/BLANK	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
NORTH OFFICE BUILDING	5TH	503	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	4	A44D2FLANGE	F42SSILL	2,860	43	4	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.173	0.095	0.078	0.074	0.074	496	272	224	224
NORTH OFFICE BUILDING	5TH	503	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	4	A44D2FLANGE	NONE	2,860	0	4	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	5TH	503	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	3	A44D2FLANGE	F42SSILL	2,860	43	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.130	0.071	0.059	0.056	0.056	372	204	168	168
NORTH OFFICE BUILDING	5TH	503	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	3	A44D2FLANGE	NONE	2,860	0	3	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	5TH	504-505	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	18	A44D2FLANGE	F42SSILL	2,860	43	18	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.780	0.428	0.352	0.334	0.334	2,230	1,223	1,007	1,007

Facility	Area	Space	Room#/ ID#/ Dwg#	Comments	Additional Comments	Pre Fixture Qty	Existing Fixture Type	Wattage Table	Hours Pre	Pre Watts/ Fixt	Post Fixture Qty	Post Design Code (Fixture)	Post Lamp Design Code (Wattage Table)	Post Description	Post Watt/ Fixt	% Contribution to Demand Charge	Hours Post	Base kW	Retro Proposed kW	kW Difference	Retro Demand Savings (kW)	Total Demand Savings (kW)	Base kWh	Retro Proposed kWh	Retro kWh Saved	Total kWh Saved
NORTH OFFICE BUILDING	5TH	504-505	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	18	A44D2FLANGE	NONE	2,860	0	18	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	5TH	506-512	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	36	A44D2FLANGE	F42SSILL	2,860	43	36	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	1.560	0.855	0.704	0.669	0.669	4,460	2,446	2,014	2,014
NORTH OFFICE BUILDING	5TH	506-512	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	36	A44D2FLANGE	NONE	2,860	0	36	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	5TH	506-512	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	4	A44D2FLANGE	F42SSILL	2,860	43	4	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.173	0.095	0.078	0.074	0.074	496	272	224	224
NORTH OFFICE BUILDING	5TH	506-512	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	4	A44D2FLANGE	NONE	2,860	0	4	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	5TH	506-512	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	6	A44D2FLANGE	F42SSILL	2,860	43	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.260	0.143	0.117	0.111	0.111	743	408	336	336
NORTH OFFICE BUILDING	5TH	506-512	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	6	A44D2FLANGE	NONE	2,860	0	6	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	5TH	513	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A44D2FLANGE	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
NORTH OFFICE BUILDING	5TH	513	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	1	A44D2FLANGE	NONE	2,860	0	1	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	5TH	501-517	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	11	A44D2FLANGE	F42SSILL	2,860	43	11	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.477	0.261	0.215	0.204	0.204	1,363	747	615	615
NORTH OFFICE BUILDING	5TH	501-517	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	11	A44D2FLANGE	NONE	2,860	0	11	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	5TH	501-517	OFFICE	CKB22LL/REF	TROF KIT) & white reflector (2) GE-45748 / F17T8/SP41/ECOT8 lamps & (1) GE-49707/GE232MAX-L/ULTRA Low Power Instant Start Ballast	5	B24FLANGE/SS	F22ILL-R	2,860	26	5	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.131	0.079	0.052	0.049	0.049	374	227	148	148
NORTH OFFICE BUILDING	5TH	501-517	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A44D2FLANGE	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
NORTH OFFICE BUILDING	5TH	501-517	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	20	A44D2FLANGE	F42SSILL	2,860	43	20	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.866	0.475	0.391	0.372	0.372	2,478	1,359	1,119	1,119
NORTH OFFICE BUILDING	5TH	501-517	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	19	A44D2FLANGE	NONE	2,860	0	19	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	5TH	501-517	OFFICE-EQUIPMENT ROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	H42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
NORTH OFFICE BUILDING	5TH	514-516	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	12	2X4/BLANK	NONE	2,860	0	12	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	5TH	514-516	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	42	2X4/BLANK	NONE	2,860	0	42	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	5TH	514-516	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	56	A42M/T8L	F42SSILL	2,860	43	56	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	2.426	1.331	1.095	1.041	1.041	6,938	3,805	3,133	3,133
NORTH OFFICE BUILDING	5TH	514-516	OFFICE	B22M/T8L	2'x2' recessed fixture w/ (2) FO17T8 lamps (1) electronic ballast	1	B22M/T8L	F22LL	2,860	28	1	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.028	0.016	0.012	0.012	0.012	80	45	35	35
NORTH OFFICE BUILDING	5TH	514-516	DGS EXECUTIVE OFFICE 1	N/R	(Existing Fixtures To Remain Unchanged)	1	N/R	None	2,860	0	1	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	5TH	514-516	DGS EXECUTIVE OFFICE 1	CF1X15BR30/SI	Relamp w/ (1) 15 watt Compact Fluorescent R30 Screw-In--GE-80893/FLE15/2/R30XL827	18	I1X75/R	CFC15/1	2,860	14	18	LEDSI/R30	LEDS10/1	Surface Mounted Install LED Screw-in R30 Lamp Light Emitting Diode Lamp, Screw-in, (1) 10W lamp	9	.95	2,860	0.244	0.162	0.082	0.078	0.078	697	463	234	234
NORTH OFFICE BUILDING	5TH	514-516	EXECUTIVE OFFICE RESTROOM	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	V22CO	F22ILL-R	2,860	26	1	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.026	0.016	0.010	0.010	0.010	75	45	30	30
NORTH OFFICE BUILDING	5TH	514-516	EXECUTIVE OFFICE RESTROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	C42FLANGE	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
NORTH OFFICE BUILDING	5TH	514-516	DGS EXECUTIVE OFFICE 2	N/R	(Existing Fixtures To Remain Unchanged)	1	N/R	None	2,860	0	1	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	5TH	514-516	DGS EXECUTIVE OFFICE 2	CF1X15BR30/SI	Relamp w/ (1) 15 watt Compact Fluorescent R30 Screw-In--GE-80893/FLE15/2/R30XL827	12	I1X75/R	CFC15/1	2,860	14	12	LEDSI/R30	LEDS10/1	Surface Mounted Install LED Screw-in R30 Lamp Light Emitting Diode Lamp, Screw-in, (1) 10W lamp	9	.95	2,860	0.162	0.108	0.054	0.052	0.052	465	309	156	156
NORTH OFFICE BUILDING	5TH	514-516	EXECUTIVE OFFICE RESTROOM	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	V22CO	F22ILL-R	2,860	26	1	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.026	0.016	0.010	0.010	0.010	75	45	30	30
NORTH OFFICE BUILDING	5TH	514-516	EXECUTIVE OFFICE RESTROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	C42FLANGE	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
NORTH OFFICE BUILDING	5TH	599	WOMENS RR	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	2	C42FLANGE	F44SSILL-R	2,860	78	2	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.155	0.095	0.060	0.057	0.057	444	272	172	172
NORTH OFFICE BUILDING	5TH	599	WOMENS RR	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	3	C42FLANGE	F42SSILL-R	2,860	41	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.122	0.071	0.051	0.048	0.048	348	204	145	145
NORTH OFFICE BUILDING	5TH	599	WOMENS RR	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	C22FLANGE/SS	F22ILL-R	2,860	26	1	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.026	0.016	0.010	0.010	0.010	75	45	30	30
NORTH OFFICE BUILDING	5TH	599	WOMENS RR	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	1	V42	F44SSILL-R	2,860	78	1	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.078	0.048	0.030	0.029	0.029	222	136	86	86
NORTH OFFICE BUILDING	5TH	599	WOMENS RR	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	V22	F22ILL-R	2,860	26	1	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.026	0.016	0.010	0.010	0.010	75	45	30	30
NORTH OFFICE BUILDING	5TH	598	MECHANICAL ROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	H42	F42SSILL-R	1,092	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.50	1,092	0.041	0.024	0.017	0.008	0.008	44	26	18	18
NORTH OFFICE BUILDING	5TH	597	MENS RR	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	6	C42FLANGE	F42SSILL-R	2,860	41	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.244	0.143	0.101	0.096	0.096	697	408	289	289
NORTH OFFICE BUILDING	5TH	597	MENS RR	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	C22FLANGE/SS	F22ILL-R	2,860	26	2	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.052	0.032	0.021	0.020	0.020	150	91	59	59
NORTH OFFICE BUILDING	5TH	597	MENS RR	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	V42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
NORTH OFFICE BUILDING	5TH	597	MENS RR	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	V22	F22ILL-R	2,860	26	1	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.026	0.016	0.010	0.010	0.010	75	45	30	30
NORTH OFFICE BUILDING	5TH	596	MECHANICAL ROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	H42	F42SSILL-R	1,092	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.50	1,092	0.041	0.024	0.017	0.008	0.008	44	26	18	18
NORTH OFFICE BUILDING	5TH	595	JANITOR CLOSET	cir32	Circleline Fluorescent Fixture w/ (1) 32w Circleline lamp and (1) standard ballast	1	cir32	FC32/1	1,092	36	1	LED/DRUM/KIT/8"	LED12W	Surface Mounted Retrofit Existing Drum with 8" LED Kit LED Light Fixture. (1) 12W	12	.50	1,092	0.036	0.012	0.024	0.012	0.012	39	13	26	26
NORTH OFFICE BUILDING	4TH	400	HALLWAY	RL41-SS	Relamp w/ (1) GE-00257 / F28T8/SP41/UMX/ECO	10	A41/T8L	F41SSILL	8,760	23	10	LEDT8	LEDT8/4'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 12W Lamp	12	.95	8,760	0.235	0.119	0.116	0.110	0.110	2,056	1,041	1,015	1,015
NORTH OFFICE BUILDING	4TH	400	HALLWAY	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	16	2X4/BLANK	F42SSILL-R	2,860	41	16	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.650	0.380	0.270	0.256	0.256	1,858	1,087	771	771
NORTH OFFICE BUILDING	4TH	400	HALLWAY	CC1X3/SI-MINI	Relamp w/ (1) 3 watt Cold Cathode Lamp--TCP 8A03CL	3	I1X15/BLUE-EMERG	CCFC3/1	8,760	3	3	LEDSI	LED3W	Surface Mounted Install LED Screw-in Lamp LED Light Fixture. (1) 3W	3	.95	8,760	0.008	0.009	(0.001)	(0.001)	(0.001)	71	78	(7)	(7)
NORTH OFFICE BUILDING	4TH	400	HALLWAY	EXLED	LED Exit sign	2	EXLED	LED2W	8,760	2	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	2	.95	8,760	0.004	0.004	-	-	-	33	33	-	-
NORTH OFFICE BUILDING	4TH	401	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	3	A44FLANGE	F42SSILL	2,860	43	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.130	0.071	0.059	0.056	0.056	372	204	168	168
NORTH OFFICE BUILDING	4TH	401	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	3	A44FLANGE	NONE	2,860	0	3	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-

Facility	Area	Space	Room#/ ID#/ Dwg#	Comments	Additional Comments	Pre Fixture Qty	Existing Fixture Type	Wattage Table	Hours Pre	Pre Watts/ Fixt	Post Fixture Qty	Post Design Code (Fixture)	Post Lamp Design Code (Wattage Table)	Post Description	Post Watt/ Fixt	% Contribution to Demand Charge	Hours Post	Base kW	Retro Proposed kW	kW Difference	Retro Demand Savings (kW)	Total Demand Savings (kW)	Base kWh	Retro Proposed kWh	Retro kWh Saved	Total kWh Saved
NORTH OFFICE BUILDING	4TH	401	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	9	A44FLANGE	F42SSILL	2,860	43	9	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.390	0.214	0.176	0.167	0.167	1,115	612	503	503
NORTH OFFICE BUILDING	4TH	401	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	9	A44FLANGE	NONE	2,860	0	9	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	4TH	400-401	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A44FLANGE	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
NORTH OFFICE BUILDING	4TH	400-401	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	2	A44FLANGE	NONE	2,860	0	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	4TH	400-401	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	3	A44FLANGE	F42SSILL	2,860	43	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.130	0.071	0.059	0.056	0.056	372	204	168	168
NORTH OFFICE BUILDING	4TH	400-401	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	3	A44FLANGE	NONE	2,860	0	3	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	4TH	400-401	OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	1	2X4/BLANK	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
NORTH OFFICE BUILDING	4TH	415	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	4	A44FLANGE	F42SSILL	2,860	43	4	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.173	0.095	0.078	0.074	0.074	496	272	224	224
NORTH OFFICE BUILDING	4TH	415	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	4	A44FLANGE	NONE	2,860	0	4	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	4TH	415	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	12	A44FLANGE	F42SSILL	2,860	43	12	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.520	0.285	0.235	0.223	0.223	1,487	815	671	671
NORTH OFFICE BUILDING	4TH	415	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	12	A44FLANGE	NONE	2,860	0	12	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	4TH	402-403	OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	13	2X4/BLANK	F42SSILL-R	2,860	41	13	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.528	0.309	0.219	0.208	0.208	1,510	883	627	627
NORTH OFFICE BUILDING	4TH	402-403	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	1	A44FLANGE	F42SSILL	2,860	43	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.043	0.024	0.020	0.019	0.019	124	68	56	56
NORTH OFFICE BUILDING	4TH	402-403	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	12	A44FLANGE	F42SSILL	2,860	43	12	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.520	0.285	0.235	0.223	0.223	1,487	815	671	671
NORTH OFFICE BUILDING	4TH	402-403	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	12	A44FLANGE	NONE	2,860	0	12	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	4TH	402-403	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	12	A44FLANGE	F42SSILL	2,860	43	12	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.520	0.285	0.235	0.223	0.223	1,487	815	671	671
NORTH OFFICE BUILDING	4TH	402-403	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	12	A44FLANGE	NONE	2,860	0	12	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	4TH	402-403	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	10	A44FLANGE	F42SSILL	2,860	43	10	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.433	0.238	0.196	0.186	0.186	1,239	680	559	559
NORTH OFFICE BUILDING	4TH	402-403	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	10	A44FLANGE	NONE	2,860	0	10	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	4TH	402-403	OFFICE	CKB22LL/REF	TROF KIT) & white reflector (2) GE-45748 / F17T8/SP41/ECOT8 lamps & (1) GE-49707/GE232MAX-L/ULTRA Low Power Instant Start Ballast	2	B24FLANGE/SS	F22ILL-R	2,860	26	2	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.052	0.032	0.021	0.020	0.020	150	91	59	59
NORTH OFFICE BUILDING	4TH	402-403	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	6	A44FLANGE	F42SSILL	2,860	43	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.260	0.143	0.117	0.111	0.111	743	408	336	336
NORTH OFFICE BUILDING	4TH	402-403	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	6	A44FLANGE	NONE	2,860	0	6	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	4TH	402-403	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	18	A44FLANGE	F42SSILL	2,860	43	18	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.780	0.428	0.352	0.334	0.334	2,230	1,223	1,007	1,007
NORTH OFFICE BUILDING	4TH	402-403	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	18	A44FLANGE	F42SSILL	2,860	43	18	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.780	0.428	0.352	0.334	0.334	2,230	1,223	1,007	1,007
NORTH OFFICE BUILDING	4TH	402-403	OFFICE RESTROOM	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	V22CO	F22ILL-R	2,860	26	2	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.052	0.032	0.021	0.020	0.020	150	91	59	59
NORTH OFFICE BUILDING	4TH	402-403	OFFICE RESTROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	C42FLANGE	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
NORTH OFFICE BUILDING	4TH	404	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	3	A44FLANGE	F42SSILL	2,860	43	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.130	0.071	0.059	0.056	0.056	372	204	168	168
NORTH OFFICE BUILDING	4TH	404	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	3	A44FLANGE	NONE	2,860	0	3	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	4TH	404	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	3	A44FLANGE	F42SSILL	2,860	43	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.130	0.071	0.059	0.056	0.056	372	204	168	168
NORTH OFFICE BUILDING	4TH	404	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	3	A44FLANGE	NONE	2,860	0	3	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	4TH	405-413	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	6	A44FLANGE	F42SSILL	2,860	43	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.260	0.143	0.117	0.111	0.111	743	408	336	336
NORTH OFFICE BUILDING	4TH	405-413	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	6	A44FLANGE	NONE	2,860	0	6	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	4TH	405-413	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	1	A44FLANGE	F42SSILL	2,860	43	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.043	0.024	0.020	0.019	0.019	124	68	56	56
NORTH OFFICE BUILDING	4TH	405-413	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A44FLANGE	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
NORTH OFFICE BUILDING	4TH	405-413	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	2	A44FLANGE	NONE	2,860	0	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	4TH	405-413	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	3	A44FLANGE	F42SSILL	2,860	43	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.130	0.071	0.059	0.056	0.056	372	204	168	168
NORTH OFFICE BUILDING	4TH	405-413	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	2	A44FLANGE	NONE	2,860	0	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	4TH	405-413	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	57	A44FLANGE	F42SSILL	2,860	43	57	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	2.469	1.354	1.115	1.059	1.059	7,062	3,873	3,189	3,189
NORTH OFFICE BUILDING	4TH	405-413	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	57	A44FLANGE	NONE	2,860	0	57	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	4TH	414	OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	1	2X4/BLANK	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
NORTH OFFICE BUILDING	4TH	414	OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	1	2X4/BLANK	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
NORTH OFFICE BUILDING	4TH	414	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	62	A44D2FLANGE	F42SSILL	2,860	43	62	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	2.686	1.473	1.213	1.152	1.152	7,682	4,213	3,468	3,468
NORTH OFFICE BUILDING	4TH	414	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	62	A44D2FLANGE	NONE	2,860	0	62	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	4TH	499	WOMENS RR	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	2	C42FLANGE	F44SSILL-R	2,860	78	2	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.155	0.095	0.060	0.057	0.057	444	272	172	172
NORTH OFFICE BUILDING	4TH	499	WOMENS RR	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	3	C42FLANGE	F42SSILL-R	2,860	41	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.122	0.071	0.051	0.048	0.048	348	204	145	145
NORTH OFFICE BUILDING	4TH	499	WOMENS RR	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	C22FLANGE/SS	F22ILL-R	2,860	26	1	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.026	0.016	0.010	0.010	0.010	75	45	30	30

Facility	Area	Space	Room#/ ID#/ Dwg#	Comments	Additional Comments	Pre Fixture Qty	Existing Fixture Type	Wattage Table	Hours Pre	Pre Watts/ Fixt	Post Fixture Qty	Post Design Code (Fixture)	Post Lamp Design Code (Wattage Table)	Post Description	Post Watt/ Fixt	% Contribution to Demand Charge	Hours Post	Base kW	Retro Proposed kW	kW Difference	Retro Demand Savings (kW)	Total Demand Savings (kW)	Base kWh	Retro Proposed kWh	Retro kWh Saved	Total kWh Saved
NORTH OFFICE BUILDING	4TH	499	WOMENS RR	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	1	V42	F44SSILL-R	2,860	78	1	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.078	0.048	0.030	0.029	0.029	222	136	86	86
NORTH OFFICE BUILDING	4TH	499	WOMENS RR	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	V22	F22ILL-R	2,860	26	1	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.026	0.016	0.010	0.010	0.010	75	45	30	30
NORTH OFFICE BUILDING	4TH	498	MECHANICAL ROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	H42	F42SSILL-R	1,092	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.50	1,092	0.041	0.024	0.017	0.008	0.008	44	26	18	18
NORTH OFFICE BUILDING	4TH	497	MENS RR	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	6	C42FLANGE	F42SSILL-R	2,860	41	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.244	0.143	0.101	0.096	0.096	697	408	289	289
NORTH OFFICE BUILDING	4TH	497	MENS RR	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	C22FLANGE/SS	F22ILL-R	2,860	26	2	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.052	0.032	0.021	0.020	0.020	150	91	59	59
NORTH OFFICE BUILDING	4TH	497	MENS RR	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	V42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
NORTH OFFICE BUILDING	4TH	497	MENS RR	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	V22	F22ILL-R	2,860	26	1	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.026	0.016	0.010	0.010	0.010	75	45	30	30
NORTH OFFICE BUILDING	4TH	496	MECHANICAL ROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	H42	F42SSILL-R	1,092	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.50	1,092	0.041	0.024	0.017	0.008	0.008	44	26	18	18
NORTH OFFICE BUILDING	4TH	495	JANITOR CLOSET	cir32	Circleline Fluorescent Fixture w/ (1) 32w Circleline lamp and (1) standard ballast	1	cir32	FC32/1	1,092	36	1	LED/DRUM/KIT/8"	LED12W	Surface Mounted Retrofit Existing Drum with 8" LED Kit LED Light Fixture. (1) 12W	12	.50	1,092	0.036	0.012	0.024	0.012	0.012	39	13	26	26
NORTH OFFICE BUILDING	3RD	300	HALLWAY	RL41-SS	Relamp w/ (1) GE-00257 / F28T8/SP41/UMX/ECO	10	A41/T8L	F41SSILL	8,760	23	10	LEDT8	LEDT8/4'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 12W Lamp	12	.95	8,760	0.235	0.119	0.116	0.110	0.110	2,056	1,041	1,015	1,015
NORTH OFFICE BUILDING	3RD	300	HALLWAY	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	16	2X4/BLANK	F42SSILL-R	2,860	41	16	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.650	0.380	0.270	0.256	0.256	1,858	1,087	771	771
NORTH OFFICE BUILDING	3RD	300	HALLWAY	CC1X3/SI-MINI	Relamp w/ (1) 3 watt Cold Cathode Lamp--TCP 8A03CL	3	I1X15/BLUE-EMERG	CCFC3/1	8,760	3	3	LEDSI	LED3W	Surface Mounted Install LED Screw-in Lamp LED Light Fixture. (1) 3W	3	.95	8,760	0.008	0.009	(0.001)	(0.001)	(0.001)	71	78	(7)	(7)
NORTH OFFICE BUILDING	3RD	300	HALLWAY	EXLED	LED Exit sign	2	EXLED	LED2W	8,760	2	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	2	.95	8,760	0.004	0.004	-	-	-	33	33	-	-
NORTH OFFICE BUILDING	3RD	300	HALLWAY	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	15	I1X50/TRACK	CFC13/1	2,860	12	15	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.176	0.122	0.054	0.052	0.052	503	347	156	156
NORTH OFFICE BUILDING	3RD	300	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	0	A44D2FLANGE	F42SSILL	2,860	43	0	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	-	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	300	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	0	A44D2FLANGE	NONE	2,860	0	0	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	300	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	0	A44D2FLANGE	F42SSILL	2,860	43	0	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	-	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	300	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	0	A44D2FLANGE	NONE	2,860	0	0	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	300	OFFICE	RL41-SS	Relamp w/ (1) GE-00257 / F28T8/SP41/UMX/ECO	15	W41/T8L	F41SSILL	2,860	23	15	LEDT8	LEDT8/4'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.352	0.178	0.174	0.165	0.165	1,007	510	497	497
NORTH OFFICE BUILDING	3RD	301	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	7	A44D2FLANGE	F42SSILL	2,860	43	7	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.303	0.166	0.137	0.130	0.130	867	476	392	392
NORTH OFFICE BUILDING	3RD	301	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	7	A44D2FLANGE	NONE	2,860	0	7	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	301	OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	3	2X4/BLANK	F42SSILL-R	2,860	41	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.122	0.071	0.051	0.048	0.048	348	204	145	145
NORTH OFFICE BUILDING	3RD	301	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	6	A44D2FLANGE	F42SSILL	2,860	43	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.260	0.143	0.117	0.111	0.111	743	408	336	336
NORTH OFFICE BUILDING	3RD	301	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	6	A44D2FLANGE	NONE	2,860	0	6	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	302	OFFICE	CKA44T2/REF-QHE	brackets) & white reflector (4) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49774/GE432MAX-N/ULTRA Normal Power Instant Start Ballast, tandem wired	2	A44D2FLANGE	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
NORTH OFFICE BUILDING	3RD	302	OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	1	2X4/BLANK	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
NORTH OFFICE BUILDING	3RD	302	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A44D2FLANGE	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
NORTH OFFICE BUILDING	3RD	302	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	1	A44D2FLANGE	NONE	2,860	0	1	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	302	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A44D2FLANGE	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
NORTH OFFICE BUILDING	3RD	302	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	8	A44D2FLANGE	F42SSILL	2,860	43	8	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.347	0.190	0.156	0.149	0.149	991	544	448	448
NORTH OFFICE BUILDING	3RD	302	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	8	A44D2FLANGE	NONE	2,860	0	8	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	302	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	14	A44D2FLANGE	F42SSILL	2,860	43	14	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.606	0.333	0.274	0.260	0.260	1,735	951	783	783
NORTH OFFICE BUILDING	3RD	302	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	13	A44D2FLANGE	NONE	2,860	0	13	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	302	OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	5	2X4/BLANK	F42SSILL-R	2,860	41	5	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.203	0.119	0.084	0.080	0.080	581	340	241	241
NORTH OFFICE BUILDING	3RD	302	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	3	A44D2FLANGE	F42SSILL	2,860	43	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.130	0.071	0.059	0.056	0.056	372	204	168	168
NORTH OFFICE BUILDING	3RD	302	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	2	A44D2FLANGE	NONE	2,860	0	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	302	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	4	A44D2FLANGE	F42SSILL	2,860	43	4	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.173	0.095	0.078	0.074	0.074	496	272	224	224
NORTH OFFICE BUILDING	3RD	302	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	4	A44D2FLANGE	NONE	2,860	0	4	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	302	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	1	A44D2FLANGE	F42SSILL	2,860	43	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.043	0.024	0.020	0.019	0.019	124	68	56	56
NORTH OFFICE BUILDING	3RD	302	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	2	A44D2FLANGE	NONE	2,860	0	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	302	OFFICE	CKB22LL/REF	TROF KIT) & white reflector (2) GE-45748 / F17T8/SP41/ECOT8 lamps & (1) GE-49707/GE232MAX-L/ULTRA Low Power Instant Start Ballast	1	B24FLANGE/SS	F22ILL-R	2,860	26	1	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.026	0.016	0.010	0.010	0.010	75	45	30	30
NORTH OFFICE BUILDING	3RD	302	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	5	A44D2FLANGE	F42SSILL	2,860	43	5	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.217	0.119	0.098	0.093	0.093	619	340	280	280
NORTH OFFICE BUILDING	3RD	302	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	5	A44D2FLANGE	F42SSILL	2,860	43	5	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.217	0.119	0.098	0.093	0.093	619	340	280	280
NORTH OFFICE BUILDING	3RD	302	OFFICE	CKB22LL/REF	TROF KIT) & white reflector (2) GE-45748 / F17T8/SP41/ECOT8 lamps & (1) GE-49707/GE232MAX-L/ULTRA Low Power Instant Start Ballast	1	B24FLANGE/SS	F22ILL-R	2,860	26	1	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.026	0.016	0.010	0.010	0.010	75	45	30	30
NORTH OFFICE BUILDING	3RD	302	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	12	A44D2FLANGE	F42SSILL	2,860	43	12	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.520	0.285	0.235	0.223	0.223	1,487	815	671	671
NORTH OFFICE BUILDING	3RD	302	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	12	A44D2FLANGE	NONE	2,860	0	12	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	-	0	-	-

Facility	Area	Space	Room#/ ID#/ Dwg#	Comments	Additional Comments	Pre Fixture Qty	Existing Fixture Type	Wattage Table	Hours Pre	Pre Watts/ Fixt	Post Fixture Qty	Post Design Code (Fixture)	Post Lamp Design Code (Wattage Table)	Post Description	Post Watt/ Fixt	% Contribution to Demand Charge	Hours Post	Base kW	Retro Proposed kW	kW Difference	Retro Demand Savings (kW)	Total Demand Savings (kW)	Base kWh	Retro Proposed kWh	Retro kWh Saved	Total kWh Saved
NORTH OFFICE BUILDING	3RD	302	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	8	A44D2FLANGE	F42SSILL	2,860	43	8	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.347	0.190	0.156	0.149	0.149	991	544	448	448
NORTH OFFICE BUILDING	3RD	302	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	8	A44D2FLANGE	NONE	2,860	0	8	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	302	EXECUTIVE OFFICE	CF1X15BR30/SI	Relamp w/ (1) 15 watt Compact Fluorescent R30 Screw-In--GE-80893/FLE15/2/R30XL827	18	I1X90/R	CFC15/1	2,860	14	18	LEDSI/R30	LEDS10/1	Surface Mounted Install LED Screw-in R30 Lamp Light Emitting Diode Lamp, Screw-in, (1) 10W lamp	9	.95	2,860	0.244	0.162	0.082	0.078	0.078	697	463	234	234
NORTH OFFICE BUILDING	3RD	302	EXECUTIVE OFFICE RESTROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	C42FLANGE	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
NORTH OFFICE BUILDING	3RD	302	EXECUTIVE OFFICE RESTROOM	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	V22	F22ILL-R	2,860	26	1	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.026	0.016	0.010	0.010	0.010	75	45	30	30
NORTH OFFICE BUILDING	3RD	303-304	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	4	A44D2FLANGE	F42SSILL	2,860	43	4	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.173	0.095	0.078	0.074	0.074	496	272	224	224
NORTH OFFICE BUILDING	3RD	303-304	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	4	A44D2FLANGE	NONE	2,860	0	4	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	303-304	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A44D2FLANGE	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
NORTH OFFICE BUILDING	3RD	303-304	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	1	A44D2FLANGE	NONE	2,860	0	1	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	303-304	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	4	A44D2FLANGE	F42SSILL	2,860	43	4	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.173	0.095	0.078	0.074	0.074	496	272	224	224
NORTH OFFICE BUILDING	3RD	303-304	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	4	A44D2FLANGE	NONE	2,860	0	4	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	305	OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	8	2X4/BLANK	F42SSILL-R	2,860	41	8	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.325	0.190	0.135	0.128	0.128	929	544	386	386
NORTH OFFICE BUILDING	3RD	305	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	8	A44D2FLANGE	F42SSILL	2,860	43	8	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.347	0.190	0.156	0.149	0.149	991	544	448	448
NORTH OFFICE BUILDING	3RD	305	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	8	A44D2FLANGE	NONE	2,860	0	8	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	305	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	11	A44D2FLANGE	F42SSILL	2,860	43	11	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.477	0.261	0.215	0.204	0.204	1,363	747	615	615
NORTH OFFICE BUILDING	3RD	305	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	10	A44D2FLANGE	NONE	2,860	0	10	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	305	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	9	A44D2FLANGE	F42SSILL	2,860	43	9	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.390	0.214	0.176	0.167	0.167	1,115	612	503	503
NORTH OFFICE BUILDING	3RD	305	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	9	A44D2FLANGE	NONE	2,860	0	9	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	306	OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	4	2X4/BLANK	F42SSILL-R	2,860	41	4	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.162	0.095	0.067	0.064	0.064	465	272	193	193
NORTH OFFICE BUILDING	3RD	306	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	6	A44D2FLANGE	F42SSILL	2,860	43	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.260	0.143	0.117	0.111	0.111	743	408	336	336
NORTH OFFICE BUILDING	3RD	306	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	6	A44D2FLANGE	NONE	2,860	0	6	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	306	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	4	A44D2FLANGE	F42SSILL	2,860	43	4	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.173	0.095	0.078	0.074	0.074	496	272	224	224
NORTH OFFICE BUILDING	3RD	306	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	6	A44D2FLANGE	NONE	2,860	0	6	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	306	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	4	A44D2FLANGE	F42SSILL	2,860	43	4	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.173	0.095	0.078	0.074	0.074	496	272	224	224
NORTH OFFICE BUILDING	3RD	306	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	6	A44D2FLANGE	NONE	2,860	0	6	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	307	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	8	A44D2FLANGE	F42SSILL	2,860	43	8	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.347	0.190	0.156	0.149	0.149	991	544	448	448
NORTH OFFICE BUILDING	3RD	307	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	8	A44D2FLANGE	NONE	2,860	0	8	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	307	OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	6	2X4/BLANK	F42SSILL-R	2,860	41	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.244	0.143	0.101	0.096	0.096	697	408	289	289
NORTH OFFICE BUILDING	3RD	307	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	6	A44D2FLANGE	F42SSILL	2,860	43	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.260	0.143	0.117	0.111	0.111	743	408	336	336
NORTH OFFICE BUILDING	3RD	307	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	6	A44D2FLANGE	NONE	2,860	0	6	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	308	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A44D2FLANGE	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
NORTH OFFICE BUILDING	3RD	308	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	2	A44D2FLANGE	NONE	2,860	0	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	308	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A44D2FLANGE	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
NORTH OFFICE BUILDING	3RD	308	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	2	A44D2FLANGE	NONE	2,860	0	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	308	OFFICE	CKB22LL/REF	TROF KIT) & white reflector (2) GE-45748 / F17T8/SP41/ECOT8 lamps & (1) GE-49707/GE232MAX-L/ULTRA Low Power Instant Start Ballast	1	B24FLANGE/SS	F22ILL-R	2,860	26	1	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.026	0.016	0.010	0.010	0.010	75	45	30	30
NORTH OFFICE BUILDING	3RD	308	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	3	A44D2FLANGE	F42SSILL	2,860	43	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.130	0.071	0.059	0.056	0.056	372	204	168	168
NORTH OFFICE BUILDING	3RD	308	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	3	A44D2FLANGE	NONE	2,860	0	3	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	308	EXECUTIVE OFFICE RESTROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	C42FLANGE	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
NORTH OFFICE BUILDING	3RD	308	EXECUTIVE OFFICE RESTROOM	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	V22	F22ILL-R	2,860	26	1	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.026	0.016	0.010	0.010	0.010	75	45	30	30
NORTH OFFICE BUILDING	3RD	308	EXECUTIVE OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	4	A44D2FLANGE	F42SSILL	2,860	43	4	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.173	0.095	0.078	0.074	0.074	496	272	224	224
NORTH OFFICE BUILDING	3RD	308	EXECUTIVE OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	4	A44D2FLANGE	NONE	2,860	0	4	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	308	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A44D2FLANGE	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
NORTH OFFICE BUILDING	3RD	308	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	1	A44D2FLANGE	NONE	2,860	0	1	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	308	OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	1	2X4/BLANK	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
NORTH OFFICE BUILDING	3RD	308	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A44D2FLANGE	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
NORTH OFFICE BUILDING	3RD	308	OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	2	2X4/BLANK	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
NORTH OFFICE BUILDING	3RD	308	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A44D2FLANGE	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
NORTH OFFICE BUILDING	3RD	308	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	2	A44D2FLANGE	NONE	2,860	0	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-

Facility	Area	Space	Room#/ ID#/ Dwg#	Comments	Additional Comments	Pre Fixture Qty	Existing Fixture Type	Wattage Table	Hours Pre	Pre Watts/ Fixt	Post Fixture Qty	Post Design Code (Fixture)	Post Lamp Design Code (Wattage Table)	Post Description	Post Watt/ Fixt	% Contribution to Demand Charge	Hours Post	Base kW	Retro Proposed kW	kW Difference	Retro Demand Savings (kW)	Total Demand Savings (kW)	Base kWh	Retro Proposed kWh	Retro kWh Saved	Total kWh Saved
NORTH OFFICE BUILDING	3RD	308	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	5	A44D2FLANGE	F42SSILL	2,860	43	5	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.217	0.119	0.098	0.093	0.093	619	340	280	280
NORTH OFFICE BUILDING	3RD	308	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	5	A44D2FLANGE	NONE	2,860	0	5	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	308	OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	2	2X4/BLANK	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
NORTH OFFICE BUILDING	3RD	308	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	3	A44D2FLANGE	F42SSILL	2,860	43	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.130	0.071	0.059	0.056	0.056	372	204	168	168
NORTH OFFICE BUILDING	3RD	308	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	3	A44D2FLANGE	NONE	2,860	0	3	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	308	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	3	A44D2FLANGE	F42SSILL	2,860	43	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.130	0.071	0.059	0.056	0.056	372	204	168	168
NORTH OFFICE BUILDING	3RD	308	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	2	A44D2FLANGE	NONE	2,860	0	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	308	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	1	A44D2FLANGE	F42SSILL	2,860	43	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.043	0.024	0.020	0.019	0.019	124	68	56	56
NORTH OFFICE BUILDING	3RD	308	OFFICE	CKB23LL/REF	TROF KIT) & white reflector (3) GE-45748 / F17T8/SP41/ECOT8 lamps & (1) GE-49708/GE332MAX-L/ULTRA Low Power Instant Start Ballast	1	B24FLANGE/SS	F32ILL-R	2,860	35	1	LEDT8	LEDT8/3'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.035	0.024	0.011	0.011	0.011	101	68	33	33
NORTH OFFICE BUILDING	3RD	308	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	3	A44D2FLANGE	F42SSILL	2,860	43	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.130	0.071	0.059	0.056	0.056	372	204	168	168
NORTH OFFICE BUILDING	3RD	308	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	2	A44D2FLANGE	NONE	2,860	0	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	308	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	1	A44D2FLANGE	F42SSILL	2,860	43	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.043	0.024	0.020	0.019	0.019	124	68	56	56
NORTH OFFICE BUILDING	3RD	308	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	1	A44D2FLANGE	NONE	2,860	0	1	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	308	OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	1	2X4/BLANK	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
NORTH OFFICE BUILDING	3RD	308	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	3	A44D2FLANGE	F42SSILL	2,860	43	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.130	0.071	0.059	0.056	0.056	372	204	168	168
NORTH OFFICE BUILDING	3RD	308	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	2	A44D2FLANGE	NONE	2,860	0	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	308	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	1	A44D2FLANGE	F42SSILL	2,860	43	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.043	0.024	0.020	0.019	0.019	124	68	56	56
NORTH OFFICE BUILDING	3RD	308	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	1	A44D2FLANGE	NONE	2,860	0	1	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	308	OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	1	2X4/BLANK	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
NORTH OFFICE BUILDING	3RD	308	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A44D2FLANGE	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
NORTH OFFICE BUILDING	3RD	308	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	2	A44D2FLANGE	NONE	2,860	0	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	308	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	5	A44D2FLANGE	F42SSILL	2,860	43	5	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.217	0.119	0.098	0.093	0.093	619	340	280	280
NORTH OFFICE BUILDING	3RD	308	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	2	A44D2FLANGE	NONE	2,860	0	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	308	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	5	A44D2FLANGE	F42SSILL	2,860	43	5	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.217	0.119	0.098	0.093	0.093	619	340	280	280
NORTH OFFICE BUILDING	3RD	308	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	5	A44D2FLANGE	NONE	2,860	0	5	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	308	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	6	A44D2FLANGE	F42SSILL	2,860	43	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.260	0.143	0.117	0.111	0.111	743	408	336	336
NORTH OFFICE BUILDING	3RD	308	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	6	A44D2FLANGE	NONE	2,860	0	6	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	308	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A44D2FLANGE	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
NORTH OFFICE BUILDING	3RD	308	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	1	A44D2FLANGE	NONE	2,860	0	1	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	308	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	4	A44D2FLANGE	F42SSILL	2,860	43	4	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.173	0.095	0.078	0.074	0.074	496	272	224	224
NORTH OFFICE BUILDING	3RD	308	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	4	A44D2FLANGE	NONE	2,860	0	4	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	308	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	3	A44D2FLANGE	F42SSILL	2,860	43	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.130	0.071	0.059	0.056	0.056	372	204	168	168
NORTH OFFICE BUILDING	3RD	308	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	3	A44D2FLANGE	NONE	2,860	0	3	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	308	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	4	A44D2FLANGE	F42SSILL	2,860	43	4	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.173	0.095	0.078	0.074	0.074	496	272	224	224
NORTH OFFICE BUILDING	3RD	308	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	4	A44D2FLANGE	NONE	2,860	0	4	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	309	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	3	A44D2FLANGE	F42SSILL	2,860	43	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.130	0.071	0.059	0.056	0.056	372	204	168	168
NORTH OFFICE BUILDING	3RD	309	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	3	A44D2FLANGE	NONE	2,860	0	3	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	309	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	11	A44D2FLANGE	F42SSILL	2,860	43	11	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.477	0.261	0.215	0.204	0.204	1,363	747	615	615
NORTH OFFICE BUILDING	3RD	309	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	10	A44D2FLANGE	NONE	2,860	0	10	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	3RD	399	WOMENS RR	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	2	C42FLANGE	F44SSILL-R	2,860	78	2	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.155	0.095	0.060	0.057	0.057	444	272	172	172
NORTH OFFICE BUILDING	3RD	399	WOMENS RR	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	3	C42FLANGE	F42SSILL-R	2,860	41	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.122	0.071	0.051	0.048	0.048	348	204	145	145
NORTH OFFICE BUILDING	3RD	399	WOMENS RR	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	C22FLANGE/SS	F22ILL-R	2,860	26	1	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.026	0.016	0.010	0.010	0.010	75	45	30	30
NORTH OFFICE BUILDING	3RD	399	WOMENS RR	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	1	V42	F44SSILL-R	2,860	78	1	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.078	0.048	0.030	0.029	0.029	222	136	86	86
NORTH OFFICE BUILDING	3RD	399	WOMENS RR	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	V22	F22ILL-R	2,860	26	1	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.026	0.016	0.010	0.010	0.010	75	45	30	30
NORTH OFFICE BUILDING	3RD	398	MECHANICAL ROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	H42	F42SSILL-R	1,092	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.50	1,092	0.041	0.024	0.017	0.008	0.008	44	26	18	18
NORTH OFFICE BUILDING	3RD	397	MENS RR	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	6	C42FLANGE	F42SSILL-R	2,860	41	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.244	0.143	0.101	0.096	0.096	697	408	289	289
NORTH OFFICE BUILDING	3RD	397	MENS RR	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	C22FLANGE/SS	F22ILL-R	2,860	26	2	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.052	0.032	0.021	0.020	0.020	150	91	59	59
NORTH OFFICE BUILDING	3RD	397	MENS RR	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	V42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48

Facility	Area	Space	Room#/ ID#/ Dwg#	Comments	Additional Comments	Pre Fixture Qty	Existing Fixture Type	Wattage Table	Hours Pre	Pre Watts/ Fixt	Post Fixture Qty	Post Design Code (Fixture)	Post Lamp Design Code (Wattage Table)	Post Description	Post Watt/ Fixt	% Contribution to Demand Charge	Hours Post	Base kW	Retro Proposed kW	kW Difference	Retro Demand Savings (kW)	Total Demand Savings (kW)	Base kWh	Retro Proposed kWh	Retro kWh Saved	Total kWh Saved
NORTH OFFICE BUILDING	3RD	397	MENS RR	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	V22	F22ILL-R	2,860	26	1	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.026	0.016	0.010	0.010	0.010	75	45	30	30
NORTH OFFICE BUILDING	3RD	396	MECHANICAL ROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	H42	F42SSILL-R	1,092	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.50	1,092	0.041	0.024	0.017	0.008	0.008	44	26	18	18
NORTH OFFICE BUILDING	3RD	395	JANITOR CLOSET	cir32	Circleline Fluorescent Fixture w/ (1) 32w Circleline lamp and (1) standard ballast	1	cir32	FC32/1	1,092	36	1	LED/DRUM/KIT/8"	LED12W	Surface Mounted Retrofit Existing Drum with 8" LED Kit LED Light Fixture. (1) 12W	12	.50	1,092	0.036	0.012	0.024	0.012	0.012	39	13	26	26
NORTH OFFICE BUILDING	2ND	299	WOMENS RR	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	2	C42FLANGE	F44SSILL-R	2,860	78	2	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.155	0.095	0.060	0.057	0.057	444	272	172	172
NORTH OFFICE BUILDING	2ND	299	WOMENS RR	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	3	C42FLANGE	F42SSILL-R	2,860	41	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.122	0.071	0.051	0.048	0.048	348	204	145	145
NORTH OFFICE BUILDING	2ND	299	WOMENS RR	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	C22FLANGE/SS	F22ILL-R	2,860	26	1	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.026	0.016	0.010	0.010	0.010	75	45	30	30
NORTH OFFICE BUILDING	2ND	299	WOMENS RR	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	1	V42	F44SSILL-R	2,860	78	1	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.078	0.048	0.030	0.029	0.029	222	136	86	86
NORTH OFFICE BUILDING	2ND	299	WOMENS RR	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	V22	F22ILL-R	2,860	26	1	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.026	0.016	0.010	0.010	0.010	75	45	30	30
NORTH OFFICE BUILDING	2ND	298	MECHANICAL ROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	H42	F42SSILL-R	1,092	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.50	1,092	0.041	0.024	0.017	0.008	0.008	44	26	18	18
NORTH OFFICE BUILDING	2ND	297	MENS RR	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	6	C42FLANGE	F42SSILL-R	2,860	41	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.244	0.143	0.101	0.096	0.096	697	408	289	289
NORTH OFFICE BUILDING	2ND	297	MENS RR	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	C22FLANGE/SS	F22ILL-R	2,860	26	2	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.052	0.032	0.021	0.020	0.020	150	91	59	59
NORTH OFFICE BUILDING	2ND	297	MENS RR	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	V42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
NORTH OFFICE BUILDING	2ND	297	MENS RR	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	V22	F22ILL-R	2,860	26	1	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.026	0.016	0.010	0.010	0.010	75	45	30	30
NORTH OFFICE BUILDING	2ND	296	MECHANICAL ROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	H42	F42SSILL-R	1,092	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.50	1,092	0.041	0.024	0.017	0.008	0.008	44	26	18	18
NORTH OFFICE BUILDING	2ND	295	JANITOR CLOSET	cir32	Circleline Fluorescent Fixture w/ (1) 32w Circleline lamp and (1) standard ballast	1	cir32	FC32/1	1,092	36	1	LED/DRUM/KIT/8"	LED12W	Surface Mounted Retrofit Existing Drum with 8" LED Kit LED Light Fixture. (1) 12W	12	.50	1,092	0.036	0.012	0.024	0.012	0.012	39	13	26	26
NORTH OFFICE BUILDING	2ND	200	HALLWAY	EXLED	LED Exit sign	1	EXLED	LED2W	8,760	2	1	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	2	.95	8,760	0.002	0.002	-	-	-	16	16	-	-
NORTH OFFICE BUILDING	2ND	200	HALLWAY	CC1X3/SI-MINI	Relamp w/ (1) 3 watt Cold Cathode Lamp--TCP 8A03CL	1	I1X15/BLUE-EMERG	CCFC3/1	8,760	3	1	LEDSI	LED3W	Surface Mounted Install LED Screw-in Lamp LED Light Fixture. (1) 3W	3	.95	8,760	0.003	0.003	(0.000)	(0.000)	(0.000)	24	26	(2)	(2)
NORTH OFFICE BUILDING	2ND	200	HALLWAY	RL41-SS	Relamp w/ (1) GE-00257 / F28T8/SP41/UMX/ECO	3	A41/T8L	F41SSILL	2,860	23	3	LEDT8	LEDT8/4'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.070	0.036	0.035	0.033	0.033	201	102	99	99
NORTH OFFICE BUILDING	2ND	200	HALLWAY	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	3	2X4/BLANK	F42SSILL-R	2,860	41	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.122	0.071	0.051	0.048	0.048	348	204	145	145
NORTH OFFICE BUILDING	2ND	200	HALLWAY	EXLED	LED Exit sign	1	EXLED	LED2W	8,760	2	1	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	2	.95	8,760	0.002	0.002	-	-	-	16	16	-	-
NORTH OFFICE BUILDING	2ND	200	HALLWAY	CC1X3/SI-MINI	Relamp w/ (1) 3 watt Cold Cathode Lamp--TCP 8A03CL	1	I1X15/BLUE-EMERG	CCFC3/1	8,760	3	1	LEDSI	LED3W	Surface Mounted Install LED Screw-in Lamp LED Light Fixture. (1) 3W	3	.95	8,760	0.003	0.003	(0.000)	(0.000)	(0.000)	24	26	(2)	(2)
NORTH OFFICE BUILDING	2ND	200	HALLWAY	RL41-SS	Relamp w/ (1) GE-00257 / F28T8/SP41/UMX/ECO	3	A41/T8L	F41SSILL	2,860	23	3	LEDT8	LEDT8/4'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.070	0.036	0.035	0.033	0.033	201	102	99	99
NORTH OFFICE BUILDING	2ND	200	HALLWAY	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	3	2X4/BLANK	F42SSILL-R	2,860	41	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.122	0.071	0.051	0.048	0.048	348	204	145	145
NORTH OFFICE BUILDING	2ND	200	HALLWAY	LB44T2/DL-QHE	49774/GE432MAX-N/ULTRA ballast (Tandem Wire 2;1, delamp to 2 lamp per fixture)	3	A43	F44SSILL-R	2,860	78	3	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.233	0.143	0.090	0.086	0.086	666	408	258	258
NORTH OFFICE BUILDING	2ND	200	HALLWAY	RL41-SS	Relamp w/ (1) GE-00257 / F28T8/SP41/UMX/ECO	8	A41/T8L	F41SSILL	2,860	23	8	LEDT8	LEDT8/4'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.188	0.095	0.093	0.088	0.088	537	272	265	265
NORTH OFFICE BUILDING	2ND	200	HALLWAY	CC1X3/SI-MINI	Relamp w/ (1) 3 watt Cold Cathode Lamp--TCP 8A03CL	1	I1X15/BLUE-EMERG	CCFC3/1	8,760	3	1	LEDSI	LED3W	Surface Mounted Install LED Screw-in Lamp LED Light Fixture. (1) 3W	3	.95	8,760	0.003	0.003	(0.000)	(0.000)	(0.000)	24	26	(2)	(2)
NORTH OFFICE BUILDING	2ND	200-201-212	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	46	A44D2FLANGE	F42SSILL	2,860	43	46	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	1.993	1.093	0.900	0.855	0.855	5,699	3,126	2,573	2,573
NORTH OFFICE BUILDING	2ND	200-201-212	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	46	A44D2FLANGE	NONE	2,860	0	46	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	2ND	200-201-212	OFFICE	CKB22LL/REF	TROF KIT) & white reflector (2) GE-45748 / F17T8/SP41/ECOT8 lamps & (1) GE-49707/GE232MAX-L/ULTRA Low Power Instant Start Ballast	1	B24FLANGE/SS	F22ILL-R	2,860	26	1	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.026	0.016	0.010	0.010	0.010	75	45	30	30
NORTH OFFICE BUILDING	2ND	202	OFFICE	CKA44T2/REF-QHE	brackets) & white reflector (4) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49774/GE432MAX-N/ULTRA Normal Power Instant Start Ballast, tandem wired	2	A44D2FLANGE	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
NORTH OFFICE BUILDING	2ND	202	OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	1	2X4/BLANK	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
NORTH OFFICE BUILDING	2ND	203-204-205	OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	10	2X4/BLANK	F42SSILL-R	2,860	41	10	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.406	0.238	0.169	0.160	0.160	1,162	680	482	482
NORTH OFFICE BUILDING	2ND	203-204-205	OFFICE	CKA44T2/REF-QHE	brackets) & white reflector (4) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49774/GE432MAX-N/ULTRA Normal Power Instant Start Ballast, tandem wired	84	A44D2FLANGE	F42SSILL	2,860	43	84	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	3.639	1.996	1.643	1.561	1.561	10,407	5,708	4,699	4,699
NORTH OFFICE BUILDING	2ND	203-204-205	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	78	A44D2FLANGE	NONE	2,860	0	78	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	2ND	203-204-205	OFFICE	CKB22LL/REF	TROF KIT) & white reflector (2) GE-45748 / F17T8/SP41/ECOT8 lamps & (1) GE-49707/GE232MAX-L/ULTRA Low Power Instant Start Ballast	1	B24FLANGE/SS	F22ILL-R	2,860	26	1	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.026	0.016	0.010	0.010	0.010	75	45	30	30
NORTH OFFICE BUILDING	2ND	206	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	8	A44D2FLANGE	F42SSILL	2,860	43	8	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.347	0.190	0.156	0.149	0.149	991	544	448	448
NORTH OFFICE BUILDING	2ND	206	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	8	A44D2FLANGE	NONE	2,860	0	8	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	2ND	206	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	7	A44D2FLANGE	F42SSILL	2,860	43	7	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.303	0.166	0.137	0.130	0.130	867	476	392	392
NORTH OFFICE BUILDING	2ND	206	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	7	A44D2FLANGE	NONE	2,860	0	7	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	2ND	207-208-209	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	7	A44D2FLANGE	F42SSILL	2,860	43	7	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.303	0.166	0.137	0.130	0.130	867	476	392	392
NORTH OFFICE BUILDING	2ND	207-208-209	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	7	A44D2FLANGE	NONE	2,860	0	7	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	2ND	207-208-209	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	16	A44D2FLANGE	F42SSILL	2,860	43	16	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.693	0.380	0.313	0.297	0.297	1,982	1,087	895	895
NORTH OFFICE BUILDING	2ND	207-208-209	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	16	A44D2FLANGE	NONE	2,860	0	16	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	2ND	207-208-209	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	8	A44D2FLANGE	F42SSILL	2,860	43	8	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.347	0.190	0.156	0.149	0.149	991	544	448	448
NORTH OFFICE BUILDING	2ND	207-208-209	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	8	A44D2FLANGE	NONE	2,860	0	8	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	2ND	207-208-209	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	6	A44D2FLANGE	F42SSILL	2,860	43	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.260	0.143	0.117	0.111	0.111	743	408	336	336

Facility	Area	Space	Room#/ ID#/ Dwg#	Comments	Additional Comments	Pre Fixture Qty	Existing Fixture Type	Wattage Table	Hours Pre	Pre Watts/ Fixt	Post Fixture Qty	Post Design Code (Fixture)	Post Lamp Design Code (Wattage Table)	Post Description	Post Watt/ Fixt	% Contribution to Demand Charge	Hours Post	Base kW	Retro Proposed kW	kW Difference	Retro Demand Savings (kW)	Total Demand Savings (kW)	Base kWh	Retro Proposed kWh	Retro kWh Saved	Total kWh Saved
NORTH OFFICE BUILDING	2ND	207-208-209	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	6	A44D2FLANGE	NONE	2,860	0	6	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	2ND	207-208-209	OFFICE	CKB22LL/REF	TROF KIT) & white reflector (2) GE-45748 / F17T8/SP41/ECOT8 lamps & (1) GE-49707/GE232MAX-L/ULTRA Low Power Instant Start Ballast	4	B24FLANGE/SS	F22ILL-R	2,860	26	4	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.105	0.063	0.041	0.039	0.039	299	181	118	118
NORTH OFFICE BUILDING	2ND	210	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	64	A44D2FLANGE	F42SSILL	2,860	43	64	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	2.772	1.521	1.252	1.189	1.189	7,929	4,349	3,580	3,580
NORTH OFFICE BUILDING	2ND	210	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	64	A44D2FLANGE	NONE	2,860	0	64	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	2ND	210	OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	14	2X4/BLANK	F42SSILL-R	2,860	41	14	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.569	0.333	0.236	0.224	0.224	1,626	951	675	675
NORTH OFFICE BUILDING	2ND	210	OFFICE	CKB22LL/REF	TROF KIT) & white reflector (2) GE-45748 / F17T8/SP41/ECOT8 lamps & (1) GE-49707/GE232MAX-L/ULTRA Low Power Instant Start Ballast	6	B24FLANGE/SS	F22ILL-R	2,860	26	6	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.157	0.095	0.062	0.059	0.059	449	272	177	177
NORTH OFFICE BUILDING	1ST	199	WOMENS RR	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	2	C42FLANGE	F44SSILL-R	2,860	78	2	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.155	0.095	0.060	0.057	0.057	444	272	172	172
NORTH OFFICE BUILDING	1ST	199	WOMENS RR	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	3	C42FLANGE	F42SSILL-R	2,860	41	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.122	0.071	0.051	0.048	0.048	348	204	145	145
NORTH OFFICE BUILDING	1ST	199	WOMENS RR	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	C22FLANGE/SS	F22ILL-R	2,860	26	1	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.026	0.016	0.010	0.010	0.010	75	45	30	30
NORTH OFFICE BUILDING	1ST	199	WOMENS RR	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	1	V42	F44SSILL-R	2,860	78	1	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.078	0.048	0.030	0.029	0.029	222	136	86	86
NORTH OFFICE BUILDING	1ST	199	WOMENS RR	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	V22	F22ILL-R	2,860	26	1	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.026	0.016	0.010	0.010	0.010	75	45	30	30
NORTH OFFICE BUILDING	1ST	198	MECHANICAL ROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	H42	F42SSILL-R	1,092	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.50	1,092	0.041	0.024	0.017	0.008	0.008	44	26	18	18
NORTH OFFICE BUILDING	1ST	197	MENS RR	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	6	C42FLANGE	F42SSILL-R	2,860	41	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.244	0.143	0.101	0.096	0.096	697	408	289	289
NORTH OFFICE BUILDING	1ST	197	MENS RR	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	C22FLANGE/SS	F22ILL-R	2,860	26	2	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.052	0.032	0.021	0.020	0.020	150	91	59	59
NORTH OFFICE BUILDING	1ST	197	MENS RR	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	V42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
NORTH OFFICE BUILDING	1ST	197	MENS RR	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	V22	F22ILL-R	2,860	26	1	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.026	0.016	0.010	0.010	0.010	75	45	30	30
NORTH OFFICE BUILDING	1ST	196	MECHANICAL ROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	H42	F42SSILL-R	1,092	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.50	1,092	0.041	0.024	0.017	0.008	0.008	44	26	18	18
NORTH OFFICE BUILDING	1ST	195	JANITOR CLOSET	cir32	Circleline Fluorescent Fixture w/ (1) 32w Circleline lamp and (1) standard ballast	1	cir32	FC32/1	1,092	36	1	LED/DRUM/KIT/8"	LED12W	Surface Mounted Retrofit Existing Drum with 8" LED Kit LED Light Fixture. (1) 12W	12	.50	1,092	0.036	0.012	0.024	0.012	0.012	39	13	26	26
NORTH OFFICE BUILDING	1ST	100	HALLWAY	B24/T8L	2'x2' Recessed Troffer w/ (4) FO17T8 Lamps (2) Electronic Ballasts	20	B24/T8L	F24ILL	2,860	55	20	LEDT8	LEDT8/2'/8W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (4) 8W Lamps	32	.95	2,860	1.101	0.634	0.467	0.444	0.444	3,149	1,812	1,337	1,337
NORTH OFFICE BUILDING	1ST	100	HALLWAY	EXLED	LED Exit sign	5	EXLED	LED2W	8,760	2	5	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	2	.95	8,760	0.009	0.009	-	-	-	82	82	-	-
NORTH OFFICE BUILDING	1ST	100	HALLWAY	CC1X3/SI-MINI	Relamp w/ (1) 3 watt Cold Cathode Lamp--TCP 8A03CL	3	I1X15/BLUE-EMERG	CCFC3/1	8,760	3	3	LEDSI	LED3W	Surface Mounted Install LED Screw-in Lamp LED Light Fixture. (1) 3W	3	.95	8,760	0.008	0.009	(0.001)	(0.001)	(0.001)	71	78	(7)	(7)
NORTH OFFICE BUILDING	1ST	100	HALLWAY	I1X90/FLOOD	Incandescent "FLOOD" Fixture w/ (1) 90w Lamp	2	I1X90/FLOOD	I90/1	364	86	2	LEDSI/PAR38	LEDS11/1	Surface Mounted Install LED Screw-in PAR38 Lamp Light Emitting Diode Lamp, Screw-in, (1) 11W lamp	10	.50	364	0.171	0.020	0.151	0.076	0.076	62	7	55	55
NORTH OFFICE BUILDING	1ST	100	OFFICE	N/R	(Existing Fixtures To Remain Unchanged)	16	N/R	None	2,860	0	16	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	1ST	101	OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	2	2X4/BLANK	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
NORTH OFFICE BUILDING	1ST	101	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	6	A44FLANGE	F42SSILL	2,860	43	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.260	0.143	0.117	0.111	0.111	743	408	336	336
NORTH OFFICE BUILDING	1ST	101	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	6	A44FLANGE	NONE	2,860	0	6	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	1ST	101	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	1	A44FLANGE	F42SSILL	2,860	43	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.043	0.024	0.020	0.019	0.019	124	68	56	56
NORTH OFFICE BUILDING	1ST	101	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	5	A44FLANGE	F42SSILL	2,860	43	5	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.217	0.119	0.098	0.093	0.093	619	340	280	280
NORTH OFFICE BUILDING	1ST	101	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	5	A44FLANGE	NONE	2,860	0	5	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	1ST	101	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	6	A44FLANGE	F42SSILL	2,860	43	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.260	0.143	0.117	0.111	0.111	743	408	336	336
NORTH OFFICE BUILDING	1ST	101	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	6	A44FLANGE	NONE	2,860	0	6	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	1ST	120-121	OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	2	2X4/BLANK	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
NORTH OFFICE BUILDING	1ST	120-121	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	6	A44FLANGE	F42SSILL	2,860	43	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.260	0.143	0.117	0.111	0.111	743	408	336	336
NORTH OFFICE BUILDING	1ST	120-121	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	6	A44FLANGE	NONE	2,860	0	6	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	1ST	120-121	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	1	A44FLANGE	F42SSILL	2,860	43	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.043	0.024	0.020	0.019	0.019	124	68	56	56
NORTH OFFICE BUILDING	1ST	120-121	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	5	A44FLANGE	F42SSILL	2,860	43	5	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.217	0.119	0.098	0.093	0.093	619	340	280	280
NORTH OFFICE BUILDING	1ST	120-121	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	5	A44FLANGE	NONE	2,860	0	5	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	1ST	120-121	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	6	A44FLANGE	F42SSILL	2,860	43	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.260	0.143	0.117	0.111	0.111	743	408	336	336
NORTH OFFICE BUILDING	1ST	120-121	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	6	A44FLANGE	NONE	2,860	0	6	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	1ST	102.1	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A44FLANGE	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
NORTH OFFICE BUILDING	1ST	102.1	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	2	A44FLANGE	NONE	2,860	0	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	1ST	102	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A44FLANGE	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
NORTH OFFICE BUILDING	1ST	102	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	2	A44FLANGE	NONE	2,860	0	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	1ST	102	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A44FLANGE	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
NORTH OFFICE BUILDING	1ST	102	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	5	A44FLANGE	NONE	2,860	0	5	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	1ST	103	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A44FLANGE	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112

Facility	Area	Space	Room#/ ID#/ Dwg#	Comments	Additional Comments	Pre Fixture Qty	Existing Fixture Type	Wattage Table	Hours Pre	Pre Watts/ Fixt	Post Fixture Qty	Post Design Code (Fixture)	Post Lamp Design Code (Wattage Table)	Post Description	Post Watt/ Fixt	% Contribution to Demand Charge	Hours Post	Base kW	Retro Proposed kW	kW Difference	Retro Demand Savings (kW)	Total Demand Savings (kW)	Base kWh	Retro Proposed kWh	Retro kWh Saved	Total kWh Saved
NORTH OFFICE BUILDING	1ST	103	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	2	A44FLANGE	NONE	2,860	0	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	1ST	103	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	3	A44FLANGE	F42SSILL	2,860	43	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.130	0.071	0.059	0.056	0.056	372	204	168	168
NORTH OFFICE BUILDING	1ST	103	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	2	A44FLANGE	NONE	2,860	0	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	1ST	102	OPEN OFFICE	CKB23LL/REF	TROF KIT) & white reflector (3) GE-45748 / F17T8/SP41/ECOT8 lamps & (1) GE-49708/GE332MAX-L/ULTRA Low Power Instant Start Ballast	25	BU62P/T8L	F32ILL-R	2,860	35	25	LEDT8	LEDT8/3'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.880	0.594	0.286	0.272	0.272	2,517	1,699	818	818
NORTH OFFICE BUILDING	1ST	102	OPEN OFFICE	I1X25/CHA-DIM	Incandescent "CHANDELIER" Fixture w/ (1) 25w Incandescent Lamp, DIMMER CONTROLS	36	I1X25/CHA-DIM	I25/1	2,860	24	36	LEDSI	LED8W	Surface Mounted Install LED Screw-in Lamp LED Light Fixture. (1) 8W	8	.95	2,860	0.855	0.285	0.570	0.541	0.541	2,445	815	1,630	1,630
NORTH OFFICE BUILDING	1ST	104	OFFICE	CF1X15BR30/SI	Relamp w/ (1) 15 watt Compact Fluorescent R30 Screw-In--GE-80893/FLE15/2/R30XL827	12	I1X90/R	CFC15/1	2,860	14	12	LEDSI/R30	LEDS10/1	Surface Mounted Install LED Screw-in R30 Lamp Light Emitting Diode Lamp, Screw-in, (1) 10W lamp	9	.95	2,860	0.162	0.108	0.054	0.052	0.052	465	309	156	156
NORTH OFFICE BUILDING	1ST	104	OFFICE	I10X25/CHA	Chandelier w/ (10) 25w Incancescent Lamps	1	I10X25/CHA	I25/10	2,860	238	10	LEDSI	LED8W	Surface Mounted Install LED Screw-in Lamp LED Light Fixture. (1) 8W	8	.95	2,860	0.238	0.079	0.158	0.150	0.150	679	227	453	453
NORTH OFFICE BUILDING	1ST	104	OFFICE	LB44L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast	20	A44/DECO	F42SSILL-R	2,860	41	20	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.812	0.475	0.337	0.320	0.320	2,323	1,359	964	964
NORTH OFFICE BUILDING	1ST	104	OFFICE RESTROOM	CF1X11G25/SI-2700	Relamp w/ (1) 11 watt Compact Fluorescent Screw In G25 Globe Lamp--GE-47484/FLE11/2/G25XL/CD	3	I3X90/V	CFC11/3	2,860	30	9	LEDSI	LED3W	Surface Mounted Install LED Screw-in Lamp LED Light Fixture. (1) 3W	3	.95	2,860	0.089	0.027	0.063	0.059	0.059	256	76	179	179
NORTH OFFICE BUILDING	1ST	104	OFFICE CLOSET	CKA42L/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49707/GE232MAX-L/ULTRA Low Power Instant Start Ballast	1	A44FLANGE	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
NORTH OFFICE BUILDING	1ST	104	REAR OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	5	A44FLANGE	F42SSILL	2,860	43	5	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.217	0.119	0.098	0.093	0.093	619	340	280	280
NORTH OFFICE BUILDING	1ST	104	REAR OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	4	A44FLANGE	NONE	2,860	0	4	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	1ST	107	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	8	A44FLANGE	F42SSILL	2,860	43	8	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.347	0.190	0.156	0.149	0.149	991	544	448	448
NORTH OFFICE BUILDING	1ST	107	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	8	A44FLANGE	NONE	2,860	0	8	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	1ST	107	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	1	A44FLANGE	F42SSILL	2,860	43	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.043	0.024	0.020	0.019	0.019	124	68	56	56
NORTH OFFICE BUILDING	1ST	107	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	1	A44FLANGE	NONE	2,860	0	1	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	1ST	107	OFFICE	CKB22LL/REF	TROF KIT) & white reflector (2) GE-45748 / F17T8/SP41/ECOT8 lamps & (1) GE-49707/GE232MAX-L/ULTRA Low Power Instant Start Ballast	1	B24FLANGE/SS	F22ILL-R	2,860	26	1	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.026	0.016	0.010	0.010	0.010	75	45	30	30
NORTH OFFICE BUILDING	1ST	110	OFFICE	CKA44T2/REF-QHE	brackets) & white reflector (4) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49774/GE432MAX-N/ULTRA Normal Power Instant Start Ballast, tandem wired	12	A44D2FLANGE	F42SSILL	2,860	43	12	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.520	0.285	0.235	0.223	0.223	1,487	815	671	671
NORTH OFFICE BUILDING	1ST	110.1	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A44D2FLANGE	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
NORTH OFFICE BUILDING	1ST	110.1	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	2	A44D2FLANGE	NONE	2,860	0	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	1ST	110.2	REAR OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A44D2FLANGE	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
NORTH OFFICE BUILDING	1ST	110.2	REAR OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	2	A44D2FLANGE	NONE	2,860	0	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	1ST	110.3	REAR OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	3	A44D2FLANGE	F42SSILL	2,860	43	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.130	0.071	0.059	0.056	0.056	372	204	168	168
NORTH OFFICE BUILDING	1ST	110.3	REAR OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	3	A44D2FLANGE	NONE	2,860	0	3	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	1ST	110.3	REAR OFFICE	CKB22LL/REF	TROF KIT) & white reflector (2) GE-45748 / F17T8/SP41/ECOT8 lamps & (1) GE-49707/GE232MAX-L/ULTRA Low Power Instant Start Ballast	2	B24FLANGE/SS	F22ILL-R	2,860	26	2	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.052	0.032	0.021	0.020	0.020	150	91	59	59
NORTH OFFICE BUILDING	1ST	110.4	REAR OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A44D2FLANGE	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
NORTH OFFICE BUILDING	1ST	110.4	REAR OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	2	A44D2FLANGE	NONE	2,860	0	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	1ST	110.4	REAR OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	2	2X4/BLANK	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
NORTH OFFICE BUILDING	1ST	110.5	FRONT OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A44D2FLANGE	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
NORTH OFFICE BUILDING	1ST	110.5	FRONT OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	2	A44D2FLANGE	NONE	2,860	0	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	1ST	110.5	FRONT OFFICE	CKB22LL/REF	TROF KIT) & white reflector (2) GE-45748 / F17T8/SP41/ECOT8 lamps & (1) GE-49707/GE232MAX-L/ULTRA Low Power Instant Start Ballast	2	B24FLANGE/SS	F22ILL-R	2,860	26	2	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.052	0.032	0.021	0.020	0.020	150	91	59	59
NORTH OFFICE BUILDING	1ST	111	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	3	A44D2FLANGE	F42SSILL	2,860	43	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.130	0.071	0.059	0.056	0.056	372	204	168	168
NORTH OFFICE BUILDING	1ST	111	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	3	A44D2FLANGE	NONE	2,860	0	3	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	1ST	111	OFFICE	CKB22LL/REF	TROF KIT) & white reflector (2) GE-45748 / F17T8/SP41/ECOT8 lamps & (1) GE-49707/GE232MAX-L/ULTRA Low Power Instant Start Ballast	3	B24FLANGE/SS	F22ILL-R	2,860	26	3	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.079	0.048	0.031	0.029	0.029	225	136	89	89
NORTH OFFICE BUILDING	1ST	111.1	REAR OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	3	A44D2FLANGE	F42SSILL	2,860	43	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.130	0.071	0.059	0.056	0.056	372	204	168	168
NORTH OFFICE BUILDING	1ST	111.1	REAR OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	3	A44D2FLANGE	NONE	2,860	0	3	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	1ST	111.1	REAR OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	3	2X4/BLANK	F42SSILL-R	2,860	41	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.122	0.071	0.051	0.048	0.048	348	204	145	145
NORTH OFFICE BUILDING	1ST	100	MAIN FOYER	CF1X20/SI	Relamp w/ (1) 20 watt Compact Fluorescent screw-in lamp--GE-15834/FLE20HT3/2/827	3	I1X90/FR	CFC20/1	2,860	18	3	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.054	0.024	0.030	0.028	0.028	155	69	85	85
NORTH OFFICE BUILDING	1ST	100	MAIN FOYER	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	18	I6X90/CHA	CFC13/1	2,860	12	18	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.211	0.146	0.065	0.062	0.062	604	417	187	187
NORTH OFFICE BUILDING	1ST	112	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	5	A44FLANGE	F42SSILL	2,860	43	5	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.217	0.119	0.098	0.093	0.093	619	340	280	280
NORTH OFFICE BUILDING	1ST	112	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	4	A44FLANGE	NONE	2,860	0	4	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	1ST	112	OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	3	2X4/BLANK	F42SSILL-R	2,860	41	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.122	0.071	0.051	0.048	0.048	348	204	145	145
NORTH OFFICE BUILDING	1ST	112.1	REAR OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	5	A44FLANGE	F42SSILL	2,860	43	5	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.217	0.119	0.098	0.093	0.093	619	340	280	280
NORTH OFFICE BUILDING	1ST	112.1	REAR OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	4	A44FLANGE	NONE	2,860	0	4	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	1ST	113	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	5	A44FLANGE	F42SSILL	2,860	43	5	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.217	0.119	0.098	0.093	0.093	619	340	280	280
NORTH OFFICE BUILDING	1ST	113	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	5	A44FLANGE	NONE	2,860	0	5	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-

Facility	Area	Space	Room#/ ID#/ Dwg#	Comments	Additional Comments	Pre Fixture Qty	Existing Fixture Type	Wattage Table	Hours Pre	Pre Watts/ Fixt	Post Fixture Qty	Post Design Code (Fixture)	Post Lamp Design Code (Wattage Table)	Post Description	Post Watt/ Fixt	% Contribution to Demand Charge	Hours Post	Base kW	Retro Proposed kW	kW Difference	Retro Demand Savings (kW)	Total Demand Savings (kW)	Base kWh	Retro Proposed kWh	Retro kWh Saved	Total kWh Saved
NORTH OFFICE BUILDING	1ST	113	OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	2	2X4/BLANK	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
NORTH OFFICE BUILDING	1ST	113.1	REAR OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A44FLANGE	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
NORTH OFFICE BUILDING	1ST	114.1	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	4	A44FLANGE	F42SSILL	2,860	43	4	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.173	0.095	0.078	0.074	0.074	496	272	224	224
NORTH OFFICE BUILDING	1ST	114.1	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	4	A44FLANGE	NONE	2,860	0	4	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	1ST	114.2	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A44FLANGE	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
NORTH OFFICE BUILDING	1ST	114.2	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	2	A44FLANGE	NONE	2,860	0	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	1ST	114.2	OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	2	2X4/BLANK	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
NORTH OFFICE BUILDING	1ST	114	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	14	A44FLANGE	F42SSILL	2,860	43	14	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.606	0.333	0.274	0.260	0.260	1,735	951	783	783
NORTH OFFICE BUILDING	1ST	114	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	14	A44FLANGE	NONE	2,860	0	14	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	1ST	115	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A44FLANGE	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
NORTH OFFICE BUILDING	1ST	116	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	8	A44FLANGE	F42SSILL	2,860	43	8	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.347	0.190	0.156	0.149	0.149	991	544	448	448
NORTH OFFICE BUILDING	1ST	116	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	8	A44FLANGE	NONE	2,860	0	8	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	1ST	116	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	4	A44FLANGE	F42SSILL	2,860	43	4	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.173	0.095	0.078	0.074	0.074	496	272	224	224
NORTH OFFICE BUILDING	1ST	116	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	3	A44FLANGE	NONE	2,860	0	3	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	1ST	116	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	5	A44FLANGE	F42SSILL	2,860	43	5	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.217	0.119	0.098	0.093	0.093	619	340	280	280
NORTH OFFICE BUILDING	1ST	116	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	5	A44FLANGE	NONE	2,860	0	5	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	1ST	116.1	MIDDLE OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	2	2X4/BLANK	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
NORTH OFFICE BUILDING	1ST	116.1	MIDDLE OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A44FLANGE	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
NORTH OFFICE BUILDING	1ST	116.1	MIDDLE OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	2	A44FLANGE	NONE	2,860	0	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	1ST	116.2	REAR OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	2	2X4/BLANK	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
NORTH OFFICE BUILDING	1ST	116.2	REAR OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	3	A44FLANGE	F42SSILL	2,860	43	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.130	0.071	0.059	0.056	0.056	372	204	168	168
NORTH OFFICE BUILDING	1ST	116.2	REAR OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	3	A44FLANGE	NONE	2,860	0	3	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	1ST	116.3	REAR OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	2	2X4/BLANK	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
NORTH OFFICE BUILDING	1ST	116.3	REAR OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A44FLANGE	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
NORTH OFFICE BUILDING	1ST	116.3	REAR OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	2	A44FLANGE	NONE	2,860	0	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	1ST	119	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	14	A44FLANGE	F42SSILL	2,860	43	14	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.606	0.333	0.274	0.260	0.260	1,735	951	783	783
NORTH OFFICE BUILDING	1ST	119	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	14	A44FLANGE	NONE	2,860	0	14	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	1ST	119	OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	2	2X4/BLANK	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
NORTH OFFICE BUILDING	1ST	118	TELECOM OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	3	A44FLANGE	F42SSILL	2,860	43	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.130	0.071	0.059	0.056	0.056	372	204	168	168
NORTH OFFICE BUILDING	1ST	118	TELECOM OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	3	A44FLANGE	NONE	2,860	0	3	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	1ST	117	OFFICE	CKB22LL/REF	TROF KIT) & white reflector (2) GE-45748 / F17T8/SP41/ECOT8 lamps & (1) GE-49707/GE232MAX-L/ULTRA Low Power Instant Start Ballast	4	B24FLANGE/SS	F22ILL-R	2,860	26	4	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.105	0.063	0.041	0.039	0.039	299	181	118	118
NORTH OFFICE BUILDING	1ST	117	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	8	A44FLANGE	F42SSILL	2,860	43	8	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.347	0.190	0.156	0.149	0.149	991	544	448	448
NORTH OFFICE BUILDING	1ST	117	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	7	A44FLANGE	NONE	2,860	0	7	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	1ST	117	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	5	A44FLANGE	F42SSILL	2,860	43	5	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.217	0.119	0.098	0.093	0.093	619	340	280	280
NORTH OFFICE BUILDING	1ST	117	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	5	A44FLANGE	NONE	2,860	0	5	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	1ST	117	OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	5	2X4/BLANK	F42SSILL-R	2,860	41	5	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.203	0.119	0.084	0.080	0.080	581	340	241	241
NORTH OFFICE BUILDING	GRD	G30	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	3	A44FLANGE	F42SSILL	2,860	43	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.130	0.071	0.059	0.056	0.056	372	204	168	168
NORTH OFFICE BUILDING	GRD	G30	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	3	A44FLANGE	NONE	2,860	0	3	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	G30	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A44FLANGE	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
NORTH OFFICE BUILDING	GRD	G30	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	2	A44FLANGE	NONE	2,860	0	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	G30	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	1	A44FLANGE	F42SSILL	2,860	43	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.043	0.024	0.020	0.019	0.019	124	68	56	56
NORTH OFFICE BUILDING	GRD	G30.1	REAR OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A44FLANGE	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
NORTH OFFICE BUILDING	GRD	G30.1	REAR OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	2	A44FLANGE	NONE	2,860	0	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	G30.2	MIDDLE OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	3	A44FLANGE	F42SSILL	2,860	43	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.130	0.071	0.059	0.056	0.056	372	204	168	168
NORTH OFFICE BUILDING	GRD	G30.2	MIDDLE OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	3	A44FLANGE	NONE	2,860	0	3	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	G30.2	MIDDLE OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	2	2X4/BLANK	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96

Facility	Area	Space	Room#/ ID#/ Dwg#	Comments	Additional Comments	Pre Fixture Qty	Existing Fixture Type	Wattage Table	Hours Pre	Pre Watts/ Fixt	Post Fixture Qty	Post Design Code (Fixture)	Post Lamp Design Code (Wattage Table)	Post Description	Post Watt/ Fixt	% Contribution to Demand Charge	Hours Post	Base kW	Retro Proposed kW	kW Difference	Retro Demand Savings (kW)	Total Demand Savings (kW)	Base kWh	Retro Proposed kWh	Retro kWh Saved	Total kWh Saved
NORTH OFFICE BUILDING	GRD	G30.2	MIDDLE OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	2	2X4/BLANK	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
NORTH OFFICE BUILDING	GRD	G30.3	MIDDLE OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	3	A44FLANGE	F42SSILL	2,860	43	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.130	0.071	0.059	0.056	0.056	372	204	168	168
NORTH OFFICE BUILDING	GRD	G30.3	MIDDLE OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	3	A44FLANGE	NONE	2,860	0	3	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	G31	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A44FLANGE	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
NORTH OFFICE BUILDING	GRD	G31	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	2	A44FLANGE	NONE	2,860	0	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	G31	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	4	A44FLANGE	F42SSILL	2,860	43	4	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.173	0.095	0.078	0.074	0.074	496	272	224	224
NORTH OFFICE BUILDING	GRD	G31	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	4	A44FLANGE	NONE	2,860	0	4	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	G31.1	REAR OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	2	2X4/BLANK	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
NORTH OFFICE BUILDING	GRD	G31.1	REAR OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A44FLANGE	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
NORTH OFFICE BUILDING	GRD	G31.1	REAR OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	2	A44FLANGE	NONE	2,860	0	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	G31.2	SIDE OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A44FLANGE	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
NORTH OFFICE BUILDING	GRD	G31.2	SIDE OFFICE	LB44L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast	1	A44X	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
NORTH OFFICE BUILDING	GRD	G31.2	SIDE OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	2	2X4/BLANK	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
NORTH OFFICE BUILDING	GRD	G31.2	SIDE OFFICE	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	1	C42FLANGE	F44SSILL-R	2,860	78	1	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.078	0.048	0.030	0.029	0.029	222	136	86	86
NORTH OFFICE BUILDING	GRD	G001	PASSAGE TO EAST	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	A42FLANGE	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
NORTH OFFICE BUILDING	GRD	G001	STAIRWELL TO EAST	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	3	S32	F44SSILL-R	2,860	78	3	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.233	0.143	0.090	0.086	0.086	666	408	258	258
NORTH OFFICE BUILDING	GRD	G001	HALLWAY	RL41-SS	Relamp w/ (1) GE-00257 / F28T8/SP41/UMX/ECO	5	A41/T8L	F41SSILL	2,860	23	5	LEDT8	LEDT8/4'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.117	0.059	0.058	0.055	0.055	336	170	166	166
NORTH OFFICE BUILDING	GRD	G001	HALLWAY	EXLED	LED Exit sign	2	EXLED	LED2W	8,760	2	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	2	.95	8,760	0.004	0.004	-	-	-	33	33	-	-
NORTH OFFICE BUILDING	GRD	G001	HALLWAY	CC1X3/SI-MINI	Relamp w/ (1) 3 watt Cold Cathode Lamp--TCP 8A03CL	1	I1X15/BLUE-EMERG	CCFC3/1	8,760	3	1	LEDSI	LED3W	Surface Mounted Install LED Screw-in Lamp LED Light Fixture. (1) 3W	3	.95	8,760	0.003	0.003	(0.000)	(0.000)	(0.000)	24	26	(2)	(2)
NORTH OFFICE BUILDING	GRD	G001	HALLWAY	I1X90/FLOOD	Incandescent "FLOOD" Fixture w/ (1) 90w Lamp	1	I1X90/FLOOD	I90/1	364	86	1	LEDSI/PAR38	LEDS11/1	Surface Mounted Install LED Screw-in PAR38 Lamp Light Emitting Diode Lamp, Screw-in, (1) 11W lamp	10	.50	364	0.086	0.010	0.076	0.038	0.038	31	4	28	28
NORTH OFFICE BUILDING	GRD	G001	HALLWAY	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	32	UD842	F42SSILL-R	2,860	41	32	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	1.300	0.760	0.539	0.512	0.512	3,717	2,175	1,542	1,542
NORTH OFFICE BUILDING	GRD	G001	HALLWAY	RL41-SS	Relamp w/ (1) GE-00257 / F28T8/SP41/UMX/ECO	3	A41/T8L	F41SSILL	2,860	23	3	LEDT8	LEDT8/4'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.070	0.036	0.035	0.033	0.033	201	102	99	99
NORTH OFFICE BUILDING	GRD	G001	HALLWAY	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	32	UD842	F42SSILL-R	2,860	41	32	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	1.300	0.760	0.539	0.512	0.512	3,717	2,175	1,542	1,542
NORTH OFFICE BUILDING	GRD	G001	HALLWAY	RL41-SS	Relamp w/ (1) GE-00257 / F28T8/SP41/UMX/ECO	3	A41/T8L	F41SSILL	2,860	23	3	LEDT8	LEDT8/4'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.070	0.036	0.035	0.033	0.033	201	102	99	99
NORTH OFFICE BUILDING	GRD	G001	HALLWAY	EXLED	LED Exit sign	2	EXLED	LED2W	8,760	2	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	2	.95	8,760	0.004	0.004	-	-	-	33	33	-	-
NORTH OFFICE BUILDING	GRD	G001	HALLWAY	EXLED	LED Exit sign	4	EXLED	LED2W	8,760	2	4	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	2	.95	8,760	0.008	0.008	-	-	-	66	66	-	-
NORTH OFFICE BUILDING	GRD	G001	HALLWAY	RL41-SS	Relamp w/ (1) GE-00257 / F28T8/SP41/UMX/ECO	6	A41/T8L	F41SSILL	2,860	23	6	LEDT8	LEDT8/4'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.141	0.071	0.070	0.066	0.066	403	204	199	199
NORTH OFFICE BUILDING	GRD	G001	HALLWAY	CC1X3/SI-MINI	Relamp w/ (1) 3 watt Cold Cathode Lamp--TCP 8A03CL	2	I1X15/BLUE-EMERG	CCFC3/1	8,760	3	2	LEDSI	LED3W	Surface Mounted Install LED Screw-in Lamp LED Light Fixture. (1) 3W	3	.95	8,760	0.005	0.006	(0.001)	(0.000)	(0.000)	47	52	(5)	(5)
NORTH OFFICE BUILDING	GRD	G001	HALLWAY	EXLED	LED Exit sign	2	EXLED	LED2W	8,760	2	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	2	.95	8,760	0.004	0.004	-	-	-	33	33	-	-
NORTH OFFICE BUILDING	GRD	G001	HALLWAY	RL41-SS	Relamp w/ (1) GE-00257 / F28T8/SP41/UMX/ECO	11	A41/T8L	F41SSILL	2,860	23	11	LEDT8	LEDT8/4'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.258	0.131	0.127	0.121	0.121	738	374	364	364
NORTH OFFICE BUILDING	GRD	G001	HALLWAY	CC1X3/SI-MINI	Relamp w/ (1) 3 watt Cold Cathode Lamp--TCP 8A03CL	2	I1X15/BLUE-EMERG	CCFC3/1	8,760	3	2	LEDSI	LED3W	Surface Mounted Install LED Screw-in Lamp LED Light Fixture. (1) 3W	3	.95	8,760	0.005	0.006	(0.001)	(0.000)	(0.000)	47	52	(5)	(5)
NORTH OFFICE BUILDING	GRD	G001	STAIRS TO EAST	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	A42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
NORTH OFFICE BUILDING	GRD	G17-G18	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	10	A44FLANGE	F42SSILL	2,860	43	10	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.433	0.238	0.196	0.186	0.186	1,239	680	559	559
NORTH OFFICE BUILDING	GRD	G17-G18	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	10	A44FLANGE	NONE	2,860	0	10	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	G17-G18	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	5	A44FLANGE	F42SSILL	2,860	43	5	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.217	0.119	0.098	0.093	0.093	619	340	280	280
NORTH OFFICE BUILDING	GRD	G17-G18	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	4	A44FLANGE	NONE	2,860	0	4	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	G17-G18	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	3	A44FLANGE	F42SSILL	2,860	43	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.130	0.071	0.059	0.056	0.056	372	204	168	168
NORTH OFFICE BUILDING	GRD	G16.1	MECHANICAL ROOM	H844L/TG-QHE	00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA low power ballast, tube guards--white reflector	7	H882/HO	F44SSILL-R	2,860	78	7	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.543	0.333	0.211	0.200	0.200	1,554	951	603	603
NORTH OFFICE BUILDING	GRD	G16	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	4	A44FLANGE	F42SSILL	2,860	43	4	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.173	0.095	0.078	0.074	0.074	496	272	224	224
NORTH OFFICE BUILDING	GRD	G16	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	4	A44FLANGE	NONE	2,860	0	4	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	G16	OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	2	2X4/BLANK	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
NORTH OFFICE BUILDING	GRD	G14-G15	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	15	A44	F42SSILL	2,860	43	15	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.650	0.356	0.293	0.279	0.279	1,858	1,019	839	839
NORTH OFFICE BUILDING	GRD	G14-G15	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	14	A44	NONE	2,860	0	14	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	G19-G29	OFFICE CLOSET	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	1	A44D2FLANGE	F42SSILL	2,860	43	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.043	0.024	0.020	0.019	0.019	124	68	56	56
NORTH OFFICE BUILDING	GRD	G19-G29	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	11	A44D2FLANGE	F42SSILL	2,860	43	11	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.477	0.261	0.215	0.204	0.204	1,363	747	615	615
NORTH OFFICE BUILDING	GRD	G19-G29	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	10	A44D2FLANGE	NONE	2,860	0	10	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	G19-G29	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	8	A44D2FLANGE	F42SSILL	2,860	43	8	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.347	0.190	0.156	0.149	0.149	991	544	448	448
NORTH OFFICE BUILDING	GRD	G19-G29	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	7	A44D2FLANGE	NONE	2,860	0	7	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-

Facility	Area	Space	Room#/ ID#/ Dwg#	Comments	Additional Comments	Pre Fixture Qty	Existing Fixture Type	Wattage Table	Hours Pre	Pre Watts/ Fixt	Post Fixture Qty	Post Design Code (Fixture)	Post Lamp Design Code (Wattage Table)	Post Description	Post Watt/ Fixt	% Contribution to Demand Charge	Hours Post	Base kW	Retro Proposed kW	kW Difference	Retro Demand Savings (kW)	Total Demand Savings (kW)	Base kWh	Retro Proposed kWh	Retro kWh Saved	Total kWh Saved
NORTH OFFICE BUILDING	GRD	G19-G29	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	3	A44D2FLANGE	F42SSILL	2,860	43	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.130	0.071	0.059	0.056	0.056	372	204	168	168
NORTH OFFICE BUILDING	GRD	G19-G29	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	3	A44D2FLANGE	NONE	2,860	0	3	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	G19-G29	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	5	A44D2FLANGE	F42SSILL	2,860	43	5	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.217	0.119	0.098	0.093	0.093	619	340	280	280
NORTH OFFICE BUILDING	GRD	G19-G29	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	5	A44D2FLANGE	NONE	2,860	0	5	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	G19-G29	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	3	A44D2FLANGE	F42SSILL	2,860	43	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.130	0.071	0.059	0.056	0.056	372	204	168	168
NORTH OFFICE BUILDING	GRD	G19-G29	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	3	A44D2FLANGE	NONE	2,860	0	3	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	G19-G29	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	3	A44D2FLANGE	F42SSILL	2,860	43	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.130	0.071	0.059	0.056	0.056	372	204	168	168
NORTH OFFICE BUILDING	GRD	G19-G29	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	3	A44D2FLANGE	NONE	2,860	0	3	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	G19-G29	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	9	A44D2FLANGE	F42SSILL	2,860	43	9	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.390	0.214	0.176	0.167	0.167	1,115	612	503	503
NORTH OFFICE BUILDING	GRD	G19-G29	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	9	A44D2FLANGE	NONE	2,860	0	9	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	G19-G29	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	9	A44D2FLANGE	F42SSILL	2,860	43	9	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.390	0.214	0.176	0.167	0.167	1,115	612	503	503
NORTH OFFICE BUILDING	GRD	G19-G29	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	8	A44D2FLANGE	NONE	2,860	0	8	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	G19-G29	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A44D2FLANGE	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
NORTH OFFICE BUILDING	GRD	G29.1	STORAGE	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	6	H42	F44SSILL-R	2,860	78	6	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.466	0.285	0.181	0.172	0.172	1,332	815	516	516
NORTH OFFICE BUILDING	GRD	G29.1	STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	3	H42	F42SSILL-R	2,860	41	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.122	0.071	0.051	0.048	0.048	348	204	145	145
NORTH OFFICE BUILDING	GRD	G29.1	REAR STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	H42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
NORTH OFFICE BUILDING	GRD	G29.1	STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	A42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
NORTH OFFICE BUILDING	GRD	G28	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A44FLANGE	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
NORTH OFFICE BUILDING	GRD	G28	OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	2	2X4/BLANK	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
NORTH OFFICE BUILDING	GRD	G27	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A44D2FLANGE	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
NORTH OFFICE BUILDING	GRD	G27	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	2	A44D2FLANGE	NONE	2,860	0	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	G27	OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	2	2X4/BLANK	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
NORTH OFFICE BUILDING	GRD	G27	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	2	A44D2FLANGE	NONE	2,860	0	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	G27	OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	2	2X4/BLANK	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
NORTH OFFICE BUILDING	GRD	G26	DINING	CF1X20/SI	Relamp w/ (1) 20 watt Compact Fluorescent screw-in lamp--GE-15834/FLE20HT3/2/827	9	I1X90/G	CFC20/1	2,860	18	9	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.162	0.073	0.090	0.085	0.085	465	208	256	256
NORTH OFFICE BUILDING	GRD	G25	VENDING	CKB23LL/REF	TROF KIT) & white reflector (3) GE-45748 / F17T8/SP41/ECOT8 lamps & (1) GE-49708/GE332MAX-L/ULTRA Low Power Instant Start Ballast	24	BU62	F32ILL-R	2,860	35	24	LEDT8	LEDT8/3'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.845	0.570	0.275	0.261	0.261	2,416	1,631	785	785
NORTH OFFICE BUILDING	GRD	G25	VENDING	CF1X23SI	Relamp w/ (1) 23 watt Compact Fluorescent screw-in lamp--GE-80889/FLE23HT3/2/XL827	7	I1X100	CFC23/1	2,860	21	7	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.145	0.057	0.089	0.084	0.084	416	162	253	253
NORTH OFFICE BUILDING	GRD	G23	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	3	A44FLANGE	F42SSILL	2,860	43	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.130	0.071	0.059	0.056	0.056	372	204	168	168
NORTH OFFICE BUILDING	GRD	G23	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	3	A44FLANGE	NONE	2,860	0	3	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	G23.1	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	3	A44FLANGE	F42SSILL	2,860	43	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.130	0.071	0.059	0.056	0.056	372	204	168	168
NORTH OFFICE BUILDING	GRD	G23.1	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	3	A44FLANGE	NONE	2,860	0	3	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	G22	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	6	A44FLANGE	F42SSILL	2,860	43	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.260	0.143	0.117	0.111	0.111	743	408	336	336
NORTH OFFICE BUILDING	GRD	G22	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	6	A44FLANGE	NONE	2,860	0	6	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	G20-G21	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	11	A44FLANGE	F42SSILL	2,860	43	11	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.477	0.261	0.215	0.204	0.204	1,363	747	615	615
NORTH OFFICE BUILDING	GRD	G20-G21	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	10	A44FLANGE	NONE	2,860	0	10	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	G900	WOMENS RR	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	2	C42FLANGE	F44SSILL-R	2,860	78	2	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.155	0.095	0.060	0.057	0.057	444	272	172	172
NORTH OFFICE BUILDING	GRD	G900	WOMENS RR	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	3	C42FLANGE	F42SSILL-R	2,860	41	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.122	0.071	0.051	0.048	0.048	348	204	145	145
NORTH OFFICE BUILDING	GRD	G900	WOMENS RR	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	C22FLANGE/SS	F22ILL-R	2,860	26	1	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.026	0.016	0.010	0.010	0.010	75	45	30	30
NORTH OFFICE BUILDING	GRD	G900	WOMENS RR	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	1	V42	F44SSILL-R	2,860	78	1	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.078	0.048	0.030	0.029	0.029	222	136	86	86

Facility	Area	Space	Room#/ ID#/ Dwg#	Comments	Additional Comments	Pre Fixture Qty	Existing Fixture Type	Wattage Table	Hours Pre	Pre Watts/ Fixt	Post Fixture Qty	Post Design Code (Fixture)	Post Lamp Design Code (Wattage Table)	Post Description	Post Watt/ Fixt	% Contribution to Demand Charge	Hours Post	Base kW	Retro Proposed kW	kW Difference	Retro Demand Savings (kW)	Total Demand Savings (kW)	Base kWh	Retro Proposed kWh	Retro kWh Saved	Total kWh Saved
NORTH OFFICE BUILDING	GRD	G900	WOMENS RR	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	V22	F22ILL-R	2,860	26	1	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.026	0.016	0.010	0.010	0.010	75	45	30	30
NORTH OFFICE BUILDING	GRD	G901	MECHANICAL ROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	H42	F42SSILL-R	1,092	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.50	1,092	0.041	0.024	0.017	0.008	0.008	44	26	18	18
NORTH OFFICE BUILDING	GRD	G902	MENS RR	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	6	C42FLANGE	F42SSILL-R	2,860	41	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.244	0.143	0.101	0.096	0.096	697	408	289	289
NORTH OFFICE BUILDING	GRD	G902	MENS RR	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	C22FLANGE/SS	F22ILL-R	2,860	26	2	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.052	0.032	0.021	0.020	0.020	150	91	59	59
NORTH OFFICE BUILDING	GRD	G902	MENS RR	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	V42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
NORTH OFFICE BUILDING	GRD	G902	MENS RR	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	V22	F22ILL-R	2,860	26	1	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.026	0.016	0.010	0.010	0.010	75	45	30	30
NORTH OFFICE BUILDING	GRD	G903	MECHANICAL ROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	H42	F42SSILL-R	1,092	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.50	1,092	0.041	0.024	0.017	0.008	0.008	44	26	18	18
NORTH OFFICE BUILDING	GRD	G904	JANITOR CLOSET	cir32	Circleline Fluorescent Fixture w/ (1) 32w Circleline lamp and (1) standard ballast	1	cir32	FC32/1	1,092	36	1	LED/DRUM/KIT/8"	LED12W	Surface Mounted Retrofit Existing Drum with 8" LED Kit LED Light Fixture. (1) 12W	12	.50	1,092	0.036	0.012	0.024	0.012	0.012	39	13	26	26
NORTH OFFICE BUILDING	GRD	G32-G33	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	1	A44FLANGE	F42SSILL	2,860	43	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.043	0.024	0.020	0.019	0.019	124	68	56	56
NORTH OFFICE BUILDING	GRD	G32-G33	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	1	A44FLANGE	NONE	2,860	0	1	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	G32-G33	OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	1	2X4/BLANK	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
NORTH OFFICE BUILDING	GRD	G32-G33	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	5	A44FLANGE	F42SSILL	2,860	43	5	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.217	0.119	0.098	0.093	0.093	619	340	280	280
NORTH OFFICE BUILDING	GRD	G32-G33	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	5	A44FLANGE	NONE	2,860	0	5	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	G32-G33	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	4	A44FLANGE	F42SSILL	2,860	43	4	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.173	0.095	0.078	0.074	0.074	496	272	224	224
NORTH OFFICE BUILDING	GRD	G32-G33	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	4	A44FLANGE	NONE	2,860	0	4	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	G32-G33	REAR OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A44FLANGE	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
NORTH OFFICE BUILDING	GRD	G32-G33	REAR OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	2	A44FLANGE	NONE	2,860	0	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	G32-G33	REAR OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	2	2X4/BLANK	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
NORTH OFFICE BUILDING	GRD	G32-G33	STORAGE	CKA42L/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49707/GE232MAX-L/ULTRA Low Power Instant Start Ballast	2	A44FLANGE	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
NORTH OFFICE BUILDING	GRD	G32-G33	STORAGE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	2	A44FLANGE	NONE	2,860	0	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	G001	FOYER ENTRY	CF1X20/SI	Relamp w/ (1) 20 watt Compact Fluorescent screw-in lamp--GE-15834/FLE20HT3/2/827	3	I1X90/FR	CFC20/1	2,860	18	3	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.054	0.024	0.030	0.028	0.028	155	69	85	85
NORTH OFFICE BUILDING	GRD	G001	FOYER ENTRY	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	21	I7X90/CHA	CFC13/1	2,860	12	21	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.246	0.170	0.076	0.072	0.072	705	486	218	218
NORTH OFFICE BUILDING	GRD	G12-G13-G11	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	20	A44FLANGE	F42SSILL	2,860	43	20	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.866	0.475	0.391	0.372	0.372	2,478	1,359	1,119	1,119
NORTH OFFICE BUILDING	GRD	G12-G13-G11	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	20	A44FLANGE	NONE	2,860	0	20	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	G12-G13-G11	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A44FLANGE	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
NORTH OFFICE BUILDING	GRD	G12-G13-G11	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	2	A44FLANGE	NONE	2,860	0	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	G12-G13-G11	OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	1	2X4/BLANK	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
NORTH OFFICE BUILDING	GRD	G12-G13-G11	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	1	A44FLANGE	F42SSILL	2,860	43	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.043	0.024	0.020	0.019	0.019	124	68	56	56
NORTH OFFICE BUILDING	GRD	G12-G13-G11	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	1	A44FLANGE	NONE	2,860	0	1	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	G12-G13-G11	COMPUTER OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	4	2X4/BLANK	F42SSILL-R	2,860	41	4	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.162	0.095	0.067	0.064	0.064	465	272	193	193
NORTH OFFICE BUILDING	GRD	G12-G13-G11	COMPUTER OFFICE	CKB22LL/REF	TROF KIT) & white reflector (2) GE-45748 / F17T8/SP41/ECOT8 lamps & (1) GE-49707/GE232MAX-L/ULTRA Low Power Instant Start Ballast	1	B24FLANGE/SS	F22ILL-R	2,860	26	1	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.026	0.016	0.010	0.010	0.010	75	45	30	30
NORTH OFFICE BUILDING	GRD	G12-G13-G11	COMPUTER OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	4	A44FLANGE	F42SSILL	2,860	43	4	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.173	0.095	0.078	0.074	0.074	496	272	224	224
NORTH OFFICE BUILDING	GRD	G12-G13-G11	COMPUTER OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	4	A44FLANGE	NONE	2,860	0	4	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	G12-G13-G11	COMPUTER OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	3	A44FLANGE	F42SSILL	2,860	43	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.130	0.071	0.059	0.056	0.056	372	204	168	168
NORTH OFFICE BUILDING	GRD	G12-G13-G11	COMPUTER OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	3	A44FLANGE	NONE	2,860	0	3	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	G04	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	8	A44FLANGE	F42SSILL	2,860	43	8	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.347	0.190	0.156	0.149	0.149	991	544	448	448
NORTH OFFICE BUILDING	GRD	G04	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	8	A44FLANGE	NONE	2,860	0	8	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	G04	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	8	A44FLANGE	F42SSILL	2,860	43	8	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.347	0.190	0.156	0.149	0.149	991	544	448	448
NORTH OFFICE BUILDING	GRD	G04	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	7	A44FLANGE	NONE	2,860	0	7	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	G08-G09-G10	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	12	A44FLANGE	F42SSILL	2,860	43	12	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.520	0.285	0.235	0.223	0.223	1,487	815	671	671
NORTH OFFICE BUILDING	GRD	G08-G09-G10	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	11	A44FLANGE	NONE	2,860	0	11	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	G08-G09-G10	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	11	A44FLANGE	F42SSILL	2,860	43	11	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.477	0.261	0.215	0.204	0.204	1,363	747	615	615
NORTH OFFICE BUILDING	GRD	G08-G09-G10	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	10	A44FLANGE	NONE	2,860	0	10	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	G08-G09-G10	OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	5	2X4/BLANK	F42SSILL-R	2,860	41	5	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.203	0.119	0.084	0.080	0.080	581	340	241	241
NORTH OFFICE BUILDING	GRD	G05	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A44D2FLANGE	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
NORTH OFFICE BUILDING	GRD	G05	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	2	A44D2FLANGE	NONE	2,860	0	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-

Facility	Area	Space	Room#/ ID#/ Dwg#	Comments	Additional Comments	Pre Fixture Qty	Existing Fixture Type	Wattage Table	Hours Pre	Pre Watts/ Fixt	Post Fixture Qty	Post Design Code (Fixture)	Post Lamp Design Code (Wattage Table)	Post Description	Post Watt/ Fixt	% Contribution to Demand Charge	Hours Post	Base kW	Retro Proposed kW	kW Difference	Retro Demand Savings (kW)	Total Demand Savings (kW)	Base kWh	Retro Proposed kWh	Retro kWh Saved	Total kWh Saved
NORTH OFFICE BUILDING	GRD	G05	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A44D2FLANGE	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
NORTH OFFICE BUILDING	GRD	G05	OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	6	2X4/BLANK	F42SSILL-R	2,860	41	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.244	0.143	0.101	0.096	0.096	697	408	289	289
NORTH OFFICE BUILDING	GRD	G05	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	3	A44D2FLANGE	F42SSILL	2,860	43	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.130	0.071	0.059	0.056	0.056	372	204	168	168
NORTH OFFICE BUILDING	GRD	G05	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	2	A44D2FLANGE	NONE	2,860	0	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	G05	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	3	A44D2FLANGE	F42SSILL	2,860	43	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.130	0.071	0.059	0.056	0.056	372	204	168	168
NORTH OFFICE BUILDING	GRD	G05	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	3	A44D2FLANGE	NONE	2,860	0	3	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	G05	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	3	A44D2FLANGE	F42SSILL	2,860	43	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.130	0.071	0.059	0.056	0.056	372	204	168	168
NORTH OFFICE BUILDING	GRD	G05	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	3	A44D2FLANGE	NONE	2,860	0	3	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	G06	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	27	A42FLANGE/T8L	F42SSILL	2,860	43	27	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	1.170	0.642	0.528	0.502	0.502	3,345	1,835	1,510	1,510
NORTH OFFICE BUILDING	GRD	G06	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	27	A42FLANGE/T8L	NONE	2,860	0	27	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	G06	OFFICE	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	13	2X4/BLANK	F42SSILL-R	2,860	41	13	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.528	0.309	0.219	0.208	0.208	1,510	883	627	627
NORTH OFFICE BUILDING	GRD	G06	SIDE ENTRY	CF1X20/SI	Relamp w/ (1) 20 watt Compact Fluorescent screw-in lamp--GE-15834/FLE20HT3/2/827	1	I1X90/FR	CFC20/1	2,860	18	1	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.018	0.008	0.010	0.009	0.009	52	23	28	28
NORTH OFFICE BUILDING	GRD	G06	SIDE ENTRY	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	7	I7X90/CHA	CFC13/1	2,860	12	7	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.082	0.057	0.025	0.024	0.024	235	162	73	73
NORTH OFFICE BUILDING	GRD	G07	TELEPHONE BOOTHS (3)	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	3	I1X90/R	CFC13/1	2,860	12	3	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.035	0.024	0.011	0.010	0.010	101	69	31	31
NORTH OFFICE BUILDING	GRD	G07	SERVER ROOM	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A44FLANGE	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
NORTH OFFICE BUILDING	GRD	G07	SERVER ROOM	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	4	A44FLANGE	NONE	2,860	0	4	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	G07A	SERVER ROOM	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	17	A44FLANGE	F42SSILL	2,860	43	17	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.736	0.404	0.333	0.316	0.316	2,106	1,155	951	951
NORTH OFFICE BUILDING	GRD	G07A	SERVER ROOM	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	13	A44FLANGE	NONE	2,860	0	13	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	G07A	SERVER ROOM	CKB22LL/REF	TROF KIT) & white reflector (2) GE-45748 / F17T8/SP41/ECOT8 lamps & (1) GE-49707/GE232MAX-L/ULTRA Low Power Instant Start Ballast	3	BU62	F22ILL-R	2,860	26	3	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.079	0.048	0.031	0.029	0.029	225	136	89	89
NORTH OFFICE BUILDING	GRD	#1	HEARING ROOM	N/R	(Existing Fixtures To Remain Unchanged)	1	N/R	None	2,860	0	1	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	#2	HEARING ROOM	N/R	(Existing Fixtures To Remain Unchanged)	1	N/R	None	2,860	0	1	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	#3	HEARING ROOM	N/R	(Existing Fixtures To Remain Unchanged)	1	N/R	None	2,860	0	1	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	GRD	HEARING	HALLWAY	EXLED	LED Exit sign	1	EXLED	LED2W	8,760	2	1	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	2	.95	8,760	0.002	0.002	-	-	-	16	16	-	-
NORTH OFFICE BUILDING	GRD	HEARING	HALLWAY	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	40	I10X90/CHA	CFC13/1	2,860	12	40	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.469	0.324	0.145	0.138	0.138	1,342	927	416	416
NORTH OFFICE BUILDING	BASE	B20	UNDER CONSTRUCTION	N/R	(Existing Fixtures To Remain Unchanged)	1	N/R	None	2,860	0	1	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	BASE	B21	UNDER CONSTRUCTION	N/R	(Existing Fixtures To Remain Unchanged)	1	N/R	None	2,860	0	1	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	BASE	B15	UNDER CONSTRUCTION	N/R	(Existing Fixtures To Remain Unchanged)	1	N/R	None	2,860	0	1	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	BASE	B16	UNDER CONSTRUCTION	N/R	(Existing Fixtures To Remain Unchanged)	1	N/R	None	2,860	0	1	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	BASE	B22	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	12	A44	F42SSILL	2,860	43	12	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.520	0.285	0.235	0.223	0.223	1,487	815	671	671
NORTH OFFICE BUILDING	BASE	B22	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	6	A44	NONE	2,860	0	6	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	BASE	B22	OFFICE	CKA44T2/REF-QHE	brackets) & white reflector (4) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49774/GE432MAX-N/ULTRA Normal Power Instant Start Ballast, tandem wired	4	A43	F42SSILL	2,860	43	4	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.173	0.095	0.078	0.074	0.074	496	272	224	224
NORTH OFFICE BUILDING	BASE	B001	HALLWAY	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	6	C42X	F42SSILL-R	2,860	41	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.244	0.143	0.101	0.096	0.096	697	408	289	289
NORTH OFFICE BUILDING	BASE	B001	HALLWAY	EXLED	LED Exit sign	1	EXLED	LED2W	8,760	2	1	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	2	.95	8,760	0.002	0.002	-	-	-	16	16	-	-
NORTH OFFICE BUILDING	BASE	B001	HALLWAY	CC1X3/SI-MINI	Relamp w/ (1) 3 watt Cold Cathode Lamp--TCP 8A03CL	1	I1X15/BLUE-EMERG	CCFC3/1	8,760	3	1	LEDSI	LED3W	Surface Mounted Install LED Screw-in Lamp LED Light Fixture. (1) 3W	3	.95	8,760	0.003	0.003	(0.000)	(0.000)	(0.000)	24	26	(2)	(2)
NORTH OFFICE BUILDING	BASE	B001	HALLWAY	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	19	C42X	F42SSILL-R	2,860	41	19	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.772	0.451	0.320	0.304	0.304	2,207	1,291	916	916
NORTH OFFICE BUILDING	BASE	B001	HALLWAY	EXLED	LED Exit sign	2	EXLED	LED2W	8,760	2	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	2	.95	8,760	0.004	0.004	-	-	-	33	33	-	-
NORTH OFFICE BUILDING	BASE	B001	HALLWAY	CC1X3/SI-MINI	Relamp w/ (1) 3 watt Cold Cathode Lamp--TCP 8A03CL	2	I1X15/BLUE-EMERG	CCFC3/1	8,760	3	2	LEDSI	LED3W	Surface Mounted Install LED Screw-in Lamp LED Light Fixture. (1) 3W	3	.95	8,760	0.005	0.006	(0.001)	(0.000)	(0.000)	47	52	(5)	(5)
NORTH OFFICE BUILDING	BASE	B001	HALLWAY	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	9	C42X	F42SSILL-R	2,860	41	9	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.366	0.214	0.152	0.144	0.144	1,045	612	434	434
NORTH OFFICE BUILDING	BASE	B001	HALLWAY	EXLED	LED Exit sign	1	EXLED	LED2W	8,760	2	1	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	2	.95	8,760	0.002	0.002	-	-	-	16	16	-	-
NORTH OFFICE BUILDING	BASE	B001	HALLWAY	CC1X3/SI-MINI	Relamp w/ (1) 3 watt Cold Cathode Lamp--TCP 8A03CL	1	I1X15/BLUE-EMERG	CCFC3/1	8,760	3	1	LEDSI	LED3W	Surface Mounted Install LED Screw-in Lamp LED Light Fixture. (1) 3W	3	.95	8,760	0.003	0.003	(0.000)	(0.000)	(0.000)	24	26	(2)	(2)
NORTH OFFICE BUILDING	BASE	B001	HALLWAY	EXLED	LED Exit sign	1	EXLED	LED2W	8,760	2	1	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	2	.95	8,760	0.002	0.002	-	-	-	16	16	-	-
NORTH OFFICE BUILDING	BASE	B001	HALLWAY	CC1X3/SI-MINI	Relamp w/ (1) 3 watt Cold Cathode Lamp--TCP 8A03CL	1	I1X15/BLUE-EMERG	CCFC3/1	8,760	3	1	LEDSI	LED3W	Surface Mounted Install LED Screw-in Lamp LED Light Fixture. (1) 3W	3	.95	8,760	0.003	0.003	(0.000)	(0.000)	(0.000)	24	26	(2)	(2)
NORTH OFFICE BUILDING	BASE	B001	HALLWAY	RL41-SS	Relamp w/ (1) GE-00257 / F28T8/SP41/UMX/ECO	5	A41/T8L	F41SSILL	2,860	23	5	LEDT8	LEDT8/4'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.117	0.059	0.058	0.055	0.055	336	170	166	166
NORTH OFFICE BUILDING	BASE	B001	HALLWAY	2X4/BLANK	EXISTING 2X4 RECESSED TROFFER DELAMPED AND DEBALLAST-NO WATTAGE SAVINGS	4	2X4/BLANK	F42SSILL-R	2,860	41	4	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.162	0.095	0.067	0.064	0.064	465	272	193	193
NORTH OFFICE BUILDING	BASE	B06	ENTRY	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	1	A43	F42SSILL	2,860	43	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.043	0.024	0.020	0.019	0.019	124	68	56	56
NORTH OFFICE BUILDING	BASE	B06	STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	8	H42	F42SSILL-R	2,860	41	8	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.325	0.190	0.135	0.128	0.128	929	544	386	386

Facility	Area	Space	Room#/ ID#/ Dwg#	Comments	Additional Comments	Pre Fixture Qty	Existing Fixture Type	Wattage Table	Hours Pre	Pre Watts/ Fixt	Post Fixture Qty	Post Design Code (Fixture)	Post Lamp Design Code (Wattage Table)	Post Description	Post Watt/ Fixt	% Contribution to Demand Charge	Hours Post	Base kW	Retro Proposed kW	kW Difference	Retro Demand Savings (kW)	Total Demand Savings (kW)	Base kWh	Retro Proposed kWh	Retro kWh Saved	Total kWh Saved
NORTH OFFICE BUILDING	BASE	B06	TUNNEL	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A43	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
NORTH OFFICE BUILDING	BASE	B06	TUNNEL	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	7	W42	F42SSILL-R	2,860	41	7	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.284	0.166	0.118	0.112	0.112	813	476	337	337
NORTH OFFICE BUILDING	BASE	B05	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	10	A44	F42SSILL	2,860	43	10	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.433	0.238	0.196	0.186	0.186	1,239	680	559	559
NORTH OFFICE BUILDING	BASE	B05	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	5	A44	NONE	2,860	0	5	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	BASE	B07	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	3	A44M	F42SSILL	2,860	43	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.130	0.071	0.059	0.056	0.056	372	204	168	168
NORTH OFFICE BUILDING	BASE	B07	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	2	A44M	NONE	2,860	0	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	BASE	B07	PIPE CHASE/KITCHENETTE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	4	V42	F42SSILL-R	2,860	41	4	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.162	0.095	0.067	0.064	0.064	465	272	193	193
NORTH OFFICE BUILDING	BASE	B07	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	7	A44	F42SSILL	2,860	43	7	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.303	0.166	0.137	0.130	0.130	867	476	392	392
NORTH OFFICE BUILDING	BASE	B07	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	4	A44	NONE	2,860	0	4	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	BASE	B08	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	13	A44FLANGE	F42SSILL	2,860	43	13	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.563	0.309	0.254	0.242	0.242	1,611	883	727	727
NORTH OFFICE BUILDING	BASE	B08	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	6	A44FLANGE	NONE	2,860	0	6	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	BASE	B08	OFFICE	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	3	H42	F44SSILL-R	2,860	78	3	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.233	0.143	0.090	0.086	0.086	666	408	258	258
NORTH OFFICE BUILDING	BASE	B08	OFFICE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	H42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
NORTH OFFICE BUILDING	BASE	B08	OFFICE	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	4	H42	F44SSILL-R	2,860	78	4	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.310	0.190	0.120	0.114	0.114	888	544	344	344
NORTH OFFICE BUILDING	BASE	B08	OFFICE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	H42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
NORTH OFFICE BUILDING	BASE	B08	OFFICE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	3	C42X	F42SSILL-R	2,860	41	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.122	0.071	0.051	0.048	0.048	348	204	145	145
NORTH OFFICE BUILDING	BASE	B14	OFFICE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	C42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
NORTH OFFICE BUILDING	BASE	B14	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	4	A44M	F42SSILL	2,860	43	4	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.173	0.095	0.078	0.074	0.074	496	272	224	224
NORTH OFFICE BUILDING	BASE	B14	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	2	A44M	NONE	2,860	0	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	BASE	B13	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	6	A44M	F42SSILL	2,860	43	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.260	0.143	0.117	0.111	0.111	743	408	336	336
NORTH OFFICE BUILDING	BASE	B13	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	2	A44M	NONE	2,860	0	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	BASE	B04	OFFICE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	C42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
NORTH OFFICE BUILDING	BASE	B04	OFFICE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	24	A44FLANGE	F42SSILL	2,860	43	24	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	1.040	0.570	0.469	0.446	0.446	2,973	1,631	1,343	1,343
NORTH OFFICE BUILDING	BASE	B04	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	16	A44FLANGE	NONE	2,860	0	16	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	BASE	B04	OFFICE	CKB22LL/REF	TROF KIT) & white reflector (2) GE-45748 / F17T8/SP41/ECOT8 lamps & (1) GE-49707/GE232MAX-L/ULTRA Low Power Instant Start Ballast	1	BU62	F22ILL-R	2,860	26	1	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.026	0.016	0.010	0.010	0.010	75	45	30	30
NORTH OFFICE BUILDING	BASE	B04	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	21	A42	F42SSILL	2,860	43	21	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.910	0.499	0.411	0.390	0.390	2,602	1,427	1,175	1,175
NORTH OFFICE BUILDING	BASE	B04	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	21	A42	NONE	2,860	0	21	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	BASE	B03	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	12	A44	F42SSILL	2,860	43	12	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.520	0.285	0.235	0.223	0.223	1,487	815	671	671
NORTH OFFICE BUILDING	BASE	B03	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	6	A44	NONE	2,860	0	6	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	BASE	B03	OFFICE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	C42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
NORTH OFFICE BUILDING	BASE	B09	STORAGE	CF1X29/SI	Relamp w/ (1) 29 watt Compact Fluorescent Screw-In lamp--GE-81514/FLE29HLX/2XL/827	37	I1X200/P	CFC30/1	2,860	27	37	LEDSI/A	LEDS11/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 11W lamp	10	.95	2,860	1.002	0.366	0.635	0.604	0.604	2,865	1,048	1,817	1,817
NORTH OFFICE BUILDING	BASE	B09	STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	S42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
NORTH OFFICE BUILDING	BASE	B09	STORAGE	LB41L-QHE	Relamp & Reballast w/ (1) GE-00257 / F28T8/SP41/UMX/ECO Lamp & (1) GE-49706/GE132MAX-L/ULTRA ballast	1	V41	F41SSILL-R	2,860	21	1	LEDT8	LEDT8/4'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.021	0.012	0.009	0.008	0.008	59	34	25	25
NORTH OFFICE BUILDING	BASE	B10-B11-B12	STORAGE	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	9	H42	F44SSILL-R	2,860	78	9	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.699	0.428	0.271	0.257	0.257	1,998	1,223	775	775
NORTH OFFICE BUILDING	BASE	B10-B11-B12	STORAGE	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	2	H42	F44SSILL-R	2,860	78	2	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.155	0.095	0.060	0.057	0.057	444	272	172	172
NORTH OFFICE BUILDING	BASE	B10-B11-B12	STORAGE	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	1	H42	F44SSILL-R	2,860	78	1	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.078	0.048	0.030	0.029	0.029	222	136	86	86
NORTH OFFICE BUILDING	BASE	B10-B11-B12	STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	H42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
NORTH OFFICE BUILDING	BASE	B17	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	6	A44FLANGE	F42SSILL	2,860	43	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.260	0.143	0.117	0.111	0.111	743	408	336	336
NORTH OFFICE BUILDING	BASE	B17	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	4	A44FLANGE	NONE	2,860	0	4	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	BASE	B18-B19	OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	24	A44FLANGE	F42SSILL	2,860	43	24	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	1.040	0.570	0.469	0.446	0.446	2,973	1,631	1,343	1,343
NORTH OFFICE BUILDING	BASE	B18-B19	OFFICE	SAFEOFF/LENS-NORTH	NORTH / MEASUREMENTS= 22 1/8 X 47 1/2 lens blank, Clips installed during construction	16	A44FLANGE	NONE	2,860	0	16	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
NORTH OFFICE BUILDING	BASE	B01-B02-B26	MECHANICAL ROOM	CF1X29/SI	Relamp w/ (1) 29 watt Compact Fluorescent Screw-In lamp--GE-81514/FLE29HLX/2XL/827	32	I1X150/B	CFC30/1	1,092	27	32	LEDSI/A	LEDS11/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 11W lamp	10	.50	1,092	0.866	0.317	0.550	0.275	0.275	946	346	600	600
NORTH OFFICE BUILDING	BASE	B25	HALLWAY	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	4	A43	F42SSILL	2,860	43	4	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.173	0.095	0.078	0.074	0.074	496	272	224	224
NORTH OFFICE BUILDING	BASE	B25	HALLWAY	EXLED	LED Exit sign	1	EXLED	LED2W	8,760	2	1	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	2	.95	8,760	0.002	0.002	-	-	-	16	16	-	-
NORTH OFFICE BUILDING	BASE	B25	RESTROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	4	C42FLANGE	F42SSILL-R	2,860	41	4	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.162	0.095	0.067	0.064	0.064	465	272	193	193
NORTH OFFICE BUILDING	BASE	B25	RESTROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	V42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
NORTH OFFICE BUILDING	BASE	B25	RESTROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	V42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
NORTH OFFICE BUILDING	BASE	B25	RESTROOM	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	V22	F22ILL-R	2,860	26	1	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.026	0.016	0.010	0.010	0.010	75	45	30	30

Facility	Area	Space	Room#/ ID#/ Dwg#	Comments	Additional Comments	Pre Fixture Qty	Existing Fixture Type	Wattage Table	Hours Pre	Pre Watts/ Fixt	Post Fixture Qty	Post Design Code (Fixture)	Post Lamp Design Code (Wattage Table)	Post Description	Post Watt/ Fixt	% Contribution to Demand Charge	Hours Post	Base kW	Retro Proposed kW	kW Difference	Retro Demand Savings (kW)	Total Demand Savings (kW)	Base kWh	Retro Proposed kWh	Retro kWh Saved	Total kWh Saved
NORTH OFFICE BUILDING	BASE	B25	RESTROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	5	C42FLANGE	F42SSILL-R	2,860	41	5	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.203	0.119	0.084	0.080	0.080	581	340	241	241
NORTH OFFICE BUILDING	BASE	B25	RESTROOM	CF1X26/SI	Relamp w/ (1) 26 watt Compact Fluorescent Screw-In lamp--GE-15836/FLE26HT3/2/827	1	I1X150/B	CFC26/1	2,860	23	1	LEDSI/A	LEDS11/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 11W lamp	10	.95	2,860	0.023	0.010	0.014	0.013	0.013	67	28	39	39
NORTH OFFICE BUILDING	BASE	B25	OFFICE/BREAKROOM	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	2	A42	F44SSILL-R	2,860	78	2	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.155	0.095	0.060	0.057	0.057	444	272	172	172
NORTH OFFICE BUILDING	BASE	B25	OFFICE/BREAKROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	A42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
NORTH OFFICE BUILDING	BASE	B25	OFFICE/BREAKROOM	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	2	A42	F44SSILL-R	2,860	78	2	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.155	0.095	0.060	0.057	0.057	444	272	172	172
NORTH OFFICE BUILDING	BASE	B25	OFFICE/BREAKROOM	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	6	H42	F44SSILL-R	2,860	78	6	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.466	0.285	0.181	0.172	0.172	1,332	815	516	516
NORTH OFFICE BUILDING	BASE	B25	HALLWAY	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	C42P	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
NORTH OFFICE BUILDING	BASE	B23	FREIGHT HALLWAY	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	H42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
NORTH OFFICE BUILDING	BASE	B23	FREIGHT HALLWAY	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	7	V42	F42SSILL-R	2,860	41	7	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.284	0.166	0.118	0.112	0.112	813	476	337	337
NORTH OFFICE BUILDING	BASE	B23	ELECTRIC SHOP	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	7	H42	F42SSILL-R	2,860	41	7	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.284	0.166	0.118	0.112	0.112	813	476	337	337
NORTH OFFICE BUILDING	BASE	B23	FREIGHT HALLWAY	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	11	H42/T8E	F42SSILL-R	2,860	41	11	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.447	0.261	0.185	0.176	0.176	1,278	747	530	530
NORTH OFFICE BUILDING	BASE	B23	FREIGHT HALLWAY	EXN	New Astralite Model #TP-U-R-W-AC White PVC Plastic LED exit sign AC only (dual voltage 120/277),	2	EX2X15	LED2W	8,760	2	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	2	.95	8,760	0.004	0.004	-	-	-	33	33	-	-
NORTH OFFICE BUILDING	BASE	B23	FREIGHT HALLWAY	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	H42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
NORTH OFFICE BUILDING	BASE	B23	FREIGHT HALLWAY	CC1X3/SI-MINI	Relamp w/ (1) 3 watt Cold Cathode Lamp--TCP 8A03CL	1	I1X15/BLUE-EMERG	CCFC3/1	8,760	3	1	LEDSI	LED3W	Surface Mounted Install LED Screw-in Lamp LED Light Fixture. (1) 3W	3	.95	8,760	0.003	0.003	(0.000)	(0.000)	(0.000)	24	26	(2)	(2)
NORTH OFFICE BUILDING	BASE	B23	STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	C42P	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
NORTH OFFICE BUILDING	BASE	B23	STORAGE	CKB23LL/REF	TROF KIT) & white reflector (3) GE-45748 / F17T8/SP41/ECOT8 lamps & (1) GE-49708/GE332MAX-L/ULTRA Low Power Instant Start Ballast	4	BU62P	F32ILL-R	2,860	35	4	LEDT8	LEDT8/3'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.141	0.095	0.046	0.043	0.043	403	272	131	131
TUNNELS	ALL	901	UNDER FIELD TO CENTRAL PLANT	VP844L/PIPE/OCC-QHE	(4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA--white ballast cover, Add Conduit as needed, Sensor Switch occupancy	2	W842	F44SSILL-R	3,500	78	2	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	3,500	0.155	0.095	0.060	0.057	0.057	543	333	211	211
TUNNELS	ALL	901	UNDER FIELD TO CENTRAL PLANT	VP844L/PIPE-QHE	Sylvania QHE Electronic Low-Power Ballast--white ballast cover, Add Conduit as needed	1	W842	F44SSILL-R	3,500	78	1	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	3,500	0.078	0.048	0.030	0.029	0.029	272	166	105	105
TUNNELS	ALL	901	UNDER FIELD TO CENTRAL PLANT	VP844L/PIPE/OCC-QHE	(4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA--white ballast cover, Add Conduit as needed, Sensor Switch occupancy	1	W41	F44SSILL-R	3,500	78	1	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	3,500	0.078	0.048	0.030	0.029	0.029	272	166	105	105
TUNNELS	ALL	901	UNDER FIELD TO CENTRAL PLANT	VP844L/PIPE/OCC-QHE	(4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA--white ballast cover, Add Conduit as needed, Sensor Switch occupancy	2	W842	F44SSILL-R	3,500	78	2	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	3,500	0.155	0.095	0.060	0.057	0.057	543	333	211	211
TUNNELS	ALL	901	UNDER FIELD TO CENTRAL PLANT	VP844L/PIPE-QHE	Sylvania QHE Electronic Low-Power Ballast--white ballast cover, Add Conduit as needed	6	W842	F44SSILL-R	3,500	78	6	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	3,500	0.466	0.285	0.181	0.172	0.172	1,630	998	632	632
TUNNELS	ALL	901	UNDER FIELD TO CENTRAL PLANT	VP844L/PIPE/OCC-QHE	(4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA--white ballast cover, Add Conduit as needed, Sensor Switch occupancy	2	W41	F44SSILL-R	3,500	78	2	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	3,500	0.155	0.095	0.060	0.057	0.057	543	333	211	211
TUNNELS	ALL	901	UNDER FIELD TO CENTRAL PLANT	VP844L/PIPE/OCC-QHE	(4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA--white ballast cover, Add Conduit as needed, Sensor Switch occupancy	1	W842	F44SSILL-R	3,500	78	1	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	3,500	0.078	0.048	0.030	0.029	0.029	272	166	105	105
TUNNELS	ALL	901	UNDER FIELD TO CENTRAL PLANT	VP844L/PIPE/OCC-QHE	(4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA--white ballast cover, Add Conduit as needed, Sensor Switch occupancy	1	W41	F44SSILL-R	3,500	78	1	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	3,500	0.078	0.048	0.030	0.029	0.029	272	166	105	105
TUNNELS	ALL	901	UNDER FIELD TO CENTRAL PLANT	EXN	New Astralite Model #TP-U-R-W-AC White PVC Plastic LED exit sign AC only (dual voltage 120/277),	2	EX2XF6T5	LED2W	8,760	2	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	2	.95	8,760	0.004	0.004	-	-	-	33	33	-	-
TUNNELS	ALL	901	UNDER FIELD TO CENTRAL PLANT	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	H42	F42SSILL-R	8,760	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	8,760	0.041	0.024	0.017	0.016	0.016	356	208	148	148
TUNNELS	ALL	901	UNDER FIELD TO CENTRAL PLANT	LB44L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast	3	W44	F42SSILL-R	8,760	41	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	8,760	0.122	0.071	0.051	0.048	0.048	1,067	624	443	443
TUNNELS	ALL	902	TUNNEL TO SOUTH	VP844L/PIPE/OCC-QHE	(4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA--white ballast cover, Add Conduit as needed, Sensor Switch occupancy	3	W842	F44SSILL-R	3,500	78	3	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	3,500	0.233	0.143	0.090	0.086	0.086	815	499	316	316
TUNNELS	ALL	902	TUNNEL TO SOUTH	VP844L/PIPE-QHE	Sylvania QHE Electronic Low-Power Ballast--white ballast cover, Add Conduit as needed	8	W842	F44SSILL-R	3,500	78	8	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	3,500	0.621	0.380	0.241	0.229	0.229	2,173	1,331	843	843
TUNNELS	ALL	902	TUNNEL TO SOUTH	VP844L/PIPE/OCC-QHE	(4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA--white ballast cover, Add Conduit as needed, Sensor Switch occupancy	3	W41	F44SSILL-R	3,500	78	3	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	3,500	0.233	0.143	0.090	0.086	0.086	815	499	316	316
TUNNELS	ALL	902	TUNNEL TO SOUTH	VP42L/PIPE-QHE	(2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA--white ballast cover, Add Conduit as needed	1	W41	F42SSILL-R	8,760	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	8,760	0.041	0.024	0.017	0.016	0.016	356	208	148	148
TUNNELS	ALL	902	TUNNEL TO SOUTH	VP42L/PIPE-QHE	(2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA--white ballast cover, Add Conduit as needed	1	W842	F42SSILL-R	8,760	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	8,760	0.041	0.024	0.017	0.016	0.016	356	208	148	148
TUNNELS	ALL	902	TUNNEL TO SOUTH	VP42L/PIPE-QHE	(2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA--white ballast cover, Add Conduit as needed	1	W842	F42SSILL-R	8,760	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	8,760	0.041	0.024	0.017	0.016	0.016	356	208	148	148
TUNNELS	ALL	902	TUNNEL TO SOUTH	VP844L/PIPE/OCC-QHE	(4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA--white ballast cover, Add Conduit as needed, Sensor Switch occupancy	1	W842	F44SSILL-R	3,500	78	1	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	3,500	0.078	0.048	0.030	0.029	0.029	272	166	105	105
TUNNELS	ALL	902	TUNNEL TO SOUTH	VP844L/PIPE/OCC-QHE	(4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA--white ballast cover, Add Conduit as needed, Sensor Switch occupancy	1	W41	F44SSILL-R	3,500	78	1	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	3,500	0.078	0.048	0.030	0.029	0.029	272	166	105	105
TUNNELS	ALL	902	TUNNEL TO SOUTH	VP42L/PIPE-QHE	(2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA--white ballast cover, Add Conduit as needed	2	W41	F42SSILL-R	8,760	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	8,760	0.081	0.048	0.034	0.032	0.032	712	416	295	295
TUNNELS	ALL	902	TUNNEL TO SOUTH	EXLED	LED Exit sign	2	EXLED	LED2W	8,760	2	2	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	2	.95	8,760	0.004	0.004	-	-	-	33	33	-	-
TUNNELS	ALL	902	PIPE CHASE TO NORTH	VP41/OCC-QHE	w/ (1) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49711/GE132MAX-N/ULTRA Ballast--white ballast cover, Sensor Switch occupancy sensor field	16	VP42	F42SSILL	8,760	43	16	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	8,760	0.693	0.380	0.313	0.297	0.297	6,072	3,330	2,742	2,742
TUNNELS	ALL	902	PIPE CHASE TO NORTH	VP41-QHE	w/ (1) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49711/GE132MAX-N/ULTRA Ballast--white ballast cover	4	VP42	F42SSILL	8,760	43	4	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	8,760	0.173	0.095	0.078	0.074	0.074	1,518	833	685	685
TUNNELS	ALL	903	TUNNEL TO NORTH OFFICE	VP42L/PIPE-QHE	(2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA--white ballast cover, Add Conduit as needed	1	W41	F42SSILL-R	8,760	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	8,760	0.041	0.024	0.017	0.016	0.016	356	208	148	148
TUNNELS	ALL	903	TUNNEL TO NORTH OFFICE	VP844L/PIPE/OCC-QHE	(4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA--white ballast cover, Add Conduit as needed, Sensor Switch occupancy	3	W842	F44SSILL-R	3,500	78	3	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	3,500	0.233	0.143	0.090	0.086	0.086	815	499	316	316
TUNNELS	ALL	903	TUNNEL TO NORTH OFFICE	VP844L/PIPE-QHE	Sylvania QHE Electronic Low-Power Ballast--white ballast cover, Add Conduit as needed	2	W842	F44SSILL-R	3,500	78	2	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	3,500	0.155	0.095	0.060	0.057	0.057	543	333	211	211
TUNNELS	ALL	903	TUNNEL TO NORTH OFFICE	VP844L/PIPE/OCC-QHE	(4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA--white ballast cover, Add Conduit as needed, Sensor Switch occupancy	2	W41	F44SSILL-R	3,500	78	2	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	3,500	0.155	0.095	0.060	0.057	0.057	543	333	211	211

Facility	Area	Space	Room#/ ID#/ Dwg#	Comments	Additional Comments	Pre Fixture Qty	Existing Fixture Type	Wattage Table	Hours Pre	Pre Watts/ Fixt	Post Fixture Qty	Post Design Code (Fixture)	Post Lamp Design Code (Wattage Table)	Post Description	Post Watt/ Fixt	% Contribution to Demand Charge	Hours Post	Base kW	Retro Proposed kW	kW Difference	Retro Demand Savings (kW)	Total Demand Savings (kW)	Base kWh	Retro Proposed kWh	Retro kWh Saved	Total kWh Saved
TUNNELS	ALL	903	TUNNEL TO NORTH OFFICE	VP844L/PIPE/OCC-QHE	(4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA--white ballast cover, Add Conduit as needed, Sensor Switch occupancy	3	W842	F44SSILL-R	3,500	78	3	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	3,500	0.233	0.143	0.090	0.086	0.086	815	499	316	316
TUNNELS	ALL	903	TUNNEL TO NORTH OFFICE	VP844L/PIPE/OCC-QHE	(4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA--white ballast cover, Add Conduit as needed, Sensor Switch occupancy	4	W842	F44SSILL-R	3,500	78	4	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	3,500	0.310	0.190	0.120	0.114	0.114	1,087	665	421	421
TUNNELS	ALL	903	TUNNEL TO NORTH OFFICE	VP844L/PIPE/OCC-QHE	(4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA--white ballast cover, Add Conduit as needed, Sensor Switch occupancy	3	W842	F44SSILL-R	3,500	78	3	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	3,500	0.233	0.143	0.090	0.086	0.086	815	499	316	316
TUNNELS	ALL	903	TUNNEL TO NORTH OFFICE	VP844L/PIPE/OCC-QHE	(4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA--white ballast cover, Add Conduit as needed, Sensor Switch occupancy	1	W41	F44SSILL-R	3,500	78	1	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	3,500	0.078	0.048	0.030	0.029	0.029	272	166	105	105
TUNNELS	ALL	903	TUNNEL TO NORTH OFFICE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	VP42	F42SSILL-R	8,760	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	8,760	0.081	0.048	0.034	0.032	0.032	712	416	295	295
TUNNELS	ALL	903	TUNNEL TO NORTH OFFICE	VP844L/PIPE/OCC-QHE	(4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA--white ballast cover, Add Conduit as needed, Sensor Switch occupancy	1	W842	F44SSILL-R	3,500	78	1	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	3,500	0.078	0.048	0.030	0.029	0.029	272	166	105	105
TUNNELS	ALL	903	TUNNEL TO NORTH OFFICE	VP42L/PIPE-QHE	(2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA--white ballast cover, Add Conduit as needed	1	W41	F42SSILL-R	8,760	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	8,760	0.041	0.024	0.017	0.016	0.016	356	208	148	148
TUNNELS	ALL	903	TUNNEL TO NORTH OFFICE	VP844L/PIPE/OCC-QHE	(4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA--white ballast cover, Add Conduit as needed, Sensor Switch occupancy	1	W842	F44SSILL-R	3,500	78	1	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	3,500	0.078	0.048	0.030	0.029	0.029	272	166	105	105
TUNNELS	ALL	903	TUNNEL TO NORTH OFFICE	VP844L/PIPE/OCC-QHE	(4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA--white ballast cover, Add Conduit as needed, Sensor Switch occupancy	1	W41	F44SSILL-R	3,500	78	1	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	3,500	0.078	0.048	0.030	0.029	0.029	272	166	105	105
TUNNELS	ALL	903	TUNNEL TO NORTH OFFICE	VP42L/PIPE-QHE	(2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA--white ballast cover, Add Conduit as needed	1	W41	F42SSILL-R	8,760	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	8,760	0.041	0.024	0.017	0.016	0.016	356	208	148	148
TUNNELS	ALL	903	TUNNEL TO NORTH OFFICE	RL42-SS	Relamp w/ (2) GE-00257 / F28T8/SP41/UMX/ECO	1	W42/T8L	F42SSILL	8,760	43	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	8,760	0.043	0.024	0.020	0.019	0.019	379	208	171	171
TUNNELS	ALL	903	TUNNEL TO NORTH OFFICE	EXLED	LED Exit sign	1	EXLED	LED2W	8,760	2	1	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	2	.95	8,760	0.002	0.002	-	-	-	16	16	-	-
TUNNELS	ALL	903	TUNNEL TO NORTH OFFICE	VP42L/PIPE-QHE	(2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA--white ballast cover, Add Conduit as needed	1	H42/HO	F42SSILL-R	8,760	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	8,760	0.041	0.024	0.017	0.016	0.016	356	208	148	148
TUNNELS	ALL	903	HALLWAY STAIRS TO OUTSIDE	VP42L/PIPE-QHE	(2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA--white ballast cover, Add Conduit as needed	2	VP42	F42SSILL-R	8,760	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	8,760	0.081	0.048	0.034	0.032	0.032	712	416	295	295
TUNNELS	ALL	903	HALLWAY STAIRS TO OUTSIDE	VP42T5	46761 / F54W/T5/841/ECO lamps & (1) GE-29721/GE254MVPSN1 Ballast--white ballast cover	8	VP42	F41GHL	1,092	53	8	LEDT5	LEDT5/4'/25W/1	Surface Mounted T5 LED Retrofit Lamp with External Driver LED 4' T5 Lamp (1) 25W Lamp	25	.50	1,092	0.426	0.198	0.228	0.114	0.114	465	216	249	249
TUNNELS	ALL	903	TUNNEL TO NORTH OFFICE	VP844L/PIPE/OCC-QHE	(4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA--white ballast cover, Add Conduit as needed, Sensor Switch occupancy	1	H882/HO	F44SSILL-R	3,500	78	1	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	3,500	0.078	0.048	0.030	0.029	0.029	272	166	105	105
TUNNELS	ALL	903	TUNNEL TO NORTH OFFICE	VP21/OCC-QHE	GE-45748 / F17T8/SP41/ECO Lamp & (1) GE-49771/GE132MAX-N/ULTRA Ballast--white housing finish & white reflector/ballast cover, Sensor Switch occupancy sensor	16	I1X200/B	F21LL	3,500	14	16	LEDT8	LEDT8/2'/8W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (1) 8W Lamp	8	.95	3,500	0.231	0.127	0.104	0.099	0.099	809	444	365	365
TUNNELS	ALL	903	TUNNEL TO NORTH OFFICE	VP21/OCC-QHE	GE-45748 / F17T8/SP41/ECO Lamp & (1) GE-49771/GE132MAX-N/ULTRA Ballast--white housing finish & white reflector/ballast cover, Sensor Switch occupancy sensor	2	I1X200/B	F21LL	3,500	14	2	LEDT8	LEDT8/2'/8W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (1) 8W Lamp	8	.95	3,500	0.029	0.016	0.013	0.012	0.012	101	55	46	46
CENTRAL PLANT	ALL	904	CENTRAL PLANT	H44T5	/ F54W/T5/841/ECO lamps & (2) GE-29721/GE254MVPSN1 ballast, with wire guards & white reflector	10	MH1X400	F44GHL	8,760	211	10	LEDT5	LEDT5/4'/25W/4	Surface Mounted T5 LED Retrofit Lamp with External Driver LED 4' T5 Lamp (4) 25W Lamp	99	.95	8,760	2.112	0.990	1.122	1.066	1.066	18,500	8,672	9,827	9,827
CENTRAL PLANT	ALL	904	TUNNEL TO NORTH OFFICE	EXN	New Astralite Model #TP-U-R-W-AC White PVC Plastic LED exit sign AC only (dual voltage 120/277),	1	EX2XF6T5	LED2W	8,760	2	1	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	2	.95	8,760	0.002	0.002	-	-	-	16	16	-	-
CENTRAL PLANT	ALL	904	TUNNEL TO NORTH OFFICE	EXN	New Astralite Model #TP-U-R-W-AC White PVC Plastic LED exit sign AC only (dual voltage 120/277),	1	EX2XF6T5	LED2W	8,760	2	1	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	2	.95	8,760	0.002	0.002	-	-	-	16	16	-	-
CENTRAL PLANT	ALL	904	CENTRAL PLANT	H44T5	/ F54W/T5/841/ECO lamps & (2) GE-29721/GE254MVPSN1 ballast, with wire guards & white reflector	4	MH1X400	F44GHL	8,760	211	4	LEDT5	LEDT5/4'/25W/4	Surface Mounted T5 LED Retrofit Lamp with External Driver LED 4' T5 Lamp (4) 25W Lamp	99	.95	8,760	0.845	0.396	0.449	0.426	0.426	7,400	3,469	3,931	3,931
CENTRAL PLANT	ALL	904	TUNNEL TO NORTH OFFICE	EXN	/ F54W/T5/841/ECO lamps & (2) GE-29721/GE254MVPSN1 ballast, with wire guards & white reflector	4	MH1X400	F44GHL	8,760	211	4	LEDT5	LEDT5/4'/25W/4	Surface Mounted T5 LED Retrofit Lamp with External Driver LED 4' T5 Lamp (4) 25W Lamp	99	.95	8,760	0.845	0.396	0.449	0.426	0.426	7,400	3,469	3,931	3,931
CENTRAL PLANT	ALL	904	CENTRAL PLANT	DIS/REMOVE	Disconnect and Remove existing fixture	0	MH1X400	None	8,760	0	0	N/R	NONE	Existing luminaire to remain as is No Retrofit. To remain as is.	0	.95	8,760	-	-	-	-	-	-	0	-	-
CENTRAL PLANT	ALL	904	CENTRAL PLANT	H844-QHE	New 8' Hooded Industrial Fixture w/ (4) FO28/841/SS/ECO lamps & (1) 4/32 Sylvania QHE Electronic low power ballast OR EQUAL--white ballast cover	2	ADD	F44SSILL-R	8,760	78	2	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	8,760	0.155	0.095	0.060	0.057	0.057	1,360	833	527	527
CENTRAL PLANT	ALL	904	CENTRAL PLANT	LB44L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast	20	W44	F42SSILL-R	8,760	41	20	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	8,760	0.812	0.475	0.337	0.320	0.320	7,115	4,163	2,953	2,953
CENTRAL PLANT	ALL	904	CENTRAL PLANT	LB44L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast	19	W44	F42SSILL-R	8,760	41	19	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	8,760	0.772	0.451	0.320	0.304	0.304	6,760	3,955	2,805	2,805
CENTRAL PLANT	ALL	904	CENTRAL PLANT	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	6	W42	F42SSILL-R	8,760	41	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	8,760	0.244	0.143	0.101	0.096	0.096	2,135	1,249	886	886
CENTRAL PLANT	ALL	904	CENTRAL PLANT	LB44L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast	1	W44	F42SSILL-R	8,760	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	8,760	0.041	0.024	0.017	0.016	0.016	356	208	148	148
CENTRAL PLANT	ALL	904	CENTRAL PLANT-Fan room	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	8	VP42	F42SSILL-R	8,760	41	8	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	8,760	0.325	0.190	0.135	0.128	0.128	2,846	1,665	1,181	1,181
EAST WING	BASE		North Access Dock	VP42T5	46761 / F54W/T5/841/ECO lamps & (1) GE-29721/GE254MVPSN1 Ballast--white ballast cover	3	MH1X175	F41GHL	8,760	53	3	LEDT5	LEDT5/4'/25W/1	Surface Mounted T5 LED Retrofit Lamp with External Driver LED 4' T5 Lamp (1) 25W Lamp	25	.95	8,760	0.160	0.074	0.085	0.081	0.081	1,399	650	749	749
EAST WING	BASE		North Access Dock	VP42T5/OCC	46761 / F54W/T5/841/ECO lamps & (1) GE-29721/GE254MVPSN1 Ballast--white ballast cover, Sensor Switch occupancy sensor field installation	3	MH1X175	F41GHL	5,256	53	3	LEDT5	LEDT5/4'/25W/1	Surface Mounted T5 LED Retrofit Lamp with External Driver LED 4' T5 Lamp (1) 25W Lamp	25	.95	5,256	0.160	0.074	0.085	0.081	0.081	840	390	449	449
EAST WING	BASE		Irvis Access Dock	VP42T5	46761 / F54W/T5/841/ECO lamps & (1) GE-29721/GE254MVPSN1 Ballast--white ballast cover	3	MH1X175	F41GHL	8,760	53	3	LEDT5	LEDT5/4'/25W/1	Surface Mounted T5 LED Retrofit Lamp with External Driver LED 4' T5 Lamp (1) 25W Lamp	25	.95	8,760	0.160	0.074	0.085	0.081	0.081	1,399	650	749	749
EAST WING	BASE		Irvis Access Dock	VP42T5/OCC	46761 / F54W/T5/841/ECO lamps & (1) GE-29721/GE254MVPSN1 Ballast--white ballast cover, Sensor Switch occupancy sensor field installation	3	MH1X175	F41GHL	5,256	53	3	LEDT5	LEDT5/4'/25W/1	Surface Mounted T5 LED Retrofit Lamp with External Driver LED 4' T5 Lamp (1) 25W Lamp	25	.95	5,256	0.160	0.074	0.085	0.081	0.081	840	390	449	449
EAST WING	BASE		East Truck P-2 Access Dock	VP42T5	46761 / F54W/T5/841/ECO lamps & (1) GE-29721/GE254MVPSN1 Ballast--white ballast cover	8	MH1X175	F41GHL	8,760	53	8	LEDT5	LEDT5/4'/25W/1	Surface Mounted T5 LED Retrofit Lamp with External Driver LED 4' T5 Lamp (1) 25W Lamp	25	.95	8,760	0.426	0.198	0.228	0.217	0.217	3,732	1,734	1,997	1,997
EAST WING	BASE		East Truck P-2 Access Dock	VP42T5/OCC	46761 / F54W/T5/841/ECO lamps & (1) GE-29721/GE254MVPSN1 Ballast--white ballast cover, Sensor Switch occupancy sensor field installation	4	MH1X175	F41GHL	5,256	53	4	LEDT5	LEDT5/4'/25W/1	Surface Mounted T5 LED Retrofit Lamp with External Driver LED 4' T5 Lamp (1) 25W Lamp	25	.95	5,256	0.213	0.099	0.114	0.108	0.108	1,119	520	599	599
EAST WING	BASE		East Truck P-2 Access Dock	DIS/REMOVE	Disconnect and Remove existing fixture	0	MH1X175	None	8,760	0	0	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	0	.95	8,760	-	-	-	-	-	-	0	-	-
EAST WING	BASE		TUNNEL	CKS42T5	Retrofit w/ (1) 1'x4' T5 strip conversion kit (2) GE-46761 / F54W/T5/841/ECO Lamps & (1) GE-29721/GE254MVPSN1	98	VP42HO	F42GHL	8,760	106	98	LEDT5	LEDT5/4'/25W/2	Surface Mounted T5 LED Retrofit Lamp with External Driver LED 4' T5 Lamp (2) 25W Lamp	50	.95	8,760	10.348	4.851	5.497	5.222	5.222	90,649	42,495	48,154	48,154
EAST WING	BASE		TUNNEL	VP22L-QHE	45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA Ballast--white reflector	3	MH1X100	F22LL	8,760	28	3	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	8,760	0.084	0.048	0.036	0.035	0.035	735	416	319	319
EAST WING	BASE		TUNNEL	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	C42	F42SSILL-R	8,760	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	8,760	0.041	0.024	0.017	0.016	0.016	356	208	148	148
EAST WING	BASE	701	ELEVATOR LOBBY	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	7	H42	F42SSILL-R	8,760	41	7	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	8,760	0.284	0.166	0.118	0.112	0.112	2,490	1,457	1,033	1,033
EAST WING	BASE	701	ELEVATOR LOBBY	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	1	H42	F44SSILL-R	8,760	78	1	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	8,760	0.078	0.048	0.030	0.029	0.029	680	416	264	264
EAST WING	BASE	701	ELEVATOR EQUIP	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	H42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	BASE		TRASH ROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	16	H42	F42SSILL-R	2,860	41	16	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.650	0.380	0.270	0.256	0.256	1,858	1,087	771	771
EAST WING	BASE		HALLWAY	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	24	H42	F42SSILL-R	2,860	41	24	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.975	0.570	0.404	0.384	0.384	2,788	1,631	1,157	1,157
EAST WING	BASE		HALLWAY	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	3	EX2X15	LED2W	8,760	2	3	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.006	0.006	-	-	-	49	49	-	-
EAST WING	BASE		FREIGHT ELEVATOR	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	C42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96

Facility	Area	Space	Room#/ ID#/ Dwg#	Comments	Additional Comments	Pre Fixture Qty	Existing Fixture Type	Wattage Table	Hours Pre	Pre Watts/ Fixt	Post Fixture Qty	Post Design Code (Fixture)	Post Lamp Design Code (Wattage Table)	Post Description	Post Watt/ Fixt	% Contribution to Demand Charge	Hours Post	Base kW	Retro Proposed kW	kW Difference	Retro Demand Savings (kW)	Total Demand Savings (kW)	Base kWh	Retro Proposed kWh	Retro kWh Saved	Total kWh Saved
EAST WING	BASE		STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	H42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	BASE		STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	H42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	BASE		RESTROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	V42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	BASE		JANITOR CLOSET	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	3	H42	F42SSILL-R	2,860	41	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.122	0.071	0.051	0.048	0.048	348	204	145	145
EAST WING	BASE		PRINT SHOP	CKA44LT2/REF-QHE	brackets) & white reflector (4) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49709/GE432MAX-L/ULTRA Low Power Instant Start Ballast, tandem wired 2:1	4	A43	F42SSILL-R	2,860	41	4	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.162	0.095	0.067	0.064	0.064	465	272	193	193
EAST WING	BASE		PRINT SHOP	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	4	A43	F42SSILL	2,860	43	4	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.173	0.095	0.078	0.074	0.074	496	272	224	224
EAST WING	BASE		PRINT SHOP	CKA42L/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49707/GE232MAX-L/ULTRA Low Power Instant Start Ballast	10	A43	F42SSILL-R	2,860	41	10	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.406	0.238	0.169	0.160	0.160	1,162	680	482	482
EAST WING	BASE		PRINT SHOP	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	6	VP42	F42SSILL-R	2,860	41	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.244	0.143	0.101	0.096	0.096	697	408	289	289
EAST WING	BASE		STORAGE	SAFEOFF/REMOVE	Safeoff & remove fixture	0	MH1X250	NONE	2,860	0	0	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	-	-
EAST WING	BASE		STORAGE	SAFEOFF/REMOVE	Safeoff & remove fixture	0	MH1X250	NONE	2,860	0	0	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	0	.95	2,860	-	-	-	-	-	-	0	-	-
EAST WING	BASE		STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	28	H42	F42SSILL-R	2,860	41	28	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	1.137	0.665	0.472	0.448	0.448	3,252	1,903	1,350	1,350
EAST WING	BASE		STORAGE	W42L-QHE	00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA--white housing finish & white ballast cover	2	VP42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	BASE		STORAGE	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	2	EX2X15	LED2W	8,760	2	2	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.004	0.004	-	-	-	33	33	-	-
EAST WING	BASE		STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	12	H42	F42SSILL-R	2,860	41	12	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.487	0.285	0.202	0.192	0.192	1,394	815	578	578
EAST WING	BASE		FAN ROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	3	H42	F42SSILL-R	2,860	41	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.122	0.071	0.051	0.048	0.048	348	204	145	145
EAST WING	BASE		STORAGE	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	17	H42	F44SSILL-R	2,860	78	17	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	1.319	0.808	0.512	0.486	0.486	3,774	2,310	1,463	1,463
EAST WING	BASE		STORAGE	H46/TG/QHE-HIGH	F28T8/SP41/UMX/ECO Lamps & (2) Sylvania-49865/QHE3x32T8UNVISLSC, tube guards--OVER 12' CEILING	11	MH1X175	F46ILL-H	2,860	176	11	LEDT8	LEDT8/4'/12W/6	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (6) 12W Lamps	71	.95	2,860	1.936	0.784	1.152	1.094	1.094	5,537	2,242	3,294	3,294
EAST WING	BASE		STORAGE	H46/TG/QHE-HIGH	F28T8/SP41/UMX/ECO Lamps & (2) Sylvania-49865/QHE3x32T8UNVISLSC, tube guards--OVER 12' CEILING	1	MH1X175	F46ILL-H	2,860	176	1	LEDT8	LEDT8/4'/12W/6	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (6) 12W Lamps	71	.95	2,860	0.176	0.071	0.105	0.099	0.099	503	204	299	299
EAST WING	BASE		STORAGE	S842-QHE	49772/GE232MAX-N/ULTRA ballast--white ballast cover, tubeguards added in the field	1	MH1X175	F42SSILL	2,860	43	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.043	0.024	0.020	0.019	0.019	124	68	56	56
EAST WING	BASE		STORAGE	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	3	EX2X15	LED2W	8,760	2	3	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.006	0.006	-	-	-	49	49	-	-
EAST WING	BASE		STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	6	H42	F42SSILL-R	2,860	41	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.244	0.143	0.101	0.096	0.096	697	408	289	289
EAST WING	BASE		STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	H42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	BASE		STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	6	H42	F42SSILL-R	2,860	41	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.244	0.143	0.101	0.096	0.096	697	408	289	289
EAST WING	BASE		STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	H42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	BASE		TUNNEL	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	7	H42	F42SSILL-R	2,860	41	7	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.284	0.166	0.118	0.112	0.112	813	476	337	337
EAST WING	BASE		TUNNEL	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	1	A44	F42SSILL	2,860	43	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.043	0.024	0.020	0.019	0.019	124	68	56	56
EAST WING	BASE		OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	20	A44	F42SSILL	2,860	43	20	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.866	0.475	0.391	0.372	0.372	2,478	1,359	1,119	1,119
EAST WING	BASE		OFFICE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	W42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	BASE		OFFICE	CKA42L/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49707/GE232MAX-L/ULTRA Low Power Instant Start Ballast	6	A43	F42SSILL-R	2,860	41	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.244	0.143	0.101	0.096	0.096	697	408	289	289
EAST WING	BASE		OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A44	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
EAST WING	BASE		OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	1	A44	F42SSILL	2,860	43	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.043	0.024	0.020	0.019	0.019	124	68	56	56
EAST WING	BASE		OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A44	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
EAST WING	BASE		STAIRWELL	V21-QHE	45748 / F17T8/SP41/ECO Lamp & (1) GE-49771/GE132MAX-N/ULTRA Ballast--white housing finish & white reflector/ballast cover	3	I1X100	F21LL	2,860	14	3	LEDT8	LEDT8/2'/8W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (1) 8W Lamp	8	.95	2,860	0.043	0.024	0.020	0.019	0.019	124	68	56	56
EAST WING	BASE		FREIGHT ELEVATOR	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	C42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	BASE		HALLWAY	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	VP42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	BASE		HALLWAY	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	H42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	BASE		HALLWAY	CKA42L/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49707/GE232MAX-L/ULTRA Low Power Instant Start Ballast	3	A44	F42SSILL-R	2,860	41	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.122	0.071	0.051	0.048	0.048	348	204	145	145
EAST WING	BASE		HALLWAY	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	1	EX2X15	LED2W	8,760	2	1	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.002	0.002	-	-	-	16	16	-	-
EAST WING	BASE		RESTROOM	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	2	VP42	F44SSILL-R	2,860	78	2	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.155	0.095	0.060	0.057	0.057	444	272	172	172
EAST WING	BASE		RESTROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	VP42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	BASE		RESTROOM	CF1X15BR30/SI	Relamp w/ (1) 15 watt Compact Fluorescent R30 Screw-In--GE-80893/FLE15/2/R30XL827	1	I1X75	CFC15/1	2,860	14	1	LEDSI/R30	LEDS10/1	Surface Mounted Install LED Screw-in R30 Lamp Light Emitting Diode Lamp, Screw-in, (1) 10W lamp	9	.95	2,860	0.014	0.009	0.005	0.004	0.004	39	26	13	13
EAST WING	BASE		MECHANICAL ROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	13	H42	F42SSILL-R	2,860	41	13	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.528	0.309	0.219	0.208	0.208	1,510	883	627	627
EAST WING	BASE		MECHANICAL ROOM	V21-QHE	45748 / F17T8/SP41/ECO Lamp & (1) GE-49771/GE132MAX-N/ULTRA Ballast--white housing finish & white reflector/ballast cover	2	I1X100	F21LL	2,860	14	2	LEDT8	LEDT8/2'/8W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (1) 8W Lamp	8	.95	2,860	0.029	0.016	0.013	0.012	0.012	83	45	37	37
EAST WING	BASE		RESTROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	4	VP42	F42SSILL-R	2,860	41	4	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.162	0.095	0.067	0.064	0.064	465	272	193	193
EAST WING	BASE		RESTROOM	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	1	VP42	F44SSILL-R	2,860	78	1	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.078	0.048	0.030	0.029	0.029	222	136	86	86
EAST WING	BASE		RESTROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	H42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	BASE		HALLWAY	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	2	H42	F44SSILL-R	2,860	78	2	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.155	0.095	0.060	0.057	0.057	444	272	172	172
EAST WING	BASE		LOCKSMITH	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	12	H42	F42SSILL-R	2,860	41	12	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.487	0.285	0.202	0.192	0.192	1,394	815	578	578

Facility	Area	Space	Room#/ ID#/ Dwg#	Comments	Additional Comments	Pre Fixture Qty	Existing Fixture Type	Wattage Table	Hours Pre	Pre Watts/ Fixt	Post Fixture Qty	Post Design Code (Fixture)	Post Lamp Design Code (Wattage Table)	Post Description	Post Watt/ Fixt	% Contribution to Demand Charge	Hours Post	Base kW	Retro Proposed kW	kW Difference	Retro Demand Savings (kW)	Total Demand Savings (kW)	Base kWh	Retro Proposed kWh	Retro kWh Saved	Total kWh Saved
EAST WING	BASE		OFFICE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	6	H42	F42SSILL-R	2,860	41	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.244	0.143	0.101	0.096	0.096	697	408	289	289
EAST WING	BASE		OFFICE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	6	H42	F42SSILL-R	2,860	41	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.244	0.143	0.101	0.096	0.096	697	408	289	289
EAST WING	BASE		CAPITAL POLICE	CKA42L/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49707/GE232MAX-L/ULTRA Low Power Instant Start Ballast	9	A43DS	F42SSILL-R	2,860	41	9	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.366	0.214	0.152	0.144	0.144	1,045	612	434	434
EAST WING	BASE		CAPITAL POLICE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	W42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	BASE		CAPITAL POLICE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	W42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	BASE		CAPITAL POLICE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	W42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	BASE		CAPITAL POLICE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	W42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	BASE		CAPITAL POLICE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	14	A42	F42SSILL-R	2,860	41	14	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.569	0.333	0.236	0.224	0.224	1,626	951	675	675
EAST WING	BASE		CAPITAL POLICE	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	5	EX2X15	LED2W	8,760	2	5	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.009	0.009	-	-	-	82	82	-	-
EAST WING	BASE		CAPITAL POLICE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	4	A42	F42SSILL-R	2,860	41	4	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.162	0.095	0.067	0.064	0.064	465	272	193	193
EAST WING	BASE		CAPITAL POLICE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	6	A42	F42SSILL-R	2,860	41	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.244	0.143	0.101	0.096	0.096	697	408	289	289
EAST WING	BASE		CAPITAL POLICE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	6	A42	F42SSILL-R	2,860	41	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.244	0.143	0.101	0.096	0.096	697	408	289	289
EAST WING	BASE		CAPITAL POLICE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	4	C42	F42SSILL-R	2,860	41	4	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.162	0.095	0.067	0.064	0.064	465	272	193	193
EAST WING	BASE		CAPITAL POLICE	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	6	C42X	F44SSILL-R	2,860	78	6	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.466	0.285	0.181	0.172	0.172	1,332	815	516	516
EAST WING	BASE		CAPITAL POLICE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	3	C42X	F42SSILL-R	2,860	41	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.122	0.071	0.051	0.048	0.048	348	204	145	145
EAST WING	BASE		CAPITAL POLICE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	W42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	BASE		CAPITAL POLICE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	4	A42	F42SSILL-R	2,860	41	4	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.162	0.095	0.067	0.064	0.064	465	272	193	193
EAST WING	BASE		CAPITAL POLICE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	27	W42	F42SSILL-R	2,860	41	27	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	1.097	0.642	0.455	0.432	0.432	3,136	1,835	1,301	1,301
EAST WING	BASE		CAPITAL POLICE	CF1X15BR30/SI	Relamp w/ (1) 15 watt Compact Fluorescent R30 Screw-In--GE-80893/FLE15/2/R30XL827	6	I1X75	CFC15/1	2,860	14	6	LEDSI/R30	LEDS10/1	Surface Mounted Install LED Screw-in R30 Lamp Light Emitting Diode Lamp, Screw-in, (1) 10W lamp	9	.95	2,860	0.081	0.054	0.027	0.026	0.026	232	154	78	78
EAST WING	BASE		CAPITAL POLICE	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	4	EX2X15	LED2W	8,760	2	4	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.008	0.008	-	-	-	66	66	-	-
EAST WING	BASE		STAIRWELL	LB34LT2-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49709/GE432MAX-L/ULTRA ballast, tandem wired 2:1	6	S32	F31ILL-R	2,860	24	6	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.146	0.071	0.075	0.071	0.071	418	204	214	214
EAST WING	BASE		STAIRWELL	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	A42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	BASE		STAIRWELL	LB34LT2-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49709/GE432MAX-L/ULTRA ballast, tandem wired 2:1	6	S32	F31ILL-R	2,860	24	6	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.146	0.071	0.075	0.071	0.071	418	204	214	214
EAST WING	BASE		STAIRWELL	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	A42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	BASE		STAIRWELL	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	2	EX2X15	LED2W	8,760	2	2	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.004	0.004	-	-	-	33	33	-	-
EAST WING	BASE		FREIGHT ELEVATOR LOBBY	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	12	H42	F42SSILL-R	2,860	41	12	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.487	0.285	0.202	0.192	0.192	1,394	815	578	578
EAST WING	BASE		FREIGHT ELEVATOR LOBBY	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	VP42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	BASE		FREIGHT ELEVATOR LOBBY	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	2	EX2X15	LED2W	8,760	2	2	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.004	0.004	-	-	-	33	33	-	-
EAST WING	BASE		STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	4	H42	F42SSILL-R	2,860	41	4	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.162	0.095	0.067	0.064	0.064	465	272	193	193
EAST WING	BASE		STAIRWELL	LB34LT2-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49709/GE432MAX-L/ULTRA ballast, tandem wired 2:1	6	S32	F31ILL-R	2,860	24	6	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.146	0.071	0.075	0.071	0.071	418	204	214	214
EAST WING	BASE		STAIRWELL	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	1	EX2X15	LED2W	8,760	2	1	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.002	0.002	-	-	-	16	16	-	-
EAST WING	BASE		STORAGE	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	1	H42	F44SSILL-R	2,860	78	1	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.078	0.048	0.030	0.029	0.029	222	136	86	86
EAST WING	BASE		STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	H42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	BASE		STORAGE	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	1	H42	F44SSILL-R	2,860	78	1	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.078	0.048	0.030	0.029	0.029	222	136	86	86
EAST WING	BASE		STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	H42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	BASE		ELEVATOR	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	S42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	BASE		STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	H42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	BASE		STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	W42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	BASE		STORAGE	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	1	H42	F44SSILL-R	2,860	78	1	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.078	0.048	0.030	0.029	0.029	222	136	86	86
EAST WING	BASE		STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	H42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	BASE		OFFICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	4	A44P	F42SSILL	2,860	43	4	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.173	0.095	0.078	0.074	0.074	496	272	224	224
EAST WING	BASE		STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	H42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	BASE		ELEVATOR LOBBY	LB34LT2-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49709/GE432MAX-L/ULTRA ballast, tandem wired 2:1	4	S32	F31ILL-R	2,860	24	4	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.097	0.048	0.050	0.047	0.047	279	136	143	143
EAST WING	BASE		ELEVATOR LOBBY	LB32L-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49707/GE232MAX-L/ULTRA ballast	4	S32	F31ILL-R	2,860	24	4	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.097	0.048	0.050	0.047	0.047	279	136	143	143
EAST WING	BASE		ELEVATOR LOBBY	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	S42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	BASE		ELEVATOR LOBBY	LB34LT2-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49709/GE432MAX-L/ULTRA ballast, tandem wired 2:1	4	S32	F31ILL-R	2,860	24	4	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.097	0.048	0.050	0.047	0.047	279	136	143	143
EAST WING	BASE		ELEVATOR LOBBY	LB32L-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49707/GE232MAX-L/ULTRA ballast	4	S32	F31ILL-R	2,860	24	4	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.097	0.048	0.050	0.047	0.047	279	136	143	143
EAST WING	BASE		ELEVATOR LOBBY	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	S42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96

Facility	Area	Space	Room#/ ID#/ Dwg#	Comments	Additional Comments	Pre Fixture Qty	Existing Fixture Type	Wattage Table	Hours Pre	Pre Watts/ Fixt	Post Fixture Qty	Post Design Code (Fixture)	Post Lamp Design Code (Wattage Table)	Post Description	Post Watt/ Fixt	% Contribution to Demand Charge	Hours Post	Base kW	Retro Proposed kW	kW Difference	Retro Demand Savings (kW)	Total Demand Savings (kW)	Base kWh	Retro Proposed kWh	Retro kWh Saved	Total kWh Saved
EAST WING	BASE		STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	H42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	BASE		STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	H42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	BASE		STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	H42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	BASE		GEAR ROOM	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	2	H42	F44SSILL-R	2,860	78	2	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.155	0.095	0.060	0.057	0.057	444	272	172	172
EAST WING	BASE		STORAGE BY GARAGE ENTRANCE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	H42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	BASE		STORAGE BY GARAGE ENTRANCE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	H42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	BASE		STORAGE BY GARAGE ENTRANCE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	4	H42	F42SSILL-R	2,860	41	4	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.162	0.095	0.067	0.064	0.064	465	272	193	193
EAST WING	BASE		OFFICE BY ENTRANCE	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	4	A42	F44SSILL-R	2,860	78	4	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.310	0.190	0.120	0.114	0.114	888	544	344	344
EAST WING	BASE		OFFICE BY ENTRANCE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	H42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	BASE		OFFICE BY ENTRANCE	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	V22	F22ILL-R	2,860	26	1	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.026	0.016	0.010	0.010	0.010	75	45	30	30
EAST WING	BASE		OFFICE BY ENTRANCE	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	6	A42	F44SSILL-R	2,860	78	6	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.466	0.285	0.181	0.172	0.172	1,332	815	516	516
EAST WING	BASE		OFFICE BY ENTRANCE	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	V22	F22ILL-R	2,860	26	1	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.026	0.016	0.010	0.010	0.010	75	45	30	30
EAST WING	BASE		STORAGE BY GARAGE ENTRANCE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	H42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	BASE		STORAGE BY GARAGE ENTRANCE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	H42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	BASE		ELEVATOR STATION	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	8	S42	F44SSILL-R	2,860	78	8	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.621	0.380	0.241	0.229	0.229	1,776	1,087	689	689
EAST WING	BASE		ELEVATOR STATION	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	S42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	BASE		ELEVATOR STATION	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	4	H42	F42SSILL-R	2,860	41	4	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.162	0.095	0.067	0.064	0.064	465	272	193	193
EAST WING	BASE		STAIRWELL	LB34LT2-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49709/GE432MAX-L/ULTRA ballast, tandem wired 2:1	14	S32	F31ILL-R	2,860	24	14	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.341	0.166	0.175	0.166	0.166	976	476	500	500
EAST WING	BASE		AROUND ELEVATOR STATION	VP22L-QHE	45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA Ballast--white reflector	16	MV1X100	F22LL	2,860	28	16	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.448	0.253	0.194	0.184	0.184	1,280	725	555	555
EAST WING	BASE		AROUND ELEVATOR STATION	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	3	EX2X15	LED2W	8,760	2	3	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.006	0.006	-	-	-	49	49	-	-
EAST WING	BASE		ELEVATOR STATION	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	8	S42	F44SSILL-R	2,860	78	8	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.621	0.380	0.241	0.229	0.229	1,776	1,087	689	689
EAST WING	BASE		ELEVATOR STATION	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	S42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	BASE		ELEVATOR STATION	LB32L-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49707/GE232MAX-L/ULTRA ballast	8	S42	F31ILL-R	2,860	24	8	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.195	0.095	0.100	0.095	0.095	558	272	286	286
EAST WING	BASE		ELEVATOR STATION	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	1	H42	F44SSILL-R	2,860	78	1	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.078	0.048	0.030	0.029	0.029	222	136	86	86
EAST WING	BASE		ELEVATOR STATION	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	H42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	BASE		STAIRWELL	LB34LT2-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49709/GE432MAX-L/ULTRA ballast, tandem wired 2:1	24	S32	F31ILL-R	2,860	24	24	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.585	0.285	0.300	0.285	0.285	1,673	815	857	857
EAST WING	BASE		AROUND ELEVATOR STATION	VP22L-QHE	45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA Ballast--white reflector	14	MV1X100	F22LL	2,860	28	14	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.392	0.222	0.170	0.161	0.161	1,120	634	486	486
EAST WING	BASE		AROUND ELEVATOR STATION	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	3	EX2X15	LED2W	8,760	2	3	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.006	0.006	-	-	-	49	49	-	-
EAST WING	BASE		ELEVATOR STATION	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	4	S42	F44SSILL-R	2,860	78	4	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.310	0.190	0.120	0.114	0.114	888	544	344	344
EAST WING	BASE		ELEVATOR STATION	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	S42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	BASE		ELEVATOR STATION	LB32L-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49707/GE232MAX-L/ULTRA ballast	8	S42	F31ILL-R	2,860	24	8	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.195	0.095	0.100	0.095	0.095	558	272	286	286
EAST WING	BASE		ELEVATOR STATION	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	1	H42	F44SSILL-R	2,860	78	1	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.078	0.048	0.030	0.029	0.029	222	136	86	86
EAST WING	BASE		ELEVATOR STATION	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	H42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	BASE		STAIRWELL	LB34LT2-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49709/GE432MAX-L/ULTRA ballast, tandem wired 2:1	24	S32	F31ILL-R	2,860	24	24	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.585	0.285	0.300	0.285	0.285	1,673	815	857	857
EAST WING	BASE		AROUND ELEVATOR STATION	VP22L-QHE	45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA Ballast--white reflector	14	MV1X100	F22LL	2,860	28	14	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.392	0.222	0.170	0.161	0.161	1,120	634	486	486
EAST WING	BASE		AROUND ELEVATOR STATION	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	3	EX2X15	LED2W	8,760	2	3	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.006	0.006	-	-	-	49	49	-	-
PARKING GARAGE	BASE		GARAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	21	D42	F42SSILL-R	8,760	41	21	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	8,760	0.853	0.499	0.354	0.336	0.336	7,471	4,371	3,100	3,100
PARKING GARAGE	BASE		GARAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	50	D42	F42SSILL-R	8,760	41	50	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	8,760	2.031	1.188	0.843	0.800	0.800	17,788	10,407	7,381	7,381
PARKING GARAGE	BASE		GARAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	60	D42	F42SSILL-R	8,760	41	60	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	8,760	2.437	1.426	1.011	0.961	0.961	21,346	12,488	8,858	8,858
PARKING GARAGE	BASE		GARAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	90	D42	F42SSILL-R	8,760	41	90	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	8,760	3.655	2.138	1.517	1.441	1.441	32,019	18,732	13,287	13,287

Facility	Area	Space	Room#/ ID#/ Dwg#	Comments	Additional Comments	Pre Fixture Qty	Existing Fixture Type	Wattage Table	Hours Pre	Pre Watts/ Fixt	Post Fixture Qty	Post Design Code (Fixture)	Post Lamp Design Code (Wattage Table)	Post Description	Post Watt/ Fixt	% Contribution to Demand Charge	Hours Post	Base kW	Retro Proposed kW	kW Difference	Retro Demand Savings (kW)	Total Demand Savings (kW)	Base kWh	Retro Proposed kWh	Retro kWh Saved	Total kWh Saved
PARKING GARAGE	BASE		GARAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	90	D42	F42SSILL-R	8,760	41	90	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	8,760	3.655	2.138	1.517	1.441	1.441	32,019	18,732	13,287	13,287
PARKING GARAGE	BASE		GARAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	205	D42	F42SSILL-R	8,760	41	205	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	8,760	8.326	4.871	3.455	3.282	3.282	72,932	42,668	30,264	30,264
PARKING GARAGE	BASE		GARAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	5	D42	F42SSILL-R	8,760	41	5	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	8,760	0.203	0.119	0.084	0.080	0.080	1,779	1,041	738	738
PARKING GARAGE	BASE		GARAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	132	D42	F42SSILL-R	8,760	41	132	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	8,760	5.361	3.136	2.225	2.113	2.113	46,961	27,474	19,487	19,487
PARKING GARAGE	BASE		GARAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	115	D42	F42SSILL-R	8,760	41	115	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	8,760	4.670	2.732	1.938	1.841	1.841	40,913	23,936	16,977	16,977
PARKING GARAGE	BASE		GARAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	25	D42	F42SSILL-R	8,760	41	25	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	8,760	1.015	0.594	0.421	0.400	0.400	8,894	5,203	3,691	3,691
EAST WING	SUB-BASE		TUNNEL-P2	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	14	H42	F42SSILL-R	2,860	41	14	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.569	0.333	0.236	0.224	0.224	1,626	951	675	675
EAST WING	SUB-BASE		TUNNEL-P2	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	H42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	SUB-BASE		TUNNEL-P2	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	6	H42	F42SSILL-R	2,860	41	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.244	0.143	0.101	0.096	0.096	697	408	289	289
EAST WING	SUB-BASE		TUNNEL	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	16	H42	F44SSILL-R	2,860	78	16	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	1.242	0.760	0.482	0.457	0.457	3,552	2,175	1,377	1,377
EAST WING	SUB-BASE		TUNNEL	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	8	H42	F44SSILL-R	2,860	78	8	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.621	0.380	0.241	0.229	0.229	1,776	1,087	689	689
EAST WING	SUB-BASE		TUNNEL	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	8	VP42	F44SSILL-R	2,860	78	8	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.621	0.380	0.241	0.229	0.229	1,776	1,087	689	689
EAST WING	SUB-BASE		TUNNEL	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	C42X	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	SUB-BASE		STORAGE	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	11	H42	F44SSILL-R	2,860	78	11	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.854	0.523	0.331	0.314	0.314	2,442	1,495	947	947
EAST WING	SUB-BASE		STORAGE	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	2	EX2X15	LED2W	8,760	2	2	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.004	0.004	-	-	-	33	33	-	-
EAST WING	SUB-BASE		STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	67	H42	F42SSILL-R	2,860	41	67	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	2.721	1.592	1.129	1.073	1.073	7,782	4,553	3,229	3,229
EAST WING	SUB-BASE		SIDE TUNNEL	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	10	C42	F42SSILL-R	2,860	41	10	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.406	0.238	0.169	0.160	0.160	1,162	680	482	482
EAST WING	SUB-BASE		SIDE TUNNEL	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	10	C42	F42SSILL-R	2,860	41	10	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.406	0.238	0.169	0.160	0.160	1,162	680	482	482
EAST WING	SUB-BASE		STORAGE AWAY FROM MAIN	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	2	H42	F44SSILL-R	2,860	78	2	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.155	0.095	0.060	0.057	0.057	444	272	172	172
EAST WING	SUB-BASE		STORAGE AWAY FROM MAIN	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	H42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	SUB-BASE		STORAGE BY SOUTH MAIN	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	6	H42	F42SSILL-R	2,860	41	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.244	0.143	0.101	0.096	0.096	697	408	289	289
EAST WING	SUB-BASE		STAIRWELL BY MAIN	MW22L	Fixture w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA Ballast	2	MV1X100	F22ILL-R	2,860	26	2	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.052	0.032	0.021	0.020	0.020	150	91	59	59
EAST WING	SUB-BASE		STAIRWELL BY MAIN	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	V42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	SUB-BASE		STAIRWELL BY MAIN	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	3	H42	F42SSILL-R	2,860	41	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.122	0.071	0.051	0.048	0.048	348	204	145	145
EAST WING	SUB-BASE		ELEVATOR LOBBY	MW22L	Fixture w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA Ballast	2	MV1X100	F22ILL-R	2,860	26	2	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.052	0.032	0.021	0.020	0.020	150	91	59	59
EAST WING	SUB-BASE		MECHANICAL ROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	4	H42	F42SSILL-R	2,860	41	4	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.162	0.095	0.067	0.064	0.064	465	272	193	193
EAST WING	SUB-BASE		STORAGE BY NORTH MAIN	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	H42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	SUB-BASE		STORAGE BY NORTH MAIN	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	H42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	SUB-BASE		STORAGE BY NORTH MAIN	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	H42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	SUB-BASE		STORAGE BY NORTH MAIN	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	H42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	SUB-BASE		STORAGE BY NORTH MAIN	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	H42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	SUB-BASE		STORAGE BY NORTH MAIN	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	VP42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	SUB-BASE		AROUND ELEVATOR STATION	VP22L-QHE	45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA Ballast--white reflector	16	MV1X100	F22LL	2,860	28	16	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.448	0.253	0.194	0.184	0.184	1,280	725	555	555
EAST WING	SUB-BASE		AROUND ELEVATOR STATION	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	3	EX2X15	LED2W	8,760	2	3	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.006	0.006	-	-	-	49	49	-	-
EAST WING	SUB-BASE		ELEVATOR STATION	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	8	S42	F44SSILL-R	2,860	78	8	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.621	0.380	0.241	0.229	0.229	1,776	1,087	689	689
EAST WING	SUB-BASE		ELEVATOR STATION	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	S42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	SUB-BASE		ELEVATOR STATION	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	2	H42	F44SSILL-R	2,860	78	2	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.155	0.095	0.060	0.057	0.057	444	272	172	172
EAST WING	SUB-BASE		AROUND ELEVATOR STATION	VP22L-QHE	45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA Ballast--white reflector	16	MV1X100	F22LL	2,860	28	16	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.448	0.253	0.194	0.184	0.184	1,280	725	555	555
EAST WING	SUB-BASE		AROUND ELEVATOR STATION	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	3	EX2X15	LED2W	8,760	2	3	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.006	0.006	-	-	-	49	49	-	-
EAST WING	SUB-BASE		ELEVATOR STATION	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	8	S42	F44SSILL-R	2,860	78	8	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.621	0.380	0.241	0.229	0.229	1,776	1,087	689	689
EAST WING	SUB-BASE		ELEVATOR STATION	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	S42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	SUB-BASE		ELEVATOR STATION	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	4	H42	F42SSILL-R	2,860	41	4	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.162	0.095	0.067	0.064	0.064	465	272	193	193
EAST WING	SUB-BASE		AROUND ELEVATOR STATION	VP22L-QHE	45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA Ballast--white reflector	16	MV1X100	F22LL	2,860	28	16	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.448	0.253	0.194	0.184	0.184	1,280	725	555	555
EAST WING	SUB-BASE		AROUND ELEVATOR STATION	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	3	EX2X15	LED2W	8,760	2	3	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.006	0.006	-	-	-	49	49	-	-
EAST WING	SUB-BASE		ELEVATOR STATION	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	4	S42	F44SSILL-R	2,860	78	4	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.310	0.190	0.120	0.114	0.114	888	544	344	344
EAST WING	SUB-BASE		ELEVATOR STATION	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	S42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96

Facility	Area	Space	Room#/ ID#/ Dwg#	Comments	Additional Comments	Pre Fixture Qty	Existing Fixture Type	Wattage Table	Hours Pre	Pre Watts/ Fixt	Post Fixture Qty	Post Design Code (Fixture)	Post Lamp Design Code (Wattage Table)	Post Description	Post Watt/ Fixt	% Contribution to Demand Charge	Hours Post	Base kW	Retro Proposed kW	kW Difference	Retro Demand Savings (kW)	Total Demand Savings (kW)	Base kWh	Retro Proposed kWh	Retro kWh Saved	Total kWh Saved
EAST WING	SUB-BASE		ELEVATOR STATION	LB32L-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49707/GE232MAX-L/ULTRA ballast	8	S42	F31ILL-R	2,860	24	8	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.195	0.095	0.100	0.095	0.095	558	272	286	286
EAST WING	SUB-BASE		ELEVATOR STATION	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	1	H42	F44SSILL-R	2,860	78	1	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.078	0.048	0.030	0.029	0.029	222	136	86	86
EAST WING	SUB-BASE		ELEVATOR STATION	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	H42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	SUB-BASE		AROUND ELEVATOR STATION	VP22L-QHE	45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA Ballast--white reflector	16	MV1X100	F22LL	2,860	28	16	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.448	0.253	0.194	0.184	0.184	1,280	725	555	555
EAST WING	SUB-BASE		AROUND ELEVATOR STATION	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	3	EX2X15	LED2W	8,760	2	3	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.006	0.006	-	-	-	49	49	-	-
EAST WING	SUB-BASE		ELEVATOR STATION	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	4	S42	F44SSILL-R	2,860	78	4	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.310	0.190	0.120	0.114	0.114	888	544	344	344
EAST WING	SUB-BASE		ELEVATOR STATION	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	S42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	SUB-BASE		ELEVATOR STATION	LB32L-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49707/GE232MAX-L/ULTRA ballast	8	S42	F31ILL-R	2,860	24	8	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.195	0.095	0.100	0.095	0.095	558	272	286	286
EAST WING	SUB-BASE		ELEVATOR STATION	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	1	H42	F44SSILL-R	2,860	78	1	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.078	0.048	0.030	0.029	0.029	222	136	86	86
EAST WING	SUB-BASE		ELEVATOR STATION	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	H42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
PARKING GARAGE	SUB-BASE		GARAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	22	D42	F42SSILL-R	8,760	41	22	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	8,760	0.893	0.523	0.371	0.352	0.352	7,827	4,579	3,248	3,248
PARKING GARAGE	SUB-BASE		GARAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	60	D42	F42SSILL-R	8,760	41	60	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	8,760	2.437	1.426	1.011	0.961	0.961	21,346	12,488	8,858	8,858
PARKING GARAGE	SUB-BASE		GARAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	100	D42	F42SSILL-R	8,760	41	100	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	8,760	4.061	2.376	1.685	1.601	1.601	35,577	20,814	14,763	14,763
PARKING GARAGE	SUB-BASE		GARAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	170	D42	F42SSILL-R	8,760	41	170	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	8,760	6.904	4.039	2.865	2.722	2.722	60,480	35,383	25,097	25,097
PARKING GARAGE	SUB-BASE		GARAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	190	D42	F42SSILL-R	8,760	41	190	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	8,760	7.716	4.514	3.202	3.042	3.042	67,595	39,546	28,049	28,049
PARKING GARAGE	SUB-BASE		GARAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	56	D42	F42SSILL-R	8,760	41	56	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	8,760	2.274	1.331	0.944	0.897	0.897	19,923	11,656	8,267	8,267
PARKING GARAGE	SUB-BASE		GARAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	35	D42	F42SSILL-R	8,760	41	35	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	8,760	1.421	0.832	0.590	0.560	0.560	12,452	7,285	5,167	5,167
EAST WING	1ST	51	OFFICE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	2	V41	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	1ST	51	OFFICE	MV1X175	Fixture w/ (1) 175w Mercury Vapor Lamp & Ballast	4	MV1X175	MV175/1	2,860	185	4	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	0.740	0.143	0.597	0.568	0.568	2,117	408	1,709	1,709
EAST WING	1ST	51	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	4	I1X60/table	CFC13/1	2,860	12	4	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.047	0.032	0.015	0.014	0.014	134	93	42	42
EAST WING	1ST	51	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	2	I1X60/table	CFC13/1	2,860	12	2	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.023	0.016	0.007	0.007	0.007	67	46	21	21
EAST WING	1ST	51	OFFICE	CF1X23SI	Relamp w/ (1) 23 watt Compact Fluorescent screw-in lamp--GE-80889/FLE23HT3/2/XL827	2	I1X100/table	CFC23/1	2,860	21	2	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.042	0.016	0.025	0.024	0.024	119	46	72	72
EAST WING	1ST	51	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	2	I1X60/table	CFC13/1	2,860	12	2	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.023	0.016	0.007	0.007	0.007	67	46	21	21
EAST WING	1ST	51	OFFICE	CF1X23SI	Relamp w/ (1) 23 watt Compact Fluorescent screw-in lamp--GE-80889/FLE23HT3/2/XL827	2	I1X100/table	CFC23/1	2,860	21	2	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.042	0.016	0.025	0.024	0.024	119	46	72	72
EAST WING	1ST	52	OFFICE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	2	V41	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	1ST	52	OFFICE	MV1X175	Fixture w/ (1) 175w Mercury Vapor Lamp & Ballast	4	MV1X175	MV175/1	2,860	185	4	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	0.740	0.143	0.597	0.568	0.568	2,117	408	1,709	1,709
EAST WING	1ST	52	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	4	I1X60/table	CFC13/1	2,860	12	4	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.047	0.032	0.015	0.014	0.014	134	93	42	42
EAST WING	1ST	52	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	2	I1X60/table	CFC13/1	2,860	12	2	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.023	0.016	0.007	0.007	0.007	67	46	21	21
EAST WING	1ST	52	OFFICE	CF1X23SI	Relamp w/ (1) 23 watt Compact Fluorescent screw-in lamp--GE-80889/FLE23HT3/2/XL827	1	I1X100/table	CFC23/1	2,860	21	1	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.021	0.008	0.013	0.012	0.012	59	23	36	36
EAST WING	1ST	53	OFFICE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	2	V41	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	1ST	53	OFFICE	MV1X175	Fixture w/ (1) 175w Mercury Vapor Lamp & Ballast	4	MV1X175	MV175/1	2,860	185	4	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	0.740	0.143	0.597	0.568	0.568	2,117	408	1,709	1,709
EAST WING	1ST	53	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	4	I1X60/table	CFC13/1	2,860	12	4	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.047	0.032	0.015	0.014	0.014	134	93	42	42
EAST WING	1ST	53	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	2	I1X60/table	CFC13/1	2,860	12	2	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.023	0.016	0.007	0.007	0.007	67	46	21	21
EAST WING	1ST	53	OFFICE	CF1X23SI	Relamp w/ (1) 23 watt Compact Fluorescent screw-in lamp--GE-80889/FLE23HT3/2/XL827	3	I1X100/table	CFC23/1	2,860	21	3	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.062	0.024	0.038	0.036	0.036	178	69	109	109
EAST WING	1ST	54	OFFICE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	2	V41	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	1ST	54	OFFICE	MV1X175	Fixture w/ (1) 175w Mercury Vapor Lamp & Ballast	4	MV1X175	MV175/1	2,860	185	4	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	0.740	0.143	0.597	0.568	0.568	2,117	408	1,709	1,709
EAST WING	1ST	54	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	4	I1X60/table	CFC13/1	2,860	12	4	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.047	0.032	0.015	0.014	0.014	134	93	42	42
EAST WING	1ST	54	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	2	I1X60/table	CFC13/1	2,860	12	2	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.023	0.016	0.007	0.007	0.007	67	46	21	21
EAST WING	1ST	54	OFFICE	CF1X23SI	Relamp w/ (1) 23 watt Compact Fluorescent screw-in lamp--GE-80889/FLE23HT3/2/XL827	2	I1X100/table	CFC23/1	2,860	21	2	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.042	0.016	0.025	0.024	0.024	119	46	72	72
EAST WING	1ST		HALLWAY	cir40-32x	Surface-Mount Luminaire w/ (1) 40w and (1) 32w Circline Fluorescent Lamp and (1) Standard Magnetic Ballast	12	cir40-32x	FC32/40/1	2,860	72	12	LED/DRUM/KIT/12	LED18W	Surface Mounted Retrofit Existing Drum with 12" LED Kit LED Light Fixture. (1) 18W	18	.95	2,860	0.866	0.214	0.653	0.620	0.620	2,478	612	1,866	1,866
EAST WING	1ST		HALLWAY	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	V42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	1ST		HALLWAY	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	2	EX2X15	LED2W	8,760	2	2	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.004	0.004	-	-	-	33	33	-	-
EAST WING	1ST		KITCHEN	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	3	W42	F42SSILL-R	2,860	41	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.122	0.071	0.051	0.048	0.048	348	204	145	145
EAST WING	1ST		MECHANICAL ROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	H42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	1ST		MECHANICAL ROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	13	H42	F42SSILL-R	2,860	41	13	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.528	0.309	0.219	0.208	0.208	1,510	883	627	627
EAST WING	1ST		MECHANICAL ROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	3	H42	F42SSILL-R	2,860	41	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.122	0.071	0.051	0.048	0.048	348	204	145	145
EAST WING	1ST		WOMEN'S RESTROOM	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	1	A43	F42SSILL	2,860	43	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.043	0.024	0.020	0.019	0.019	124	68	56	56
EAST WING	1ST		WOMEN'S RESTROOM	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	1	H42	F44SSILL-R	2,860	78	1	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.078	0.048	0.030	0.029	0.029	222	136	86	86

Facility	Area	Space	Room#/ ID#/ Dwg#	Comments	Additional Comments	Pre Fixture Qty	Existing Fixture Type	Wattage Table	Hours Pre	Pre Watts/ Fixt	Post Fixture Qty	Post Design Code (Fixture)	Post Lamp Design Code (Wattage Table)	Post Description	Post Watt/ Fixt	% Contribution to Demand Charge	Hours Post	Base kW	Retro Proposed kW	kW Difference	Retro Demand Savings (kW)	Total Demand Savings (kW)	Base kWh	Retro Proposed kWh	Retro kWh Saved	Total kWh Saved
EAST WING	1ST		WOMEN'S RESTROOM	LB34LT2-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49709/GE432MAX-L/ULTRA ballast, tandem wired 2:1	2	H32	F31ILL-R	2,860	24	2	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.049	0.024	0.025	0.024	0.024	139	68	71	71
EAST WING	1ST		MEN'S RESTROOM	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	1	A43	F42SSILL	2,860	43	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.043	0.024	0.020	0.019	0.019	124	68	56	56
EAST WING	1ST		MEN'S RESTROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	W42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	1ST		MEN'S RESTROOM	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	1	S42	F44SSILL-R	2,860	78	1	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.078	0.048	0.030	0.029	0.029	222	136	86	86
EAST WING	1ST		MEN'S RESTROOM	LB34LT2-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49709/GE432MAX-L/ULTRA ballast, tandem wired 2:1	2	S32	F31ILL-R	2,860	24	2	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.049	0.024	0.025	0.024	0.024	139	68	71	71
EAST WING	1ST		STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	4	W42	F42SSILL-R	2,860	41	4	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.162	0.095	0.067	0.064	0.064	465	272	193	193
EAST WING	1ST		PIPE CHASE	CF1X20/SI	Relamp w/ (1) 20 watt Compact Fluorescent screw-in lamp--GE-15834/FLE20HT3/2/827	1	I1X75	CFC20/1	2,860	18	1	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.018	0.008	0.010	0.009	0.009	52	23	28	28
EAST WING	1ST		STAIRWELL	LB34LT2-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49709/GE432MAX-L/ULTRA ballast, tandem wired 2:1	4	S32	F31ILL-R	2,860	24	4	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.097	0.048	0.050	0.047	0.047	279	136	143	143
EAST WING	1ST		STAIRWELL	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	1	EX2X15	LED2W	8,760	2	1	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.002	0.002	-	-	-	16	16	-	-
EAST WING	1ST		FOYER	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	7	S42	F44SSILL-R	2,860	78	7	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.543	0.333	0.211	0.200	0.200	1,554	951	603	603
EAST WING	1ST		FOYER	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	4	S42	F42SSILL-R	2,860	41	4	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.162	0.095	0.067	0.064	0.064	465	272	193	193
EAST WING	1ST		FOYER	LB32L-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49707/GE232MAX-L/ULTRA ballast	8	S32	F31ILL-R	2,860	24	8	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.195	0.095	0.100	0.095	0.095	558	272	286	286
EAST WING	1ST		FOYER	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	1	EX2X15	LED2W	8,760	2	1	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.002	0.002	-	-	-	16	16	-	-
EAST WING	1ST		STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	W42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	1ST		MECHANICAL ROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	W42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	1ST		HALLWAY	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	1	EX2X15	LED2W	8,760	2	1	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.002	0.002	-	-	-	16	16	-	-
EAST WING	1ST		GALLERY/OFFICES	A53P/T8L	2'x5' Recessed Troffer, large cell parabolic lens, w/ (3) 40wT8 Lamps (2) electronic Ballasts	140	A53P/T8L	F53ILL	2,860	96	140	CK2x4	LEDT8/4'/18W/2	Surface Mounted Install 2x4 2-Lamp Centering Kit LED 4' T8 Lamp (2) 18W Lamps	36	.95	2,860	13.393	4.990	8.404	7.983	7.983	38,304	14,270	24,034	24,034
EAST WING	1ST		GALLERY/OFFICES	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	1	V41	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	1ST		GALLERY/OFFICES	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	6	W42	F42SSILL-R	2,860	41	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.244	0.143	0.101	0.096	0.096	697	408	289	289
EAST WING	1ST		RAMP	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	12	UP42	F44SSILL-R	2,860	78	12	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.931	0.570	0.361	0.343	0.343	2,664	1,631	1,033	1,033
EAST WING	1ST		RAMP	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	2	EX2X15	LED2W	8,760	2	2	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.004	0.004	-	-	-	33	33	-	-
EAST WING	1ST	41-46	OFFICE	LB41L-QHE	Relamp & Reballast w/ (1) GE-00257 / F28T8/SP41/UMX/ECO Lamp & (1) GE-49706/GE132MAX-L/ULTRA ballast	6	V41	F41SSILL-R	2,860	21	6	LEDT8	LEDT8/4'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.125	0.071	0.053	0.051	0.051	356	204	152	152
EAST WING	1ST	41-46	OFFICE	LB32LT2-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49707/GE232MAX-L/ULTRA ballast, tandem wired 2:1	240	S31	F31ILL-R	2,860	24	240	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	5.848	2.851	2.997	2.847	2.847	16,726	8,154	8,571	8,571
EAST WING	1ST	41-46	OPEN OFFICE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	180	S41	F42SSILL-R	2,860	41	180	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	7.310	4.277	3.033	2.882	2.882	20,907	12,232	8,676	8,676
EAST WING	1ST	41-46	OPEN OFFICE	LB41L-QHE	Relamp & Reballast w/ (1) GE-00257 / F28T8/SP41/UMX/ECO Lamp & (1) GE-49706/GE132MAX-L/ULTRA ballast	56	S41	F41SSILL-R	2,860	21	56	LEDT8	LEDT8/4'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 12W Lamp	12	.95	2,860	1.162	0.665	0.497	0.472	0.472	3,325	1,903	1,422	1,422
EAST WING	1ST	41-46	OPEN OFFICE	LB21L-QHE	Relamp & Reballast w/ (1) GE-45748 / F17T8/SP41/ECO Lamp & (1) GE-49706/GE132MAX-L/ULTRA ballast	62	S21	F21LL	2,860	14	62	LEDT8	LEDT8/2'/8W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (1) 8W Lamp	8	.95	2,860	0.895	0.491	0.404	0.384	0.384	2,561	1,404	1,156	1,156
EAST WING	1ST		HALLWAY	cir40-32x	Surface-Mount Luminaire w/ (1) 40w and (1) 32w Circline Fluorescent Lamp and (1) Standard Magnetic Ballast	14	cir40-32x	FC32/40/1	2,860	72	14	LED/DRUM/KIT/12	LED18W	Surface Mounted Retrofit Existing Drum with 12" LED Kit LED Light Fixture. (1) 18W	18	.95	2,860	1.011	0.249	0.761	0.723	0.723	2,891	714	2,177	2,177
EAST WING	1ST		HALLWAY	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	2	EX2X15	LED2W	8,760	2	2	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.004	0.004	-	-	-	33	33	-	-
EAST WING	1ST		HALLWAY	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	9	S42	F42SSILL-R	2,860	41	9	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.366	0.214	0.152	0.144	0.144	1,045	612	434	434
EAST WING	1ST		SECURITY	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	12	S41	F42SSILL-R	2,860	41	12	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.487	0.285	0.202	0.192	0.192	1,394	815	578	578
EAST WING	1ST		SECURITY	LB41L-QHE	Relamp & Reballast w/ (1) GE-00257 / F28T8/SP41/UMX/ECO Lamp & (1) GE-49706/GE132MAX-L/ULTRA ballast	4	S41	F41SSILL-R	2,860	21	4	LEDT8	LEDT8/4'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.083	0.048	0.036	0.034	0.034	237	136	102	102
EAST WING	1ST		SECURITY	LB31L-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49706/GE132MAX-L/ULTRA ballast	16	S31	F31ILL-R	2,860	24	16	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.390	0.190	0.200	0.190	0.190	1,115	544	571	571
EAST WING	1ST		CONFERENCE ROOM	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	12	S41	F42SSILL-R	2,860	41	12	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.487	0.285	0.202	0.192	0.192	1,394	815	578	578
EAST WING	1ST		CONFERENCE ROOM	LB41L-QHE	Relamp & Reballast w/ (1) GE-00257 / F28T8/SP41/UMX/ECO Lamp & (1) GE-49706/GE132MAX-L/ULTRA ballast	4	S41	F41SSILL-R	2,860	21	4	LEDT8	LEDT8/4'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.083	0.048	0.036	0.034	0.034	237	136	102	102
EAST WING	1ST		CONFERENCE ROOM	LB31L-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49706/GE132MAX-L/ULTRA ballast	16	S31	F31ILL-R	2,860	24	16	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.390	0.190	0.200	0.190	0.190	1,115	544	571	571
EAST WING	1ST		FOYER	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	6	H42	F44SSILL-R	2,860	78	6	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.466	0.285	0.181	0.172	0.172	1,332	815	516	516
EAST WING	1ST		FOYER	MV1X100	HID Fixture w/ (1) 100w Mercury Vapor Lamp & Ballast	7	MV1X100	MV100/1	2,860	113	7	LEDSI/COB	LED22W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 22W	22	.95	2,860	0.790	0.152	0.637	0.605	0.605	2,259	436	1,822	1,822
EAST WING	1ST		FOYER	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	1	EX2X15	LED2W	8,760	2	1	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.002	0.002	-	-	-	16	16	-	-
EAST WING	1ST		OFFICE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	2	V41	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	1ST		OFFICE	MV1X175	Fixture w/ (1) 175w Mercury Vapor Lamp & Ballast	4	MV1X175	MV175/1	2,860	185	4	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	0.740	0.143	0.597	0.568	0.568	2,117	408	1,709	1,709
EAST WING	1ST		OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	4	I1X60	CFC13/1	2,860	12	4	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.047	0.032	0.015	0.014	0.014	134	93	42	42
EAST WING	1ST		OFFICE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	2	V41	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	1ST		OFFICE	MV1X175	Fixture w/ (1) 175w Mercury Vapor Lamp & Ballast	4	MV1X175	MV175/1	2,860	185	4	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	0.740	0.143	0.597	0.568	0.568	2,117	408	1,709	1,709
EAST WING	1ST		OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	4	I1X60	CFC13/1	2,860	12	4	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.047	0.032	0.015	0.014	0.014	134	93	42	42
EAST WING	1ST		OFFICE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	2	V41	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	1ST		OFFICE	MV1X175	Fixture w/ (1) 175w Mercury Vapor Lamp & Ballast	4	MV1X175	MV175/1	2,860	185	4	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	0.740	0.143	0.597	0.568	0.568	2,117	408	1,709	1,709

Facility	Area	Space	Room#/ ID#/ Dwg#	Comments	Additional Comments	Pre Fixture Qty	Existing Fixture Type	Wattage Table	Hours Pre	Pre Watts/ Fixt	Post Fixture Qty	Post Design Code (Fixture)	Post Lamp Design Code (Wattage Table)	Post Description	Post Watt/ Fixt	% Contribution to Demand Charge	Hours Post	Base kW	Retro Proposed kW	kW Difference	Retro Demand Savings (kW)	Total Demand Savings (kW)	Base kWh	Retro Proposed kWh	Retro kWh Saved	Total kWh Saved
EAST WING	1ST		OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	4	I1X60	CFC13/1	2,860	12	4	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.047	0.032	0.015	0.014	0.014	134	93	42	42
EAST WING	1ST		OFFICE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	2	V41	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	1ST		OFFICE	MV1X175	Fixture w/ (1) 175w Mercury Vapor Lamp & Ballast	4	MV1X175	MV175/1	2,860	185	4	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	0.740	0.143	0.597	0.568	0.568	2,117	408	1,709	1,709
EAST WING	1ST		OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	4	I1X60	CFC13/1	2,860	12	4	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.047	0.032	0.015	0.014	0.014	134	93	42	42
EAST WING	1ST		HALLWAY	cir40-32x	Surface-Mount Luminaire w/ (1) 40w and (1) 32w Circline Fluorescent Lamp and (1) Standard Magnetic Ballast	12	cir40-32x	FC32/40/1	2,860	72	12	LED/DRUM/KIT/12	LED18W	Surface Mounted Retrofit Existing Drum with 12" LED Kit LED Light Fixture. (1) 18W	18	.95	2,860	0.866	0.214	0.653	0.620	0.620	2,478	612	1,866	1,866
EAST WING	1ST		HALLWAY	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	V42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	1ST		HALLWAY	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	2	EX2X15	LED2W	8,760	2	2	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.004	0.004	-	-	-	33	33	-	-
EAST WING	1ST		KITCHEN	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	3	W42	F42SSILL-R	2,860	41	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.122	0.071	0.051	0.048	0.048	348	204	145	145
EAST WING	1ST		MECHANICAL ROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	H42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	1ST		MECHANICAL ROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	13	H42	F42SSILL-R	2,860	41	13	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.528	0.309	0.219	0.208	0.208	1,510	883	627	627
EAST WING	1ST		MECHANICAL ROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	3	H42	F42SSILL-R	2,860	41	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.122	0.071	0.051	0.048	0.048	348	204	145	145
EAST WING	1ST		WOMEN'S RESTROOM	CKA42L/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49707/GE232MAX-L/ULTRA Low Power Instant Start Ballast	1	A43	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	1ST		WOMEN'S RESTROOM	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	1	H42	F44SSILL-R	2,860	78	1	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.078	0.048	0.030	0.029	0.029	222	136	86	86
EAST WING	1ST		WOMEN'S RESTROOM	LB34LT2-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49709/GE432MAX-L/ULTRA ballast, tandem wired 2:1	2	H32	F31ILL-R	2,860	24	2	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.049	0.024	0.025	0.024	0.024	139	68	71	71
EAST WING	1ST		MEN'S RESTROOM	CKA42L/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49707/GE232MAX-L/ULTRA Low Power Instant Start Ballast	1	A43	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	1ST		MEN'S RESTROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	W42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	1ST		MEN'S RESTROOM	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	1	S42	F44SSILL-R	2,860	78	1	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.078	0.048	0.030	0.029	0.029	222	136	86	86
EAST WING	1ST		MEN'S RESTROOM	LB34LT2-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49709/GE432MAX-L/ULTRA ballast, tandem wired 2:1	2	S32	F31ILL-R	2,860	24	2	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.049	0.024	0.025	0.024	0.024	139	68	71	71
EAST WING	1ST		STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	4	W42	F42SSILL-R	2,860	41	4	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.162	0.095	0.067	0.064	0.064	465	272	193	193
EAST WING	1ST		PIPE CHASE	CF1X20/SI	Relamp w/ (1) 20 watt Compact Fluorescent screw-in lamp--GE-15834/FLE20HT3/2/827	1	I1X75	CFC20/1	2,860	18	1	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.018	0.008	0.010	0.009	0.009	52	23	28	28
EAST WING	1ST		STAIRWELL	LB34LT2-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49709/GE432MAX-L/ULTRA ballast, tandem wired 2:1	4	S32	F31ILL-R	2,860	24	4	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.097	0.048	0.050	0.047	0.047	279	136	143	143
EAST WING	1ST		STAIRWELL	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	1	EX2X15	LED2W	8,760	2	1	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.002	0.002	-	-	-	16	16	-	-
EAST WING	1ST		STAIRWELL	LB34LT2-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49709/GE432MAX-L/ULTRA ballast, tandem wired 2:1	4	S32	F31ILL-R	2,860	24	4	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.097	0.048	0.050	0.047	0.047	279	136	143	143
EAST WING	1ST		STAIRWELL	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	1	EX2X15	LED2W	8,760	2	1	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.002	0.002	-	-	-	16	16	-	-
EAST WING	1ST		FOYER	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	7	S42	F44SSILL-R	2,860	78	7	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.543	0.333	0.211	0.200	0.200	1,554	951	603	603
EAST WING	1ST		FOYER	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	4	S42	F42SSILL-R	2,860	41	4	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.162	0.095	0.067	0.064	0.064	465	272	193	193
EAST WING	1ST		FOYER	LB32L-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49707/GE232MAX-L/ULTRA ballast	8	S32	F31ILL-R	2,860	24	8	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.195	0.095	0.100	0.095	0.095	558	272	286	286
EAST WING	1ST		FOYER	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	1	EX2X15	LED2W	8,760	2	1	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.002	0.002	-	-	-	16	16	-	-
EAST WING	1ST		STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	W42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	1ST		MECHANICAL ROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	W42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	1ST		HALLWAY	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	1	EX2X15	LED2W	8,760	2	1	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.002	0.002	-	-	-	16	16	-	-
EAST WING	1ST		OFFICES	A53P/T8L	2'x5' Recessed Troffer, large cell parabolic lens, w/ (3) 40wT8 Lamps (2) electronic Ballasts	140	A53P/T8L	F53ILL	2,860	96	140	CK2x4	LEDT8/4'/18W/2	Surface Mounted Install 2x4 2-Lamp Centering Kit LED 4' T8 Lamp (2) 18W Lamps	36	.95	2,860	13.393	4.990	8.404	7.983	7.983	38,304	14,270	24,034	24,034
EAST WING	1ST		OFFICES	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	1	V41	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	1ST		OFFICES	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	6	W42	F42SSILL-R	2,860	41	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.244	0.143	0.101	0.096	0.096	697	408	289	289
EAST WING	1ST		RAMP	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	12	UP42	F44SSILL-R	2,860	78	12	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.931	0.570	0.361	0.343	0.343	2,664	1,631	1,033	1,033
EAST WING	1ST		RAMP	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	2	EX2X15	LED2W	8,760	2	2	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.004	0.004	-	-	-	33	33	-	-
EAST WING	1ST		OFFICE	LB41L-QHE	Relamp & Reballast w/ (1) GE-00257 / F28T8/SP41/UMX/ECO Lamp & (1) GE-49706/GE132MAX-L/ULTRA ballast	6	V41	F41SSILL-R	2,860	21	6	LEDT8	LEDT8/4'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.125	0.071	0.053	0.051	0.051	356	204	152	152
EAST WING	1ST		OFFICE	LB32LT2-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49707/GE232MAX-L/ULTRA ballast, tandem wired 2:1	120	S31	F31ILL-R	2,860	24	120	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	2.924	1.426	1.499	1.424	1.424	8,363	4,077	4,286	4,286
EAST WING	1ST		OFFICE	LB32LT2-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49707/GE232MAX-L/ULTRA ballast, tandem wired 2:1	120	S31	F31ILL-R	2,860	24	120	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	2.924	1.426	1.499	1.424	1.424	8,363	4,077	4,286	4,286
EAST WING	1ST		OPEN OFFICE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	96	S41	F42SSILL-R	2,860	41	96	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	3.899	2.281	1.618	1.537	1.537	11,151	6,524	4,627	4,627
EAST WING	1ST		OPEN OFFICE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	84	S41	F42SSILL-R	2,860	41	84	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	3.411	1.996	1.416	1.345	1.345	9,757	5,708	4,049	4,049
EAST WING	1ST		OPEN OFFICE	LB41L-QHE	Relamp & Reballast w/ (1) GE-00257 / F28T8/SP41/UMX/ECO Lamp & (1) GE-49706/GE132MAX-L/ULTRA ballast	24	S41	F41SSILL-R	2,860	21	24	LEDT8	LEDT8/4'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.498	0.285	0.213	0.202	0.202	1,425	815	609	609
EAST WING	1ST		OPEN OFFICE	LB41L-QHE	Relamp & Reballast w/ (1) GE-00257 / F28T8/SP41/UMX/ECO Lamp & (1) GE-49706/GE132MAX-L/ULTRA ballast	32	S41	F41SSILL-R	2,860	21	32	LEDT8	LEDT8/4'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.664	0.380	0.284	0.270	0.270	1,900	1,087	812	812
EAST WING	1ST		OPEN OFFICE	LB31L-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49706/GE132MAX-L/ULTRA ballast	30	S31	F31ILL-R	2,860	24	30	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.731	0.356	0.375	0.356	0.356	2,091	1,019	1,071	1,071
EAST WING	1ST		OPEN OFFICE	LB31L-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49706/GE132MAX-L/ULTRA ballast	32	S31	F31ILL-R	2,860	24	32	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.780	0.380	0.400	0.380	0.380	2,230	1,087	1,143	1,143
EAST WING	1ST	36-49	OPEN OFFICE	CF1X23SI	Relamp w/ (1) 23 watt Compact Fluorescent screw-in lamp--GE-80889/FLE23HT3/2/XL827	54	I1X100	CFC23/1	2,860	21	54	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	1.121	0.437	0.684	0.649	0.649	3,206	1,251	1,955	1,955
EAST WING	1ST	36-49	OPEN OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	30	I1X60	CFC13/1	2,860	12	30	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.352	0.243	0.109	0.104	0.104	1,007	695	312	312
EAST WING	1ST		HALLWAY	cir40-32x	Surface-Mount Luminaire w/ (1) 40w and (1) 32w Circline Fluorescent Lamp and (1) Standard Magnetic Ballast	14	cir40-32x	FC32/40/1	2,860	72	14	LED/DRUM/KIT/12	LED18W	Surface Mounted Retrofit Existing Drum with 12" LED Kit LED Light Fixture. (1) 18W	18	.95	2,860	1.011	0.249	0.761	0.723	0.723	2,891	714	2,177	2,177

Facility	Area	Space	Room#/ ID#/ Dwg#	Comments	Additional Comments	Pre Fixture Qty	Existing Fixture Type	Wattage Table	Hours Pre	Pre Watts/ Fixt	Post Fixture Qty	Post Design Code (Fixture)	Post Lamp Design Code (Wattage Table)	Post Description	Post Watt/ Fixt	% Contribution to Demand Charge	Hours Post	Base kW	Retro Proposed kW	kW Difference	Retro Demand Savings (kW)	Total Demand Savings (kW)	Base kWh	Retro Proposed kWh	Retro kWh Saved	Total kWh Saved
EAST WING	1ST		HALLWAY	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	2	EX2X15	LED2W	8,760	2	2	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.004	0.004	-	-	-	33	33	-	-
EAST WING	1ST		HALLWAY	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	9	S42	F42SSILL-R	2,860	41	9	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.366	0.214	0.152	0.144	0.144	1,045	612	434	434
EAST WING	1ST		STORAGE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	12	S41	F42SSILL-R	2,860	41	12	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.487	0.285	0.202	0.192	0.192	1,394	815	578	578
EAST WING	1ST		STORAGE	LB41L-QHE	Relamp & Reballast w/ (1) GE-00257 / F28T8/SP41/UMX/ECO Lamp & (1) GE-49706/GE132MAX-L/ULTRA ballast	4	S41	F41SSILL-R	2,860	21	4	LEDT8	LEDT8/4'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.083	0.048	0.036	0.034	0.034	237	136	102	102
EAST WING	1ST		STORAGE	LB31L-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49706/GE132MAX-L/ULTRA ballast	16	S31	F31ILL-R	2,860	24	16	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.390	0.190	0.200	0.190	0.190	1,115	544	571	571
EAST WING	1ST	87	MECHANICAL ROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	19	H42	F42SSILL-R	2,860	41	19	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.772	0.451	0.320	0.304	0.304	2,207	1,291	916	916
EAST WING	1ST		STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	H42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	1ST		STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	4	H42	F42SSILL-R	2,860	41	4	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.162	0.095	0.067	0.064	0.064	465	272	193	193
EAST WING	1ST	64	SENATE REC	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	2	C42	F44SSILL-R	2,860	78	2	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.155	0.095	0.060	0.057	0.057	444	272	172	172
EAST WING	1ST	64	SENATE REC	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	15	C42	F42SSILL-R	2,860	41	15	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.609	0.356	0.253	0.240	0.240	1,742	1,019	723	723
EAST WING	1ST	64	SENATE REC	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	2	V42	F44SSILL-R	2,860	78	2	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.155	0.095	0.060	0.057	0.057	444	272	172	172
EAST WING	1ST	64	SENATE REC	A42	2'x4' Recessed Troffer w/ (2) F40T12 Lamps & (1) Magnetic Ballast [wattage adjusted for ES lamp/ballast quantities]	24	A42	F42SSILL-R	2,860	41	24	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.975	0.570	0.404	0.384	0.384	2,788	1,631	1,157	1,157
EAST WING	1ST	64	SENATE REC	CKB22LL/REF	TROF KIT) & white reflector (2) GE-45748 / F17T8/SP41/ECOT8 lamps & (1) GE-49707/GE232MAX-L/ULTRA Low Power Instant Start Ballast	5	BU62	F22ILL-R	2,860	26	5	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.131	0.079	0.052	0.049	0.049	374	227	148	148
EAST WING	1ST	65	NURSE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	23	A43	F42SSILL	2,860	43	23	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.996	0.546	0.450	0.427	0.427	2,850	1,563	1,287	1,287
EAST WING	1ST	65	NURSE	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	V22	F22ILL-R	2,860	26	1	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.026	0.016	0.010	0.010	0.010	75	45	30	30
EAST WING	1ST	70	CAPITAL POLICE	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	78	A43	F42SSILL	2,860	43	78	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	3.379	1.853	1.526	1.449	1.449	9,664	5,300	4,363	4,363
EAST WING	1ST	70	CAPITAL POLICE	C42	1'x4' Recessed Troffer w/ (2) F40T12 Lamps & (1) Ballast [wattage adjusted for ES lamp/ballast quantities]	3	C42	F42SSILL	2,860	43	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.130	0.071	0.059	0.056	0.056	372	204	168	168
EAST WING	1ST	70	CAPITAL POLICE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	3	W42	F42SSILL-R	2,860	41	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.122	0.071	0.051	0.048	0.048	348	204	145	145
EAST WING	1ST	70	CAPITAL POLICE	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	5	EX2X15	LED2W	8,760	2	5	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.009	0.009	-	-	-	82	82	-	-
EAST WING	1ST	70	CAPITAL POLICE	MV1X250	Fixture w/ (1) 250w Mercury Vapor Lamp & Ballast	8	MV1X250	MV250/1	2,860	262	8	LEDSI/COB	LED45W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 45W	45	.95	2,860	2.094	0.356	1.737	1.651	1.651	5,988	1,019	4,969	4,969
EAST WING	1ST	70	CAPITAL POLICE	LB34LT2-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49709/GE432MAX-L/ULTRA ballast, tandem wired 2:1	4	S32	F31ILL-R	2,860	24	4	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.097	0.048	0.050	0.047	0.047	279	136	143	143
EAST WING	1ST	70	CAPITAL POLICE	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	4	S42	F44SSILL-R	2,860	78	4	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.310	0.190	0.120	0.114	0.114	888	544	344	344
EAST WING	1ST	70	CAPITAL POLICE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	S42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	1ST	70	CAPITAL POLICE	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	4	S22/SS	F22ILL-R	2,860	26	4	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.105	0.063	0.041	0.039	0.039	299	181	118	118
EAST WING	1ST		MECHANICAL ROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	16	H42	F42SSILL-R	2,860	41	16	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.650	0.380	0.270	0.256	0.256	1,858	1,087	771	771
EAST WING	1ST		HALLWAY	LB34LT2-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49709/GE432MAX-L/ULTRA ballast, tandem wired 2:1	16	S32	F31ILL-R	2,860	24	16	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.390	0.190	0.200	0.190	0.190	1,115	544	571	571
EAST WING	1ST		HALLWAY	LB32L-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49707/GE232MAX-L/ULTRA ballast	8	S32	F31ILL-R	2,860	24	8	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.195	0.095	0.100	0.095	0.095	558	272	286	286
EAST WING	1ST		HALLWAY	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	1	EX2X15	LED2W	8,760	2	1	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.002	0.002	-	-	-	16	16	-	-
EAST WING	1ST		VIDEO	A53P/T8L	2'x5' Recessed Troffer, large cell parabolic lens, w/ (3) 40wT8 Lamps (2) electronic Ballasts	82	A53P/T8L	F53ILL	2,860	96	82	CK2x4	LEDT8/4'/18W/2	Surface Mounted Install 2x4 2-Lamp Centering Kit LED 4' T8 Lamp (2) 18W Lamps	36	.95	2,860	7.845	2.922	4.922	4.676	4.676	22,435	8,358	14,077	14,077
EAST WING	1ST		VIDEO	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	6	W42	F42SSILL-R	2,860	41	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.244	0.143	0.101	0.096	0.096	697	408	289	289
EAST WING	1ST		VIDEO	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	V42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	1ST		HALLWAY	cir40-32x	Surface-Mount Luminaire w/ (1) 40w and (1) 32w Circline Fluorescent Lamp and (1) Standard Magnetic Ballast	32	cir40-32x	FC32/40/1	2,860	72	32	LED/DRUM/KIT/12	LED18W	Surface Mounted Retrofit Existing Drum with 12" LED Kit LED Light Fixture. (1) 18W	18	.95	2,860	2.310	0.570	1.740	1.653	1.653	6,608	1,631	4,977	4,977
EAST WING	1ST		HALLWAY	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	5	EX2X15	LED2W	8,760	2	5	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.009	0.009	-	-	-	82	82	-	-
EAST WING	1ST		WOMEN'S RESTROOM	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	2	S42	F44SSILL-R	2,860	78	2	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.155	0.095	0.060	0.057	0.057	444	272	172	172
EAST WING	1ST		WOMEN'S RESTROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	S42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	1ST		WOMEN'S RESTROOM	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	S22/SS	F22ILL-R	2,860	26	2	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.052	0.032	0.021	0.020	0.020	150	91	59	59
EAST WING	1ST		WOMEN'S RESTROOM	CKA42L/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49707/GE232MAX-L/ULTRA Low Power Instant Start Ballast	1	A43	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	1ST		WOMEN'S RESTROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	W42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	1ST		MEN'S RESTROOM	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	2	S42	F44SSILL-R	2,860	78	2	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.155	0.095	0.060	0.057	0.057	444	272	172	172
EAST WING	1ST		MEN'S RESTROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	S42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	1ST		MEN'S RESTROOM	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	S22/SS	F22ILL-R	2,860	26	2	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.052	0.032	0.021	0.020	0.020	150	91	59	59
EAST WING	1ST		MEN'S RESTROOM	CKA42L/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49707/GE232MAX-L/ULTRA Low Power Instant Start Ballast	1	A43	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	1ST		MEN'S RESTROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	W42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	1ST		MECHANICAL ROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	3	W42	F42SSILL-R	2,860	41	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.122	0.071	0.051	0.048	0.048	348	204	145	145
EAST WING	1ST		STAIRWELL	LB34LT2-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49709/GE432MAX-L/ULTRA ballast, tandem wired 2:1	4	S32	F31ILL-R	2,860	24	4	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.097	0.048	0.050	0.047	0.047	279	136	143	143
EAST WING	1ST		STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	H42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96

Facility	Area	Space	Room#/ ID#/ Dwg#	Comments	Additional Comments	Pre Fixture Qty	Existing Fixture Type	Wattage Table	Hours Pre	Pre Watts/ Fixt	Post Fixture Qty	Post Design Code (Fixture)	Post Lamp Design Code (Wattage Table)	Post Description	Post Watt/ Fixt	% Contribution to Demand Charge	Hours Post	Base kW	Retro Proposed kW	kW Difference	Retro Demand Savings (kW)	Total Demand Savings (kW)	Base kWh	Retro Proposed kWh	Retro kWh Saved	Total kWh Saved
EAST WING	1ST		STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	3	H42	F42SSILL-R	2,860	41	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.122	0.071	0.051	0.048	0.048	348	204	145	145
EAST WING	1ST		ELEVATOR LOBBY	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	4	S42	F44SSILL-R	2,860	78	4	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.310	0.190	0.120	0.114	0.114	888	544	344	344
EAST WING	1ST		ELEVATOR LOBBY	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	S42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	1ST		ELEVATOR LOBBY	LB32L-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49707/GE232MAX-L/ULTRA ballast	6	S32	F31ILL-R	2,860	24	6	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.146	0.071	0.075	0.071	0.071	418	204	214	214
EAST WING	1ST		CONFERENCE ROOM	LB34LT2-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49709/GE432MAX-L/ULTRA ballast, tandem wired 2:1	32	UP32	F31ILL-R	2,860	24	32	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.780	0.380	0.400	0.380	0.380	2,230	1,087	1,143	1,143
EAST WING	1ST		CONFERENCE ROOM	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	6	UP42	F44SSILL-R	2,860	78	6	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.466	0.285	0.181	0.172	0.172	1,332	815	516	516
EAST WING	1ST		CONFERENCE ROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	24	UP42	F42SSILL-R	2,860	41	24	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.975	0.570	0.404	0.384	0.384	2,788	1,631	1,157	1,157
EAST WING	1ST		CAFÉ SEATING	LB34LT2-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49709/GE432MAX-L/ULTRA ballast, tandem wired 2:1	24	UP32	F31ILL-R	2,860	24	24	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.585	0.285	0.300	0.285	0.285	1,673	815	857	857
EAST WING	1ST		CAFÉ SEATING	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	36	UP42	F44SSILL-R	2,860	78	36	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	2.794	1.711	1.083	1.029	1.029	7,991	4,893	3,099	3,099
EAST WING	1ST		CAFÉ SEATING	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	12	UP42	F42SSILL-R	2,860	41	12	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.487	0.285	0.202	0.192	0.192	1,394	815	578	578
EAST WING	1ST		SERVING	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	74	S41	F42SSILL-R	2,860	41	74	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	3.005	1.758	1.247	1.185	1.185	8,595	5,029	3,567	3,567
EAST WING	1ST		SERVING	LB41L-QHE	Relamp & Reballast w/ (1) GE-00257 / F28T8/SP41/UMX/ECO Lamp & (1) GE-49706/GE132MAX-L/ULTRA ballast	5	S41	F41SSILL-R	2,860	21	5	LEDT8	LEDT8/4'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.104	0.059	0.044	0.042	0.042	297	170	127	127
EAST WING	1ST		SERVING	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	14	A43	F42SSILL	2,860	43	14	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.606	0.333	0.274	0.260	0.260	1,735	951	783	783
EAST WING	1ST		KITCHEN	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	34	A43	F42SSILL	2,860	43	34	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	1.473	0.808	0.665	0.632	0.632	4,212	2,310	1,902	1,902
EAST WING	1ST		KITCHEN	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	25	A43	F42SSILL	2,860	43	25	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	1.083	0.594	0.489	0.465	0.465	3,097	1,699	1,399	1,399
EAST WING	1ST		KITCHEN	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	8	C42	F42SSILL-R	2,860	41	8	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.325	0.190	0.135	0.128	0.128	929	544	386	386
EAST WING	1ST		KITCHEN	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	4	C22	F22ILL-R	2,860	26	4	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.105	0.063	0.041	0.039	0.039	299	181	118	118
EAST WING	1ST		KITCHEN	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	4	W42	F44SSILL-R	2,860	78	4	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.310	0.190	0.120	0.114	0.114	888	544	344	344
EAST WING	1ST		KITCHEN	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	11	W42	F42SSILL-R	2,860	41	11	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.447	0.261	0.185	0.176	0.176	1,278	747	530	530
EAST WING	1ST		ATRIUM	MH1X960/RL	Relamp with (1) New 950 watt Metal Halide Lamp-SYLVANIA--M950SSUBT56 (64850)	8	MH1X1000	MH1000/1	2,860	975	8	LEDSI/COB	LED125W	in / Bypass Existing Ballast LED Light Fixture. (1) 125W	124	.95	2,860	7.798	0.990	6.808	6.467	6.467	22,301	2,831	19,470	19,470
EAST WING	1ST		ATRIUM	MH1X360/RL	Relamp with (1) New 360 watt Metal Halide SS Lamp-SYLVANIA--MS360/BT28/SS (64828)	5	MH1X400	MH360/1	2,860	388	5	LEDSI/COB	LED85W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 85W	84	.95	2,860	1.940	0.421	1.520	1.444	1.444	5,549	1,203	4,346	4,346
EAST WING	1ST		DOME	MV1X100	HID Fixture w/ (1) 100w Mercury Vapor Lamp & Ballast	73	MV1X100	MV100/1	2,860	113	73	LEDSI/COB	LED22W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 22W	22	.95	2,860	8.235	1.590	6.645	6.313	6.313	23,553	4,547	19,006	19,006
EAST WING	1ST		DOME	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	3	EX2X15	LED2W	8,760	2	3	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.006	0.006	-	-	-	49	49	-	-
EAST WING	1ST		ATRIUM	MH1X960/RL	Relamp with (1) New 950 watt Metal Halide Lamp-SYLVANIA--M950SSUBT56 (64850)	4	MH1X1000	MH1000/1	2,860	975	4	LEDSI/COB	LED125W	in / Bypass Existing Ballast LED Light Fixture. (1) 125W	124	.95	2,860	3.899	0.495	3.404	3.234	3.234	11,151	1,416	9,735	9,735
EAST WING	1ST		ATRIUM	MH1X360/RL	Relamp with (1) New 360 watt Metal Halide SS Lamp-SYLVANIA--MS360/BT28/SS (64828)	6	MH1X400	MH360/1	2,860	388	6	LEDSI/COB	LED85W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 85W	84	.95	2,860	2.328	0.505	1.824	1.732	1.732	6,659	1,444	5,215	5,215
EAST WING	1ST	20	OFFICE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	2	V41	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	1ST		OFFICE	MV1X175	Fixture w/ (1) 175w Mercury Vapor Lamp & Ballast	8	MV1X175	MV175/1	2,860	185	8	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	1.480	0.285	1.195	1.135	1.135	4,233	815	3,418	3,418
EAST WING	1ST		OFFICE	LB41L-QHE	Relamp & Reballast w/ (1) GE-00257 / F28T8/SP41/UMX/ECO Lamp & (1) GE-49706/GE132MAX-L/ULTRA ballast	9	V41	F41SSILL-R	2,860	21	9	LEDT8	LEDT8/4'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.187	0.107	0.080	0.076	0.076	534	306	229	229
EAST WING	1ST		OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	9	I1X75	CFC13/1	2,860	12	9	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.106	0.073	0.033	0.031	0.031	302	208	94	94
EAST WING	1ST		OFFICE	CF1X15BR30/SI	Relamp w/ (1) 15 watt Compact Fluorescent R30 Screw-In--GE-80893/FLE15/2/R30XL827	4	I1X75	CFC15/1	2,860	14	4	LEDSI/R30	LEDS10/1	Surface Mounted Install LED Screw-in R30 Lamp Light Emitting Diode Lamp, Screw-in, (1) 10W lamp	9	.95	2,860	0.054	0.036	0.018	0.017	0.017	155	103	52	52
EAST WING	1ST		WOMEN'S RESTROOM	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	2	S42	F44SSILL-R	2,860	78	2	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.155	0.095	0.060	0.057	0.057	444	272	172	172
EAST WING	1ST		WOMEN'S RESTROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	S42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	1ST		WOMEN'S RESTROOM	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	S22/SS	F22ILL-R	2,860	26	2	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.052	0.032	0.021	0.020	0.020	150	91	59	59
EAST WING	1ST		WOMEN'S RESTROOM	CKA42L/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49707/GE232MAX-L/ULTRA Low Power Instant Start Ballast	1	A43	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	1ST		WOMEN'S RESTROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	W42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	1ST		MEN'S RESTROOM	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	2	S42	F44SSILL-R	2,860	78	2	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.155	0.095	0.060	0.057	0.057	444	272	172	172
EAST WING	1ST		MEN'S RESTROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	S42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	1ST		MEN'S RESTROOM	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	S22/SS	F22ILL-R	2,860	26	2	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.052	0.032	0.021	0.020	0.020	150	91	59	59
EAST WING	1ST		MEN'S RESTROOM	CKA42L/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49707/GE232MAX-L/ULTRA Low Power Instant Start Ballast	1	A43	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	1ST		MEN'S RESTROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	W42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	1ST		MECHANICAL ROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	3	W42	F42SSILL-R	2,860	41	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.122	0.071	0.051	0.048	0.048	348	204	145	145
EAST WING	1ST		STAIRWELL	LB34LT2-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49709/GE432MAX-L/ULTRA ballast, tandem wired 2:1	4	S32	F31ILL-R	2,860	24	4	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.097	0.048	0.050	0.047	0.047	279	136	143	143
EAST WING	1ST		STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	H42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	1ST		STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	3	H42	F42SSILL-R	2,860	41	3	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.122	0.071	0.051	0.048	0.048	348	204	145	145
EAST WING	1ST		ELEVATOR LOBBY	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	4	S42	F44SSILL-R	2,860	78	4	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.310	0.190	0.120	0.114	0.114	888	544	344	344
EAST WING	1ST		ELEVATOR LOBBY	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	S42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96

Facility	Area	Space	Room#/ ID#/ Dwg#	Comments	Additional Comments	Pre Fixture Qty	Existing Fixture Type	Wattage Table	Hours Pre	Pre Watts/ Fixt	Post Fixture Qty	Post Design Code (Fixture)	Post Lamp Design Code (Wattage Table)	Post Description	Post Watt/ Fixt	% Contribution to Demand Charge	Hours Post	Base kW	Retro Proposed kW	kW Difference	Retro Demand Savings (kW)	Total Demand Savings (kW)	Base kWh	Retro Proposed kWh	Retro kWh Saved	Total kWh Saved
EAST WING	1ST		ELEVATOR LOBBY	LB32L-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49707/GE232MAX-L/ULTRA ballast	6	S32	F31ILL-R	2,860	24	6	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.146	0.071	0.075	0.071	0.071	418	204	214	214
EAST WING	1ST		HALLWAY	cir40-32x	Surface-Mount Luminaire w/ (1) 40w and (1) 32w Circline Fluorescent Lamp and (1) Standard Magnetic Ballast	14	cir40-32x	FC32/40/1	2,860	72	14	LED/DRUM/KIT/12	LED18W	Surface Mounted Retrofit Existing Drum with 12" LED Kit LED Light Fixture. (1) 18W	18	.95	2,860	1.011	0.249	0.761	0.723	0.723	2,891	714	2,177	2,177
EAST WING	1ST		HALLWAY	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	2	EX2X15	LED2W	8,760	2	2	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.004	0.004	-	-	-	33	33	-	-
EAST WING	1ST		MECHANICAL ROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	19	H42	F42SSILL-R	2,860	41	19	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.772	0.451	0.320	0.304	0.304	2,207	1,291	916	916
EAST WING	1ST		STORAGE	LB41L-QHE	Relamp & Reballast w/ (1) GE-00257 / F28T8/SP41/UMX/ECO Lamp & (1) GE-49706/GE132MAX-L/ULTRA ballast	1	S41	F41SSILL-R	2,860	21	1	LEDT8	LEDT8/4'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.021	0.012	0.009	0.008	0.008	59	34	25	25
EAST WING	1ST		OFFICE	A53P/T8L	2'x5' Recessed Troffer, large cell parabolic lens, w/ (3) 40wT8 Lamps (2) electronic Ballasts	32	A53P/T8L	F53ILL	2,860	96	32	CK2x4	LEDT8/4'/18W/2	Surface Mounted Install 2x4 2-Lamp Centering Kit LED 4' T8 Lamp (2) 18W Lamps	36	.95	2,860	3.061	1.140	1.921	1.825	1.825	8,755	3,262	5,493	5,493
EAST WING	1ST		HEARING ROOM	A53P/T8L	2'x5' Recessed Troffer, large cell parabolic lens, w/ (3) 40wT8 Lamps (2) electronic Ballasts	32	A53P/T8L	F53ILL	2,860	96	32	CK2x4	LEDT8/4'/18W/2	Surface Mounted Install 2x4 2-Lamp Centering Kit LED 4' T8 Lamp (2) 18W Lamps	36	.95	2,860	3.061	1.140	1.921	1.825	1.825	8,755	3,262	5,493	5,493
EAST WING	1ST		OFFICE	MV1X175	Fixture w/ (1) 175w Mercury Vapor Lamp & Ballast	6	MV1X175	MV175/1	2,860	185	6	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	1.110	0.214	0.896	0.851	0.851	3,175	612	2,563	2,563
EAST WING	1ST		OFFICE	LB41L-QHE	Relamp & Reballast w/ (1) GE-00257 / F28T8/SP41/UMX/ECO Lamp & (1) GE-49706/GE132MAX-L/ULTRA ballast	5	V41	F41SSILL-R	2,860	21	5	LEDT8	LEDT8/4'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.104	0.059	0.044	0.042	0.042	297	170	127	127
EAST WING	1ST		OFFICE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	1	V41	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	1ST		OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	7	I1X75	CFC13/1	2,860	12	7	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.082	0.057	0.025	0.024	0.024	235	162	73	73
EAST WING	1ST		OFFICE	CF1X15BR30/SI	Relamp w/ (1) 15 watt Compact Fluorescent R30 Screw-In--GE-80893/FLE15/2/R30XL827	4	I1X75	CFC15/1	2,860	14	4	LEDSI/R30	LEDS10/1	Surface Mounted Install LED Screw-in R30 Lamp Light Emitting Diode Lamp, Screw-in, (1) 10W lamp	9	.95	2,860	0.054	0.036	0.018	0.017	0.017	155	103	52	52

Facility	Area	Space	Room#/ ID#/ Dwg#	Comments	Additional Comments	Pre Fixture Qty	Existing Fixture Type	Wattage Table	Hours Pre	Pre Watts/ Fixt	Post Fixture Qty	Post Design Code (Fixture)	Post Lamp Design Code (Wattage Table)	Post Description	Post Watt/ Fixt	% Contribution to Demand Charge	Hours Post	Base kW	Retro Proposed kW	kW Difference	Retro Demand Savings (kW)	Total Demand Savings (kW)	Base kWh	Retro Proposed kWh	Retro kWh Saved	Total kWh Saved
EAST WING	1ST		OFFICE	CF1X15BR30/SI	Relamp w/ (1) 15 watt Compact Fluorescent R30 Screw-In--GE-80893/FLE15/2/R30XL827	4	I1X75	CFC15/1	2,860	14	4	LEDSI/R30	LEDS10/1	Surface Mounted Install LED Screw-in R30 Lamp Light Emitting Diode Lamp, Screw-in, (1) 10W lamp	9	.95	2,860	0.054	0.036	0.018	0.017	0.017	155	103	52	52
EAST WING	1ST		OFFICE	A53P/T8L	2'x5' Recessed Troffer, large cell parabolic lens, w/ (3) 40wT8 Lamps (2) electronic Ballasts	8	A53P/T8L	F53ILL	2,860	96	8	CK2x4	LEDT8/4'/18W/2	Surface Mounted Install 2x4 2-Lamp Centering Kit LED 4' T8 Lamp (2) 18W Lamps	36	.95	2,860	0.765	0.285	0.480	0.456	0.456	2,189	815	1,373	1,373
EAST WING	1ST		OFFICE	A53P/T8L	2'x5' Recessed Troffer, large cell parabolic lens, w/ (3) 40wT8 Lamps (2) electronic Ballasts	8	A53P/T8L	F53ILL	2,860	96	8	CK2x4	LEDT8/4'/18W/2	Surface Mounted Install 2x4 2-Lamp Centering Kit LED 4' T8 Lamp (2) 18W Lamps	36	.95	2,860	0.765	0.285	0.480	0.456	0.456	2,189	815	1,373	1,373
EAST WING	1ST		STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	6	W42	F42SSILL-R	2,860	41	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.244	0.143	0.101	0.096	0.096	697	408	289	289
EAST WING	1ST		HALLWAY	LB34LT2-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49709/GE432MAX-L/ULTRA ballast, tandem wired 2:1	16	S32	F31ILL-R	2,860	24	16	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.390	0.190	0.200	0.190	0.190	1,115	544	571	571
EAST WING	1ST		HALLWAY	LB32L-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49707/GE232MAX-L/ULTRA ballast	8	S32	F31ILL-R	2,860	24	8	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.195	0.095	0.100	0.095	0.095	558	272	286	286
EAST WING	1ST		HALLWAY	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	1	EX2X15	LED2W	8,760	2	1	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.002	0.002	-	-	-	16	16	-	-
EAST WING	1ST		OFFICE	A53P/T8L	2'x5' Recessed Troffer, large cell parabolic lens, w/ (3) 40wT8 Lamps (2) electronic Ballasts	102	A53P/T8L	F53ILL	2,860	96	102	CK2x4	LEDT8/4'/18W/2	Surface Mounted Install 2x4 2-Lamp Centering Kit LED 4' T8 Lamp (2) 18W Lamps	36	.95	2,860	9.758	3.635	6.123	5.816	5.816	27,907	10,397	17,510	17,510
EAST WING	1ST		OFFICE	A53P/T8L	2'x5' Recessed Troffer, large cell parabolic lens, w/ (3) 40wT8 Lamps (2) electronic Ballasts	85	A53P/T8L	F53ILL	2,860	96	85	CK2x4	LEDT8/4'/18W/2	Surface Mounted Install 2x4 2-Lamp Centering Kit LED 4' T8 Lamp (2) 18W Lamps	36	.95	2,860	8.132	3.029	5.102	4.847	4.847	23,256	8,664	14,592	14,592
EAST WING	1ST		OFFICE	A53P/T8L	2'x5' Recessed Troffer, large cell parabolic lens, w/ (3) 40wT8 Lamps (2) electronic Ballasts	10	A53P/T8L	F53ILL	2,860	96	10	CK2x4	LEDT8/4'/18W/2	Surface Mounted Install 2x4 2-Lamp Centering Kit LED 4' T8 Lamp (2) 18W Lamps	36	.95	2,860	0.957	0.356	0.600	0.570	0.570	2,736	1,019	1,717	1,717
EAST WING	1ST		HALLWAY	cir40-32x	Surface-Mount Luminaire w/ (1) 40w and (1) 32w Circline Fluorescent Lamp and (1) Standard Magnetic Ballast	41	cir40-32x	FC32/40/1	2,860	72	41	LED/DRUM/KIT/12	LED18W	Surface Mounted Retrofit Existing Drum with 12" LED Kit LED Light Fixture. (1) 18W	18	.95	2,860	2.960	0.731	2.230	2.118	2.118	8,466	2,090	6,377	6,377
EAST WING	1ST		HALLWAY	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	6	EX2X15	LED2W	8,760	2	6	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.011	0.011	-	-	-	99	99	-	-
EAST WING	1ST		RAMP	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	5	UP42	F44SSILL-R	2,860	78	5	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.388	0.238	0.150	0.143	0.143	1,110	680	430	430
EAST WING	1ST		STAIRWELL	cir40-32x	Surface-Mount Luminaire w/ (1) 40w and (1) 32w Circline Fluorescent Lamp and (1) Standard Magnetic Ballast	3	cir40-32x	FC32/40/1	2,860	72	3	LED/DRUM/KIT/12	LED18W	Surface Mounted Retrofit Existing Drum with 12" LED Kit LED Light Fixture. (1) 18W	18	.95	2,860	0.217	0.053	0.163	0.155	0.155	619	153	467	467
EAST WING	1ST		STAIRWELL	CF1X26/SI	Relamp w/ (1) 26 watt Compact Fluorescent Screw-In lamp--GE-15836/FLE26HT3/2/827	1	I1X150	CFC26/1	2,860	23	1	LEDSI/A	LEDS11/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 11W lamp	10	.95	2,860	0.023	0.010	0.014	0.013	0.013	67	28	39	39
EAST WING	1ST		STAIRWELL	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	1	EX2X15	LED2W	8,760	2	1	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.002	0.002	-	-	-	16	16	-	-
EAST WING	1ST		STAIRWELL	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	4	W42	F42SSILL-R	2,860	41	4	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.162	0.095	0.067	0.064	0.064	465	272	193	193
EAST WING	1ST		STAIRWELL	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	1	EX2X15	LED2W	8,760	2	1	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.002	0.002	-	-	-	16	16	-	-
EAST WING	1ST		STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	4	W42	F42SSILL-R	2,860	41	4	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.162	0.095	0.067	0.064	0.064	465	272	193	193
EAST WING	1ST		STORAGE	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	1	W42	F44SSILL-R	2,860	78	1	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.078	0.048	0.030	0.029	0.029	222	136	86	86
EAST WING	1ST		STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	W42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	1ST		HALLWAY	LB34LT2-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49709/GE432MAX-L/ULTRA ballast, tandem wired 2:1	8	UP32	F31ILL-R	2,860	24	8	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.195	0.095	0.100	0.095	0.095	558	272	286	286
EAST WING	1ST		STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	6	W42	F42SSILL-R	2,860	41	6	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.244	0.143	0.101	0.096	0.096	697	408	289	289
EAST WING	1ST		HALLWAY	LB34LT2-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49709/GE432MAX-L/ULTRA ballast, tandem wired 2:1	8	UP32	F31ILL-R	2,860	24	8	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.195	0.095	0.100	0.095	0.095	558	272	286	286
EAST WING	1ST		RESTROOMS	CKA42/REF-QHE	brackets) & white reflector (2) GE-00257 / F28T8/SP41/UMX/ECOT8 lamps & (1) GE-49772/GE232MAX-N/ULTRA Normal Power Instant Start Ballast	2	A43	F42SSILL	2,860	43	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.087	0.048	0.039	0.037	0.037	248	136	112	112
EAST WING	1ST		RESTROOMS	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	2	S42	F44SSILL-R	2,860	78	2	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.155	0.095	0.060	0.057	0.057	444	272	172	172
EAST WING	1ST		RESTROOMS	LB34LT2-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49709/GE432MAX-L/ULTRA ballast, tandem wired 2:1	4	S32	F31ILL-R	2,860	24	4	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.097	0.048	0.050	0.047	0.047	279	136	143	143
EAST WING	1ST		MGE	LB43L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49708/GE332MAX-L/ULTRA ballast	16	A43	F42SSILL-R	2,860	41	16	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.650	0.380	0.270	0.256	0.256	1,858	1,087	771	771
EAST WING	1ST		MGE	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	9	S42	F44SSILL-R	2,860	78	9	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.699	0.428	0.271	0.257	0.257	1,998	1,223	775	775
EAST WING	1ST		MGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	S42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	1ST		MGE	LB34LT2-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49709/GE432MAX-L/ULTRA ballast, tandem wired 2:1	2	S32	F31ILL-R	2,860	24	2	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.049	0.024	0.025	0.024	0.024	139	68	71	71
EAST WING	1ST		MGE	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	6	UP42	F44SSILL-R	2,860	78	6	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.466	0.285	0.181	0.172	0.172	1,332	815	516	516
EAST WING	1ST		MGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	UP42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	1ST		MGE	CF1X20/SI	Relamp w/ (1) 20 watt Compact Fluorescent screw-in lamp--GE-15834/FLE20HT3/2/827	4	I1X75	CFC20/1	2,860	18	4	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.072	0.032	0.040	0.038	0.038	206	93	114	114
EAST WING	1ST		MGE	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	5	EX2X15	LED2W	8,760	2	5	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.009	0.009	-	-	-	82	82	-	-
EAST WING	2ND	141	OFFICE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	2	V41	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	2ND	141	OFFICE	MV1X175	Fixture w/ (1) 175w Mercury Vapor Lamp & Ballast	4	MV1X175	MV175/1	2,860	185	4	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	0.740	0.143	0.597	0.568	0.568	2,117	408	1,709	1,709
EAST WING	2ND	141	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	4	I1X60/table	CFC13/1	2,860	12	4	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.047	0.032	0.015	0.014	0.014	134	93	42	42
EAST WING	2ND	143	OFFICE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	2	V41	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	2ND	143	OFFICE	MV1X175	Fixture w/ (1) 175w Mercury Vapor Lamp & Ballast	4	MV1X175	MV175/1	2,860	185	4	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	0.740	0.143	0.597	0.568	0.568	2,117	408	1,709	1,709
EAST WING	2ND	143	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	4	I1X60/table	CFC13/1	2,860	12	4	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.047	0.032	0.015	0.014	0.014	134	93	42	42
EAST WING	2ND	143	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	5	I1X60/table	CFC13/1	2,860	12	5	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.059	0.041	0.018	0.017	0.017	168	116	52	52
EAST WING	2ND	145	OFFICE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	2	V41	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	2ND	145	OFFICE	MV1X175	Fixture w/ (1) 175w Mercury Vapor Lamp & Ballast	4	MV1X175	MV175/1	2,860	185	4	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	0.740	0.143	0.597	0.568	0.568	2,117	408	1,709	1,709
EAST WING	2ND	145	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	4	I1X60/table	CFC13/1	2,860	12	4	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.047	0.032	0.015	0.014	0.014	134	93	42	42
EAST WING	2ND	145	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	2	I1X60/table	CFC13/1	2,860	12	2	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.023	0.016	0.007	0.007	0.007	67	46	21	21
EAST WING	2ND	145	OFFICE	CF1X23SI	Relamp w/ (1) 23 watt Compact Fluorescent screw-in lamp--GE-80889/FLE23HT3/2/XL827	2	I1X100/table	CFC23/1	2,860	21	2	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.042	0.016	0.025	0.024	0.024	119	46	72	72
EAST WING	2ND		STAIRWELL	LB34LT2-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49709/GE432MAX-L/ULTRA ballast, tandem wired 2:1	26	S32	F31ILL-R	2,860	24	26	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.634	0.309	0.325	0.308	0.308	1,812	883	929	929

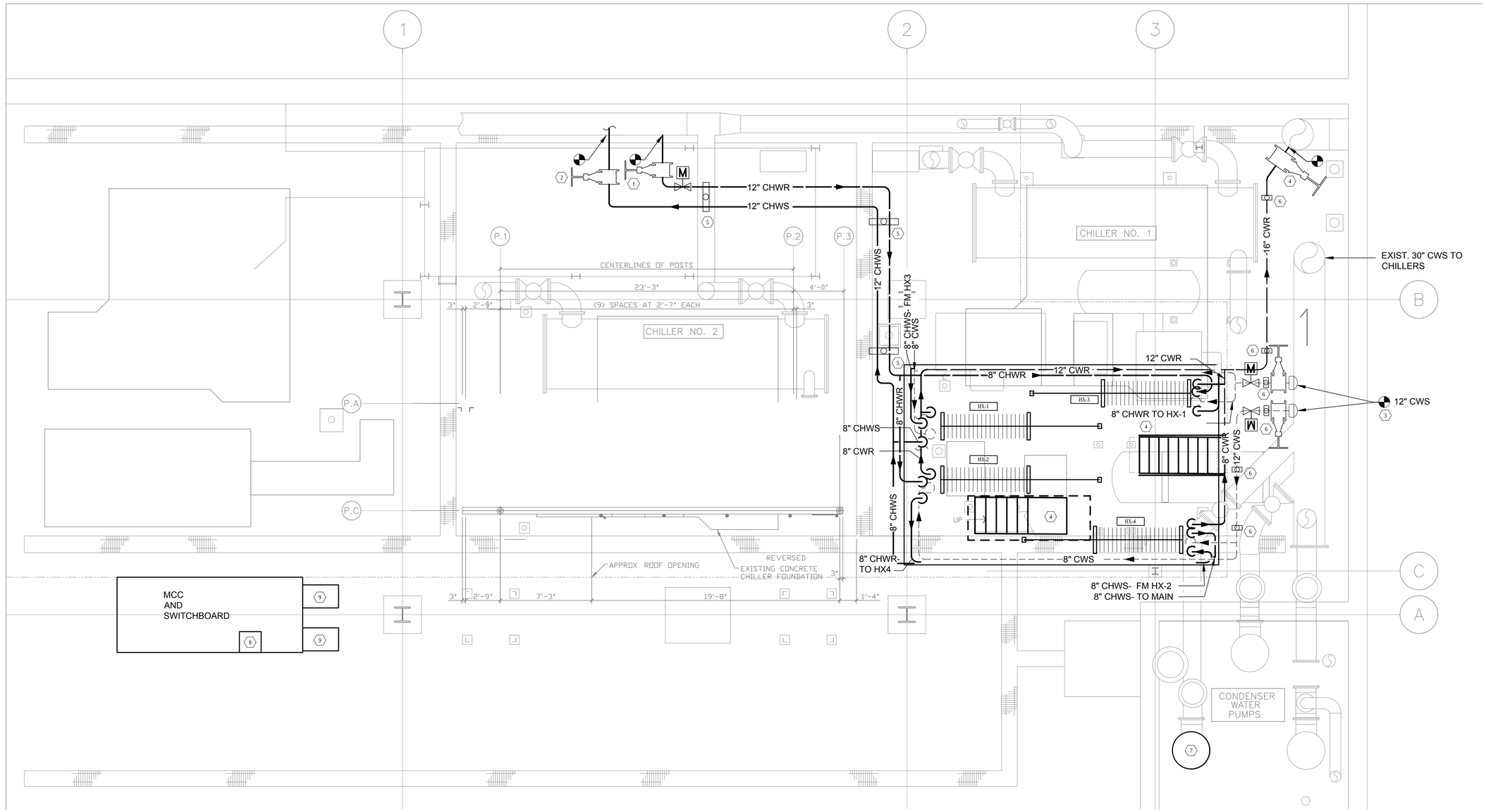
Facility	Area	Space	Room#/ ID#/ Dwg#	Comments	Additional Comments	Pre Fixture Qty	Existing Fixture Type	Wattage Table	Hours Pre	Pre Watts/ Fixt	Post Fixture Qty	Post Design Code (Fixture)	Post Lamp Design Code (Wattage Table)	Post Description	Post Watt/ Fixt	% Contribution to Demand Charge	Hours Post	Base kW	Retro Proposed kW	kW Difference	Retro Demand Savings (kW)	Total Demand Savings (kW)	Base kWh	Retro Proposed kWh	Retro kWh Saved	Total kWh Saved
EAST WING	2ND		STAIRWELL	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	2	EX2X15	LED2W	8,760	2	2	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.004	0.004	-	-	-	33	33	-	-
EAST WING	2ND		ELEVATOR LOBBY	LB34LT2-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49709/GE432MAX-L/ULTRA ballast, tandem wired 2:1	12	S32	F31ILL-R	2,860	24	12	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.292	0.143	0.150	0.142	0.142	836	408	429	429
EAST WING	2ND		ELEVATOR LOBBY	LB32L-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49707/GE232MAX-L/ULTRA ballast	4	S32	F31ILL-R	2,860	24	4	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.097	0.048	0.050	0.047	0.047	279	136	143	143
EAST WING	2ND		ELEVATOR LOBBY	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	2	S42	F44SSILL-R	2,860	78	2	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.155	0.095	0.060	0.057	0.057	444	272	172	172
EAST WING	2ND		ELEVATOR LOBBY	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	S22/SS	F22ILL-R	2,860	26	2	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.052	0.032	0.021	0.020	0.020	150	91	59	59
EAST WING	2ND		ELEVATOR LOBBY	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	1	EX2X15	LED2W	8,760	2	1	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.002	0.002	-	-	-	16	16	-	-
EAST WING	2ND		STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	W42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	2ND		HALLWAY	cir40-32x	Surface-Mount Luminaire w/ (1) 40w and (1) 32w Circline Fluorescent Lamp and (1) Standard Magnetic Ballast	10	cir40-32x	FC32/40/1	2,860	72	10	LED/DRUM/KIT/12	LED18W	Surface Mounted Retrofit Existing Drum with 12" LED Kit LED Light Fixture. (1) 18W	18	.95	2,860	0.722	0.178	0.544	0.517	0.517	2,065	510	1,555	1,555
EAST WING	2ND		HALLWAY	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	1	EX2X15	LED2W	8,760	2	1	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.002	0.002	-	-	-	16	16	-	-
EAST WING	2ND	147	OFFICE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	2	V41	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	2ND	147	OFFICE	MV1X175	Fixture w/ (1) 175w Mercury Vapor Lamp & Ballast	4	MV1X175	MV175/1	2,860	185	4	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	0.740	0.143	0.597	0.568	0.568	2,117	408	1,709	1,709
EAST WING	2ND	147	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	3	I1X60/table	CFC13/1	2,860	12	3	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.035	0.024	0.011	0.010	0.010	101	69	31	31
EAST WING	2ND	147	OFFICE	CF1X23SI	Relamp w/ (1) 23 watt Compact Fluorescent screw-in lamp--GE-80889/FLE23HT3/2/XL827	4	I1X100/table	CFC23/1	2,860	21	4	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.083	0.032	0.051	0.048	0.048	237	93	145	145
EAST WING	2ND	149	OFFICE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	2	V41	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	2ND	149	OFFICE	MV1X175	Fixture w/ (1) 175w Mercury Vapor Lamp & Ballast	4	MV1X175	MV175/1	2,860	185	4	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	0.740	0.143	0.597	0.568	0.568	2,117	408	1,709	1,709
EAST WING	2ND	149	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	4	I1X60/table	CFC13/1	2,860	12	4	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.047	0.032	0.015	0.014	0.014	134	93	42	42
EAST WING	2ND	149	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	5	I1X60/table	CFC13/1	2,860	12	5	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.059	0.041	0.018	0.017	0.017	168	116	52	52
EAST WING	2ND	149	OFFICE	CF1X23SI	Relamp w/ (1) 23 watt Compact Fluorescent screw-in lamp--GE-80889/FLE23HT3/2/XL827	2	I1X100/table	CFC23/1	2,860	21	2	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.042	0.016	0.025	0.024	0.024	119	46	72	72
EAST WING	2ND	150	OFFICE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	2	V41	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	2ND	150	OFFICE	MV1X175	Fixture w/ (1) 175w Mercury Vapor Lamp & Ballast	4	MV1X175	MV175/1	2,860	185	4	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	0.740	0.143	0.597	0.568	0.568	2,117	408	1,709	1,709
EAST WING	2ND	150	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	3	I1X60/table	CFC13/1	2,860	12	3	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.035	0.024	0.011	0.010	0.010	101	69	31	31
EAST WING	2ND	150	OFFICE	CF1X23SI	Relamp w/ (1) 23 watt Compact Fluorescent screw-in lamp--GE-80889/FLE23HT3/2/XL827	2	I1X100/table	CFC23/1	2,860	21	2	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.042	0.016	0.025	0.024	0.024	119	46	72	72
EAST WING	2ND	151	OFFICE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	1	V41	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	2ND	151	OFFICE	MV1X175	Fixture w/ (1) 175w Mercury Vapor Lamp & Ballast	3	MV1X175	MV175/1	2,860	185	3	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	0.555	0.107	0.448	0.426	0.426	1,587	306	1,282	1,282
EAST WING	2ND	151	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	3	I1X60/table	CFC13/1	2,860	12	3	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.035	0.024	0.011	0.010	0.010	101	69	31	31
EAST WING	2ND	151	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	2	I1X60/table	CFC13/1	2,860	12	2	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.023	0.016	0.007	0.007	0.007	67	46	21	21
EAST WING	2ND	151	OFFICE	CF1X23SI	Relamp w/ (1) 23 watt Compact Fluorescent screw-in lamp--GE-80889/FLE23HT3/2/XL827	5	I1X100/table	CFC23/1	2,860	21	5	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.104	0.041	0.063	0.060	0.060	297	116	181	181
EAST WING	2ND	153	OFFICE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	2	V41	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	2ND	153	OFFICE	MV1X175	Fixture w/ (1) 175w Mercury Vapor Lamp & Ballast	4	MV1X175	MV175/1	2,860	185	4	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	0.740	0.143	0.597	0.568	0.568	2,117	408	1,709	1,709
EAST WING	2ND	153	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	4	I1X60/table	CFC13/1	2,860	12	4	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.047	0.032	0.015	0.014	0.014	134	93	42	42
EAST WING	2ND	153	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	2	I1X60/table	CFC13/1	2,860	12	2	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.023	0.016	0.007	0.007	0.007	67	46	21	21
EAST WING	2ND	155	OFFICE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	2	V41	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	2ND	155	OFFICE	MV1X175	Fixture w/ (1) 175w Mercury Vapor Lamp & Ballast	4	MV1X175	MV175/1	2,860	185	4	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	0.740	0.143	0.597	0.568	0.568	2,117	408	1,709	1,709
EAST WING	2ND	155	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	4	I1X60/table	CFC13/1	2,860	12	4	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.047	0.032	0.015	0.014	0.014	134	93	42	42
EAST WING	2ND	155	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	10	I1X60/table	CFC13/1	2,860	12	10	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.117	0.081	0.036	0.035	0.035	336	232	104	104
EAST WING	2ND	155	OFFICE	CF1X23SI	Relamp w/ (1) 23 watt Compact Fluorescent screw-in lamp--GE-80889/FLE23HT3/2/XL827	2	I1X100/table	CFC23/1	2,860	21	2	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.042	0.016	0.025	0.024	0.024	119	46	72	72
EAST WING	2ND	157	OFFICE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	2	V41	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	2ND	157	OFFICE	MV1X175	Fixture w/ (1) 175w Mercury Vapor Lamp & Ballast	4	MV1X175	MV175/1	2,860	185	4	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	0.740	0.143	0.597	0.568	0.568	2,117	408	1,709	1,709
EAST WING	2ND	157	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	2	I1X60/table	CFC13/1	2,860	12	2	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.023	0.016	0.007	0.007	0.007	67	46	21	21
EAST WING	2ND	157	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	2	I1X60/table	CFC13/1	2,860	12	2	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.023	0.016	0.007	0.007	0.007	67	46	21	21
EAST WING	2ND		STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	W42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	2ND		ELEVATOR LOBBY	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	3	S42	F44SSILL-R	2,860	78	3	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.233	0.143	0.090	0.086	0.086	666	408	258	258
EAST WING	2ND		ELEVATOR LOBBY	LB34LT2-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49709/GE432MAX-L/ULTRA ballast, tandem wired 2:1	6	S32	F31ILL-R	2,860	24	6	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.146	0.071	0.075	0.071	0.071	418	204	214	214
EAST WING	2ND		ELEVATOR LOBBY	LB32L-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49707/GE232MAX-L/ULTRA ballast	8	S32	F31ILL-R	2,860	24	8	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.195	0.095	0.100	0.095	0.095	558	272	286	286
EAST WING	2ND		ELEVATOR LOBBY	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	S42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	2ND		ELEVATOR LOBBY	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	1	EX2X15	LED2W	8,760	2	1	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.002	0.002	-	-	-	16	16	-	-

Facility	Area	Space	Room#/ ID#/ Dwg#	Comments	Additional Comments	Pre Fixture Qty	Existing Fixture Type	Wattage Table	Hours Pre	Pre Watts/ Fixt	Post Fixture Qty	Post Design Code (Fixture)	Post Lamp Design Code (Wattage Table)	Post Description	Post Watt/ Fixt	% Contribution to Demand Charge	Hours Post	Base kW	Retro Proposed kW	kW Difference	Retro Demand Savings (kW)	Total Demand Savings (kW)	Base kWh	Retro Proposed kWh	Retro kWh Saved	Total kWh Saved
EAST WING	2ND		STAIRWELL	LB34LT2-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49709/GE432MAX-L/ULTRA ballast, tandem wired 2:1	26	S32	F31ILL-R	2,860	24	26	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.634	0.309	0.325	0.308	0.308	1,812	883	929	929
EAST WING	2ND		STAIRWELL	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	2	EX2X15	LED2W	8,760	2	2	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.004	0.004	-	-	-	33	33	-	-
EAST WING	2ND		WOMEN'S RESTROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	H42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	2ND		WOMEN'S RESTROOM	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	3	H22	F22ILL-R	2,860	26	3	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.079	0.048	0.031	0.029	0.029	225	136	89	89
EAST WING	2ND		WOMEN'S RESTROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	A42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	2ND		MEN'S RESTROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	H42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	2ND		MEN'S RESTROOM	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	3	H22	F22ILL-R	2,860	26	3	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.079	0.048	0.031	0.029	0.029	225	136	89	89
EAST WING	2ND		MEN'S RESTROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	W42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	2ND		MEN'S RESTROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	A42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	2ND		KITCHEN	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	W42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	2ND		STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	W42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	2ND		STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	W42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	2ND		STORAGE	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	1	A42	F44SSILL-R	2,860	78	1	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.078	0.048	0.030	0.029	0.029	222	136	86	86
EAST WING	2ND		STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	A42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	2ND		STORAGE	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	1	A42	F44SSILL-R	2,860	78	1	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.078	0.048	0.030	0.029	0.029	222	136	86	86
EAST WING	2ND		STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	A42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	2ND		HALLWAY	cir40-32x	Surface-Mount Luminaire w/ (1) 40w and (1) 32w Circline Fluorescent Lamp and (1) Standard Magnetic Ballast	11	cir40-32x	FC32/40/1	2,860	72	11	LED/DRUM/KIT/12	LED18W	Surface Mounted Retrofit Existing Drum with 12" LED Kit LED Light Fixture. (1) 18W	18	.95	2,860	0.794	0.196	0.598	0.568	0.568	2,271	561	1,711	1,711
EAST WING	2ND		HALLWAY	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	2	EX2X15	LED2W	8,760	2	2	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.004	0.004	-	-	-	33	33	-	-
EAST WING	2ND		HALLWAY	cir40-32x	Surface-Mount Luminaire w/ (1) 40w and (1) 32w Circline Fluorescent Lamp and (1) Standard Magnetic Ballast	11	cir40-32x	FC32/40/1	2,860	72	11	LED/DRUM/KIT/12	LED18W	Surface Mounted Retrofit Existing Drum with 12" LED Kit LED Light Fixture. (1) 18W	18	.95	2,860	0.794	0.196	0.598	0.568	0.568	2,271	561	1,711	1,711
EAST WING	2ND		HALLWAY	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	1	EX2X15	LED2W	8,760	2	1	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.002	0.002	-	-	-	16	16	-	-
EAST WING	2ND	159	OFFICE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	2	V41	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	2ND	159	OFFICE	MV1X175	Fixture w/ (1) 175w Mercury Vapor Lamp & Ballast	4	MV1X175	MV175/1	2,860	185	4	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	0.740	0.143	0.597	0.568	0.568	2,117	408	1,709	1,709
EAST WING	2ND	159	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	4	I1X60/table	CFC13/1	2,860	12	4	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.047	0.032	0.015	0.014	0.014	134	93	42	42
EAST WING	2ND	159	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	2	I1X60/table	CFC13/1	2,860	12	2	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.023	0.016	0.007	0.007	0.007	67	46	21	21
EAST WING	2ND	159	OFFICE	CF1X23SI	Relamp w/ (1) 23 watt Compact Fluorescent screw-in lamp--GE-80889/FLE23HT3/2/XL827	1	I1X100/table	CFC23/1	2,860	21	1	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.021	0.008	0.013	0.012	0.012	59	23	36	36
EAST WING	2ND	161	OFFICE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	2	V41	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	2ND	161	OFFICE	MV1X175	Fixture w/ (1) 175w Mercury Vapor Lamp & Ballast	4	MV1X175	MV175/1	2,860	185	4	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	0.740	0.143	0.597	0.568	0.568	2,117	408	1,709	1,709
EAST WING	2ND	161	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	4	I1X60/table	CFC13/1	2,860	12	4	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.047	0.032	0.015	0.014	0.014	134	93	42	42
EAST WING	2ND	161	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	5	I1X60/table	CFC13/1	2,860	12	5	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.059	0.041	0.018	0.017	0.017	168	116	52	52
EAST WING	2ND	161	OFFICE	CF1X23SI	Relamp w/ (1) 23 watt Compact Fluorescent screw-in lamp--GE-80889/FLE23HT3/2/XL827	1	I1X100/table	CFC23/1	2,860	21	1	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.021	0.008	0.013	0.012	0.012	59	23	36	36
EAST WING	2ND	163	OFFICE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	2	V41	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	2ND	163	OFFICE	MV1X175	Fixture w/ (1) 175w Mercury Vapor Lamp & Ballast	4	MV1X175	MV175/1	2,860	185	4	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	0.740	0.143	0.597	0.568	0.568	2,117	408	1,709	1,709
EAST WING	2ND	163	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	4	I1X60/table	CFC13/1	2,860	12	4	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.047	0.032	0.015	0.014	0.014	134	93	42	42
EAST WING	2ND	163	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	2	I1X60/table	CFC13/1	2,860	12	2	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.023	0.016	0.007	0.007	0.007	67	46	21	21
EAST WING	2ND	163	OFFICE	CF1X23SI	Relamp w/ (1) 23 watt Compact Fluorescent screw-in lamp--GE-80889/FLE23HT3/2/XL827	3	I1X100/table	CFC23/1	2,860	21	3	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.062	0.024	0.038	0.036	0.036	178	69	109	109
EAST WING	2ND	160	OFFICE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	2	V41	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	2ND	160	OFFICE	MV1X175	Fixture w/ (1) 175w Mercury Vapor Lamp & Ballast	4	MV1X175	MV175/1	2,860	185	4	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	0.740	0.143	0.597	0.568	0.568	2,117	408	1,709	1,709
EAST WING	2ND	160	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	4	I1X60/table	CFC13/1	2,860	12	4	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.047	0.032	0.015	0.014	0.014	134	93	42	42
EAST WING	2ND	160	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	2	I1X60/table	CFC13/1	2,860	12	2	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.023	0.016	0.007	0.007	0.007	67	46	21	21
EAST WING	2ND	160	OFFICE	CF1X23SI	Relamp w/ (1) 23 watt Compact Fluorescent screw-in lamp--GE-80889/FLE23HT3/2/XL827	2	I1X100/table	CFC23/1	2,860	21	2	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.042	0.016	0.025	0.024	0.024	119	46	72	72
EAST WING	2ND	162	OFFICE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	2	V41	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	2ND	162	OFFICE	MV1X175	Fixture w/ (1) 175w Mercury Vapor Lamp & Ballast	4	MV1X175	MV175/1	2,860	185	4	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	0.740	0.143	0.597	0.568	0.568	2,117	408	1,709	1,709
EAST WING	2ND	162	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	4	I1X60/table	CFC13/1	2,860	12	4	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.047	0.032	0.015	0.014	0.014	134	93	42	42
EAST WING	2ND	162	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	2	I1X60/table	CFC13/1	2,860	12	2	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.023	0.016	0.007	0.007	0.007	67	46	21	21
EAST WING	2ND	162	OFFICE	CF1X23SI	Relamp w/ (1) 23 watt Compact Fluorescent screw-in lamp--GE-80889/FLE23HT3/2/XL827	2	I1X100/table	CFC23/1	2,860	21	2	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.042	0.016	0.025	0.024	0.024	119	46	72	72
EAST WING	2ND	164	OFFICE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	2	V41	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96

Facility	Area	Space	Room#/ ID#/ Dwg#	Comments	Additional Comments	Pre Fixture Qty	Existing Fixture Type	Wattage Table	Hours Pre	Pre Watts/ Fixt	Post Fixture Qty	Post Design Code (Fixture)	Post Lamp Design Code (Wattage Table)	Post Description	Post Watt/ Fixt	% Contribution to Demand Charge	Hours Post	Base kW	Retro Proposed kW	kW Difference	Retro Demand Savings (kW)	Total Demand Savings (kW)	Base kWh	Retro Proposed kWh	Retro kWh Saved	Total kWh Saved
EAST WING	2ND	164	OFFICE	MV1X175	Fixture w/ (1) 175w Mercury Vapor Lamp & Ballast	4	MV1X175	MV175/1	2,860	185	4	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	0.740	0.143	0.597	0.568	0.568	2,117	408	1,709	1,709
EAST WING	2ND	164	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	4	I1X60/table	CFC13/1	2,860	12	4	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.047	0.032	0.015	0.014	0.014	134	93	42	42
EAST WING	2ND	164	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	5	I1X60/table	CFC13/1	2,860	12	5	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.059	0.041	0.018	0.017	0.017	168	116	52	52
EAST WING	2ND	164	OFFICE	CF1X23SI	Relamp w/ (1) 23 watt Compact Fluorescent screw-in lamp--GE-80889/FLE23HT3/2/XL827	2	I1X100/table	CFC23/1	2,860	21	2	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.042	0.016	0.025	0.024	0.024	119	46	72	72
EAST WING	2ND		FOYER TO CAPITAL	MH1X175	HID Fixture w/ (1) 175w Metal Halide Lamp & Ballast - NDA	15	MH1X175	MH175/1	2,860	194	15	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	2.911	0.535	2.376	2.257	2.257	8,324	1,529	6,795	6,795
EAST WING	2ND		BREEZWAY	MV1X175	Fixture w/ (1) 175w Mercury Vapor Lamp & Ballast	6	MV1X175	MV175/1	2,860	185	6	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	1.110	0.214	0.896	0.851	0.851	3,175	612	2,563	2,563
EAST WING	2ND		BREEZWAY	MH1X175	HID Fixture w/ (1) 175w Metal Halide Lamp & Ballast - NDA	12	MH1X175	MH175/1	2,860	194	12	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	2.328	0.428	1.901	1.806	1.806	6,659	1,223	5,436	5,436
EAST WING	2ND	101	OFFICE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	2	V41	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	2ND	101	OFFICE	MV1X175	Fixture w/ (1) 175w Mercury Vapor Lamp & Ballast	4	MV1X175	MV175/1	2,860	185	4	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	0.740	0.143	0.597	0.568	0.568	2,117	408	1,709	1,709
EAST WING	2ND	101	OFFICE	CF1X23SI	Relamp w/ (1) 23 watt Compact Fluorescent screw-in lamp--GE-80889/FLE23HT3/2/XL827	4	I1X100/table	CFC23/1	2,860	21	4	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.083	0.032	0.051	0.048	0.048	237	93	145	145
EAST WING	2ND	101	OFFICE	CF1X23SI	Relamp w/ (1) 23 watt Compact Fluorescent screw-in lamp--GE-80889/FLE23HT3/2/XL827	4	I1X100/table	CFC23/1	2,860	21	4	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.083	0.032	0.051	0.048	0.048	237	93	145	145
EAST WING	2ND	102	OFFICE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	2	V41	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	2ND	102	OFFICE	MV1X175	Fixture w/ (1) 175w Mercury Vapor Lamp & Ballast	4	MV1X175	MV175/1	2,860	185	4	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	0.740	0.143	0.597	0.568	0.568	2,117	408	1,709	1,709
EAST WING	2ND	102	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	4	I1X60/table	CFC13/1	2,860	12	4	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.047	0.032	0.015	0.014	0.014	134	93	42	42
EAST WING	2ND	102	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	2	I1X60/table	CFC13/1	2,860	12	2	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.023	0.016	0.007	0.007	0.007	67	46	21	21
EAST WING	2ND	102	OFFICE	CF1X23SI	Relamp w/ (1) 23 watt Compact Fluorescent screw-in lamp--GE-80889/FLE23HT3/2/XL827	3	I1X100/table	CFC23/1	2,860	21	3	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.062	0.024	0.038	0.036	0.036	178	69	109	109
EAST WING	2ND	103	OFFICE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	2	V41	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	2ND	103	OFFICE	MV1X175	Fixture w/ (1) 175w Mercury Vapor Lamp & Ballast	4	MV1X175	MV175/1	2,860	185	4	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	0.740	0.143	0.597	0.568	0.568	2,117	408	1,709	1,709
EAST WING	2ND	103	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	3	I1X60/table	CFC13/1	2,860	12	3	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.035	0.024	0.011	0.010	0.010	101	69	31	31
EAST WING	2ND	104	OFFICE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	2	V41	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	2ND	104	OFFICE	MV1X175	Fixture w/ (1) 175w Mercury Vapor Lamp & Ballast	4	MV1X175	MV175/1	2,860	185	4	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	0.740	0.143	0.597	0.568	0.568	2,117	408	1,709	1,709
EAST WING	2ND	104	OFFICE	CF1X23SI	Relamp w/ (1) 23 watt Compact Fluorescent screw-in lamp--GE-80889/FLE23HT3/2/XL827	2	I1X100/table	CFC23/1	2,860	21	2	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.042	0.016	0.025	0.024	0.024	119	46	72	72
EAST WING	2ND	105	OFFICE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	2	V41	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	2ND	105	OFFICE	MV1X175	Fixture w/ (1) 175w Mercury Vapor Lamp & Ballast	4	MV1X175	MV175/1	2,860	185	4	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	0.740	0.143	0.597	0.568	0.568	2,117	408	1,709	1,709
EAST WING	2ND	105	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	4	I1X60/table	CFC13/1	2,860	12	4	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.047	0.032	0.015	0.014	0.014	134	93	42	42
EAST WING	2ND	105	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	6	I1X60/table	CFC13/1	2,860	12	6	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.070	0.049	0.022	0.021	0.021	201	139	62	62
EAST WING	2ND	105	OFFICE	CF1X23SI	Relamp w/ (1) 23 watt Compact Fluorescent screw-in lamp--GE-80889/FLE23HT3/2/XL827	1	I1X100/table	CFC23/1	2,860	21	1	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.021	0.008	0.013	0.012	0.012	59	23	36	36
EAST WING	2ND	106	OFFICE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	2	V41	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	2ND	106	OFFICE	MV1X175	Fixture w/ (1) 175w Mercury Vapor Lamp & Ballast	4	MV1X175	MV175/1	2,860	185	4	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	0.740	0.143	0.597	0.568	0.568	2,117	408	1,709	1,709
EAST WING	2ND	106	OFFICE	CF1X23SI	Relamp w/ (1) 23 watt Compact Fluorescent screw-in lamp--GE-80889/FLE23HT3/2/XL827	4	I1X100/table	CFC23/1	2,860	21	4	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.083	0.032	0.051	0.048	0.048	237	93	145	145
EAST WING	2ND		STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	W42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	2ND		STORAGE	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	W42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	2ND		MECHANICAL ROOM	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	1	W42	F44SSILL-R	2,860	78	1	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.078	0.048	0.030	0.029	0.029	222	136	86	86
EAST WING	2ND		STORAGE	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	1	W42	F44SSILL-R	2,860	78	1	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.078	0.048	0.030	0.029	0.029	222	136	86	86
EAST WING	2ND		MECHANICAL ROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	W42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	2ND		ELEVATOR LOBBY	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	3	S42	F44SSILL-R	2,860	78	3	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.233	0.143	0.090	0.086	0.086	666	408	258	258
EAST WING	2ND		ELEVATOR LOBBY	LB34LT2-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49709/GE432MAX-L/ULTRA ballast, tandem wired 2:1	6	S32	F31ILL-R	2,860	24	6	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.146	0.071	0.075	0.071	0.071	418	204	214	214
EAST WING	2ND		ELEVATOR LOBBY	LB32L-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49707/GE232MAX-L/ULTRA ballast	8	S32	F31ILL-R	2,860	24	8	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.195	0.095	0.100	0.095	0.095	558	272	286	286
EAST WING	2ND		ELEVATOR LOBBY	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	S42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	2ND		ELEVATOR LOBBY	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	1	EX2X15	LED2W	8,760	2	1	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.002	0.002	-	-	-	16	16	-	-
EAST WING	2ND		STAIRWELL	LB34LT2-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49709/GE432MAX-L/ULTRA ballast, tandem wired 2:1	26	S32	F31ILL-R	2,860	24	26	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.634	0.309	0.325	0.308	0.308	1,812	883	929	929
EAST WING	2ND		STAIRWELL	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	2	EX2X15	LED2W	8,760	2	2	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.004	0.004	-	-	-	33	33	-	-
EAST WING	2ND		WOMEN'S RESTROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	H42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	2ND		WOMEN'S RESTROOM	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	3	H22	F22ILL-R	2,860	26	3	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.079	0.048	0.031	0.029	0.029	225	136	89	89
EAST WING	2ND		WOMEN'S RESTROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	A42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	2ND		MEN'S RESTROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	H42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96

Facility	Area	Space	Room#/ ID#/ Dwg#	Comments	Additional Comments	Pre Fixture Qty	Existing Fixture Type	Wattage Table	Hours Pre	Pre Watts/ Fixt	Post Fixture Qty	Post Design Code (Fixture)	Post Lamp Design Code (Wattage Table)	Post Description	Post Watt/ Fixt	% Contribution to Demand Charge	Hours Post	Base kW	Retro Proposed kW	kW Difference	Retro Demand Savings (kW)	Total Demand Savings (kW)	Base kWh	Retro Proposed kWh	Retro kWh Saved	Total kWh Saved
EAST WING	2ND		MEN'S RESTROOM	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	3	H22	F22ILL-R	2,860	26	3	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.079	0.048	0.031	0.029	0.029	225	136	89	89
EAST WING	2ND		MEN'S RESTROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	W42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	2ND		MEN'S RESTROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	1	A42	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	2ND	107	OFFICE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	1	V41	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	2ND	107	OFFICE	MV1X175	Fixture w/ (1) 175w Mercury Vapor Lamp & Ballast	4	MV1X175	MV175/1	2,860	185	4	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	0.740	0.143	0.597	0.568	0.568	2,117	408	1,709	1,709
EAST WING	2ND	107	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	2	I1X60/table	CFC13/1	2,860	12	2	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.023	0.016	0.007	0.007	0.007	67	46	21	21
EAST WING	2ND	107	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	1	I1X60/table	CFC13/1	2,860	12	1	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.012	0.008	0.004	0.003	0.003	34	23	10	10
EAST WING	2ND	107	OFFICE	CF1X23SI	Relamp w/ (1) 23 watt Compact Fluorescent screw-in lamp--GE-80889/FLE23HT3/2/XL827	3	I1X100/table	CFC23/1	2,860	21	3	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.062	0.024	0.038	0.036	0.036	178	69	109	109
EAST WING	2ND	109	OFFICE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	2	V41	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	2ND	109	OFFICE	MV1X175	Fixture w/ (1) 175w Mercury Vapor Lamp & Ballast	4	MV1X175	MV175/1	2,860	185	4	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	0.740	0.143	0.597	0.568	0.568	2,117	408	1,709	1,709
EAST WING	2ND	109	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	4	I1X60/table	CFC13/1	2,860	12	4	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.047	0.032	0.015	0.014	0.014	134	93	42	42
EAST WING	2ND	109	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	5	I1X60/table	CFC13/1	2,860	12	5	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.059	0.041	0.018	0.017	0.017	168	116	52	52
EAST WING	2ND	111	OFFICE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	2	V41	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	2ND	111	OFFICE	MV1X175	Fixture w/ (1) 175w Mercury Vapor Lamp & Ballast	4	MV1X175	MV175/1	2,860	185	4	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	0.740	0.143	0.597	0.568	0.568	2,117	408	1,709	1,709
EAST WING	2ND	111	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	4	I1X60/table	CFC13/1	2,860	12	4	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.047	0.032	0.015	0.014	0.014	134	93	42	42
EAST WING	2ND	111	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	2	I1X60/table	CFC13/1	2,860	12	2	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.023	0.016	0.007	0.007	0.007	67	46	21	21
EAST WING	2ND	113	OFFICE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	1	V41	F42SSILL-R	2,860	41	1	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.041	0.024	0.017	0.016	0.016	116	68	48	48
EAST WING	2ND	113	OFFICE	MV1X175	Fixture w/ (1) 175w Mercury Vapor Lamp & Ballast	3	MV1X175	MV175/1	2,860	185	3	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	0.555	0.107	0.448	0.426	0.426	1,587	306	1,282	1,282
EAST WING	2ND	113	OFFICE	CF1X23SI	Relamp w/ (1) 23 watt Compact Fluorescent screw-in lamp--GE-80889/FLE23HT3/2/XL827	1	I1X100/table	CFC23/1	2,860	21	1	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.021	0.008	0.013	0.012	0.012	59	23	36	36
EAST WING	2ND	115	OFFICE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	2	V41	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	2ND	115	OFFICE	MV1X175	Fixture w/ (1) 175w Mercury Vapor Lamp & Ballast	4	MV1X175	MV175/1	2,860	185	4	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	0.740	0.143	0.597	0.568	0.568	2,117	408	1,709	1,709
EAST WING	2ND	115	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	4	I1X60/table	CFC13/1	2,860	12	4	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.047	0.032	0.015	0.014	0.014	134	93	42	42
EAST WING	2ND	115	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	3	I1X60/table	CFC13/1	2,860	12	3	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.035	0.024	0.011	0.010	0.010	101	69	31	31
EAST WING	2ND	115	OFFICE	CF1X23SI	Relamp w/ (1) 23 watt Compact Fluorescent screw-in lamp--GE-80889/FLE23HT3/2/XL827	3	I1X100/table	CFC23/1	2,860	21	3	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.062	0.024	0.038	0.036	0.036	178	69	109	109
EAST WING	2ND	116	OFFICE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	2	V41	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	2ND	116	OFFICE	MV1X175	Fixture w/ (1) 175w Mercury Vapor Lamp & Ballast	4	MV1X175	MV175/1	2,860	185	4	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	0.740	0.143	0.597	0.568	0.568	2,117	408	1,709	1,709
EAST WING	2ND	116	OFFICE	CF1X23SI	Relamp w/ (1) 23 watt Compact Fluorescent screw-in lamp--GE-80889/FLE23HT3/2/XL827	2	I1X100/table	CFC23/1	2,860	21	2	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.042	0.016	0.025	0.024	0.024	119	46	72	72
EAST WING	2ND	117	OFFICE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	2	V41	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	2ND	117	OFFICE	MV1X175	Fixture w/ (1) 175w Mercury Vapor Lamp & Ballast	4	MV1X175	MV175/1	2,860	185	4	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	0.740	0.143	0.597	0.568	0.568	2,117	408	1,709	1,709
EAST WING	2ND	117	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	3	I1X60/table	CFC13/1	2,860	12	3	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.035	0.024	0.011	0.010	0.010	101	69	31	31
EAST WING	2ND	117	OFFICE	CF1X23SI	Relamp w/ (1) 23 watt Compact Fluorescent screw-in lamp--GE-80889/FLE23HT3/2/XL827	3	I1X100/table	CFC23/1	2,860	21	3	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.062	0.024	0.038	0.036	0.036	178	69	109	109
EAST WING	2ND		MECHANICAL ROOM	LB42L-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	W42	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	2ND		STAIRWELL	LB34LT2-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49709/GE432MAX-L/ULTRA ballast, tandem wired 2:1	26	S32	F31ILL-R	2,860	24	26	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.634	0.309	0.325	0.308	0.308	1,812	883	929	929
EAST WING	2ND		STAIRWELL	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	2	EX2X15	LED2W	8,760	2	2	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.004	0.004	-	-	-	33	33	-	-
EAST WING	2ND		ELEVATOR LOBBY	LB34LT2-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49709/GE432MAX-L/ULTRA ballast, tandem wired 2:1	12	S32	F31ILL-R	2,860	24	12	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.292	0.143	0.150	0.142	0.142	836	408	429	429
EAST WING	2ND		ELEVATOR LOBBY	LB32L-QHE	Relamp & Reballast w/ (1) GE-45756 / F25T8/SP41/ECO Lamp & (1) GE-49707/GE232MAX-L/ULTRA ballast	4	S32	F31ILL-R	2,860	24	4	LEDT8	LEDT8/3'/12W/1	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	12	.95	2,860	0.097	0.048	0.050	0.047	0.047	279	136	143	143
EAST WING	2ND		ELEVATOR LOBBY	LB44LT2-QHE	Relamp & Reballast w/ (4) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49709/GE432MAX-L/ULTRA ballast (Tandem Wire)	2	S42	F44SSILL-R	2,860	78	2	LEDT8	LEDT8/4'/12W/4	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 12W Lamps	48	.95	2,860	0.155	0.095	0.060	0.057	0.057	444	272	172	172
EAST WING	2ND		ELEVATOR LOBBY	LB22L-QHE	Relamp & Reballast w/ (2) GE-45748 / F17T8/SP41/ECO Lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast	2	S22/SS	F22ILL-R	2,860	26	2	LEDT8	LEDT8/2'/8W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	16	.95	2,860	0.052	0.032	0.021	0.020	0.020	150	91	59	59
EAST WING	2ND		ELEVATOR LOBBY	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	1	EX2X15	LED2W	8,760	2	1	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.002	0.002	-	-	-	16	16	-	-
EAST WING	2ND	121	OFFICE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	2	V41	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	2ND	121	OFFICE	MV1X175	Fixture w/ (1) 175w Mercury Vapor Lamp & Ballast	4	MV1X175	MV175/1	2,860	185	4	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	0.740	0.143	0.597	0.568	0.568	2,117	408	1,709	1,709
EAST WING	2ND	121	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	3	I1X60/table	CFC13/1	2,860	12	3	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.035	0.024	0.011	0.010	0.010	101	69	31	31
EAST WING	2ND	121	OFFICE	CF1X23SI	Relamp w/ (1) 23 watt Compact Fluorescent screw-in lamp--GE-80889/FLE23HT3/2/XL827	2	I1X100/table	CFC23/1	2,860	21	2	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.042	0.016	0.025	0.024	0.024	119	46	72	72
EAST WING	2ND	123	OFFICE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	2	V41	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	2ND	123	OFFICE	MV1X175	Fixture w/ (1) 175w Mercury Vapor Lamp & Ballast	4	MV1X175	MV175/1	2,860	185	4	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	0.740	0.143	0.597	0.568	0.568	2,117	408	1,709	1,709
EAST WING	2ND	123	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	3	I1X60/table	CFC13/1	2,860	12	3	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.035	0.024	0.011	0.010	0.010	101	69	31	31

Facility	Area	Space	Room#/ ID#/ Dwg#	Comments	Additional Comments	Pre Fixture Qty	Existing Fixture Type	Wattage Table	Hours Pre	Pre Watts/ Fixt	Post Fixture Qty	Post Design Code (Fixture)	Post Lamp Design Code (Wattage Table)	Post Description	Post Watt/ Fixt	% Contribution to Demand Charge	Hours Post	Base kW	Retro Proposed kW	kW Difference	Retro Demand Savings (kW)	Total Demand Savings (kW)	Base kWh	Retro Proposed kWh	Retro kWh Saved	Total kWh Saved
EAST WING	2ND	123	OFFICE	CF1X23SI	Relamp w/ (1) 23 watt Compact Fluorescent screw-in lamp--GE-80889/FLE23HT3/2/XL827	2	I1X100/table	CFC23/1	2,860	21	2	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.042	0.016	0.025	0.024	0.024	119	46	72	72
EAST WING	2ND	125	OFFICE	LB42LT2-QHE	Relamp & Reballast w/ (2) GE-00257 / F28T8/SP41/UMX/ECO lamps & (1) GE-49707/GE232MAX-L/ULTRA ballast, (Tandem Wire 2:1)	2	V41	F42SSILL-R	2,860	41	2	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.95	2,860	0.081	0.048	0.034	0.032	0.032	232	136	96	96
EAST WING	2ND	125	OFFICE	MV1X175	Fixture w/ (1) 175w Mercury Vapor Lamp & Ballast	4	MV1X175	MV175/1	2,860	185	4	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	0.740	0.143	0.597	0.568	0.568	2,117	408	1,709	1,709
EAST WING	2ND	125	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	4	I1X60/table	CFC13/1	2,860	12	4	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.047	0.032	0.015	0.014	0.014	134	93	42	42
EAST WING	2ND	125	OFFICE	CF1X13-MINI	Relamp w/ (1) 13 watt Compact Fluorescent screw-in MINI lamp--GE-16460/FLE13HT3/2/SW/CD	2	I1X60/table	CFC13/1	2,860	12	2	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.023	0.016	0.007	0.007	0.007	67	46	21	21
EAST WING	2ND	125	OFFICE	CF1X23SI	Relamp w/ (1) 23 watt Compact Fluorescent screw-in lamp--GE-80889/FLE23HT3/2/XL827	1	I1X100/table	CFC23/1	2,860	21	1	LEDSI/A	LEDS9/1	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8	.95	2,860	0.021	0.008	0.013	0.012	0.012	59	23	36	36
EAST WING	2ND		HALLWAY	cir40-32x	Surface-Mount Luminaire w/ (1) 40w and (1) 32w Circline Fluorescent Lamp and (1) Standard Magnetic Ballast	10	cir40-32x	FC32/40/1	2,860	72	10	LED/DRUM/KIT/12	LED18W	Surface Mounted Retrofit Existing Drum with 12" LED Kit LED Light Fixture. (1) 18W	18	.95	2,860	0.722	0.178	0.544	0.517	0.517	2,065	510	1,555	1,555
EAST WING	2ND		HALLWAY	MV1X175	Fixture w/ (1) 175w Mercury Vapor Lamp & Ballast	2	MV1X175	MV175/1	2,860	185	2	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	0.370	0.071	0.299	0.284	0.284	1,058	204	854	854
EAST WING	2ND		HALLWAY	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	1	EX2X15	LED2W	8,760	2	1	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.002	0.002	-	-	-	16	16	-	-
EAST WING	2ND		HALLWAY	cir40-32x	Surface-Mount Luminaire w/ (1) 40w and (1) 32w Circline Fluorescent Lamp and (1) Standard Magnetic Ballast	11	cir40-32x	FC32/40/1	2,860	72	11	LED/DRUM/KIT/12	LED18W	Surface Mounted Retrofit Existing Drum with 12" LED Kit LED Light Fixture. (1) 18W	18	.95	2,860	0.794	0.196	0.598	0.568	0.568	2,271	561	1,711	1,711
EAST WING	2ND		HALLWAY	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	2	EX2X15	LED2W	8,760	2	2	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.004	0.004	-	-	-	33	33	-	-
EAST WING	2ND		HALLWAY	cir40-32x	Surface-Mount Luminaire w/ (1) 40w and (1) 32w Circline Fluorescent Lamp and (1) Standard Magnetic Ballast	11	cir40-32x	FC32/40/1	2,860	72	11	LED/DRUM/KIT/12	LED18W	Surface Mounted Retrofit Existing Drum with 12" LED Kit LED Light Fixture. (1) 18W	18	.95	2,860	0.794	0.196	0.598	0.568	0.568	2,271	561	1,711	1,711
EAST WING	2ND		HALLWAY	EXR/CUSTOM	(70226) & (1) HF2 STICK/CONN/INPUT 2 WIRE CONNECTOR FOR INCOMING (70197) & OT6/100-240/24CE--6 WATT LED DRIVER FOR 24V HF2 STICK (51503)	1	EX2X15	LED2W	8,760	2	1	N/R	NONE	Surface Mounted No Retrofit. To remain as is.	2	.95	8,760	0.002	0.002	-	-	-	16	16	-	-
EAST WING	2ND		FOYER TO FOUNTAIN	MV1X175	Fixture w/ (1) 175w Mercury Vapor Lamp & Ballast	4	MV1X175	MV175/1	2,860	185	4	LEDSI/COB	LED36W	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast LED Light Fixture. (1) 36W	36	.95	2,860	0.740	0.143	0.597	0.568	0.568	2,117	408	1,709	1,709
Labor & Industry	All	RA96	2x4 3 lamp T8 32w T8 lamps w/ magnetic ballast			5000	2x4	F43ILL	2,500	80	5000	LEDT8	LEDT8/4'/12W/3	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 12W Lamps	36	.85	2,500	#######	178.200	223.413	189.901	189.901	#######	445,500	#######	558,531
Labor & Industry	All	RC42	8" Flour Comp			800	REC/8	CF42/1-L	2,000	43	800	REC/LED/RETRO	LED17W	Recessed Recessed Can LED Retrofit LED Light Fixture. (1) 17W	17	.70	2,000	34.656	13.464	21.192	14.834	14.834	69,312	26,928	42,384	42,384
Labor & Industry	All	RD64	1x4 2 lamp fluor 32w T8 lamps w magnetic ballast			200	1x4	F42ILL	2,500	53	200	LEDT8	LEDT8/4'/12W/2	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.85	2,500	10.650	4.752	5.898	5.013	5.013	26,624	11,880	14,744	14,744
Health & Welfare	All	RA96	2x4 3 lamp T8 32w T8 lamps w/ magnetic ballast			3500	2x4	F43ILL	2,500	80	3500	LEDT8	LEDT8/4'/12W/3	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 12W Lamps	36	.85	2,500	#######	124.740	156.389	132.930	132.930	#######	311,850	#######	390,972
Health & Welfare	All	RC42	8" Flour Comp			300	REC/8	CF42/1-L	2,000	43	300	REC/LED/RETRO	LED17W	Recessed Recessed Can LED Retrofit LED Light Fixture. (1) 17W	17	.70	2,000	12.996	5.049	7.947	5.563	5.563	25,992	10,098	15,894	15,894
Health & Welfare	All	RD64	1x4 2 lamp fluor 32w T8 lamps w magnetic ballast			300	1x4	F42ILL	2,500	53	300	LEDT8	LEDT8/4'/12W/2	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.85	2,500	15.974	7.128	8.846	7.519	7.519	39,936	17,820	22,116	22,116
Health & Welfare	All	SA64	2x4 2 lamp 34w T12 lamps w/magnetic ballast			140	2x4	F42EE	2,500	65	140	LEDT8	LEDT8/4'/12W/2	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.85	2,500	9.097	3.326	5.771	4.905	4.905	22,743	8,316	14,427	14,427
Health & Welfare	All	SC64	8"x 4' 2 lamp 32w T8 lamps w magnetic Ballast			50	W4	F42ILL	2,500	53	50	LEDT8	LEDT8/4'/12W/2	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 12W Lamps	24	.85	2,500	2.662	1.188	1.474	1.253	1.253	6,656	2,970	3,686	3,686



1 CHILLER ROOM UPPER FLOOR PLAN

SCALE: 1/4"=1'-0"

N

LEGEND

CHWS	CHILLED WATER SUPPLY
CHWR	CHILLED WATER RETURN
CWS	CONDENSER WATER SUPPLY (FROM TOWER)
CWR	CONDENSER WATER RETURN (TO TOWER)

DRAWING KEY NOTES: (#)

1. CONNECT TO EXISTING 18" CHILLED WATER RETURN USING "HOT TAP" MACHINE.
2. CONNECT TO EXISTING 18" CHILLED WATER RETURN LOCATED ABOVE CHILLED WATER SUPPLY USING "HOT TAP" MACHINE.
3. HOT TAP EXISTING 30" CONDENSER WATER SUPPLY TO CHILLERS FOR (2) NEW 12" CWS TO HX'S.
4. HOT TAP EXISTING 30" CONDENSER WATER RETURN TO TOWERS FOR (2) NEW 12" CWS FROM HX'S.
5. PIPE STANCHION #1, SEE DETAIL 2
6. PIPE STANCHION #2, SEE DETAIL 2
7. REPLACE 4160 VOLT MOTOR ON CONDENSER WATER PUMP WITH NEW 460 VOLT MOTOR WITH VFD DRIVE.
8. INSTALL NEW 200 HP VFD DRIVE FOR CONDENSER WATER PUMP IN NEW 600 AMP PANEL WITH BREAKER SERVED FROM 460 VOLT TRANSFORMER.
9. REPLACE EXISTING "SOFT START" STARTER WITH NEW VFD DRIVE (2) PLACES.

HUCKESTEIN MECHANICAL

1505 METROPOLITAN ST.
PITTSBURGH PA 15233

PHONE: (412) 678-5900
FAX: (412) 678-5905

PA CAPITAL COMPLEX FREE COOLING HX

401 NORTH STREET,
Harrisburg, PA

P.E. STAMP

REV.	DESCRIPTION	DATE

DATE ISSUED: 5/25/2017

TITLE:

HVAC - MER PLATFORM FLOOR PLAN

DRAWING SCALE:

PROJECT NUMBER:	16-710
DESIGNER:	Mark W.
CHECKED BY:	TIM R.
APPROVED BY:	TIM R.

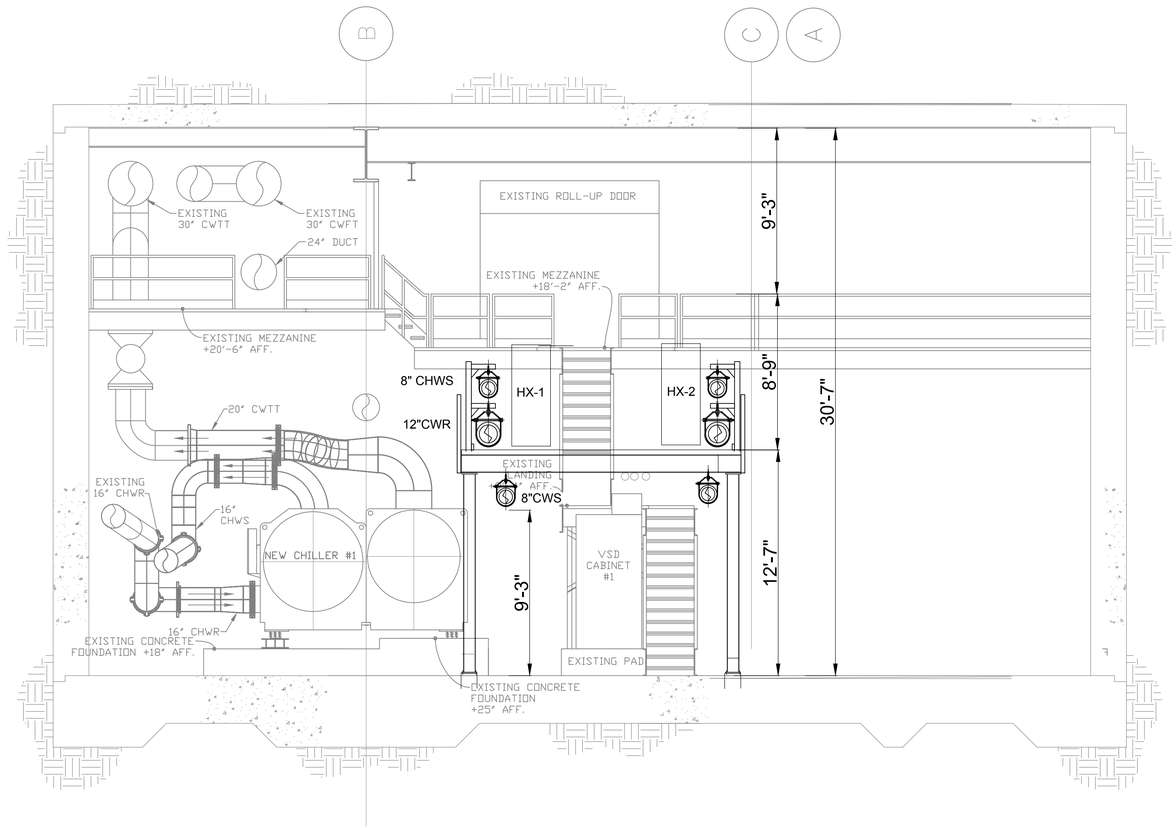
1" BAR
THIS BAR SCALES 1" LONG ON ORIGINAL DRAWING. IF LENGTH DIFFERS, ADJUST PRINT SCALE TO MATCH.

0" 1/2" 1"

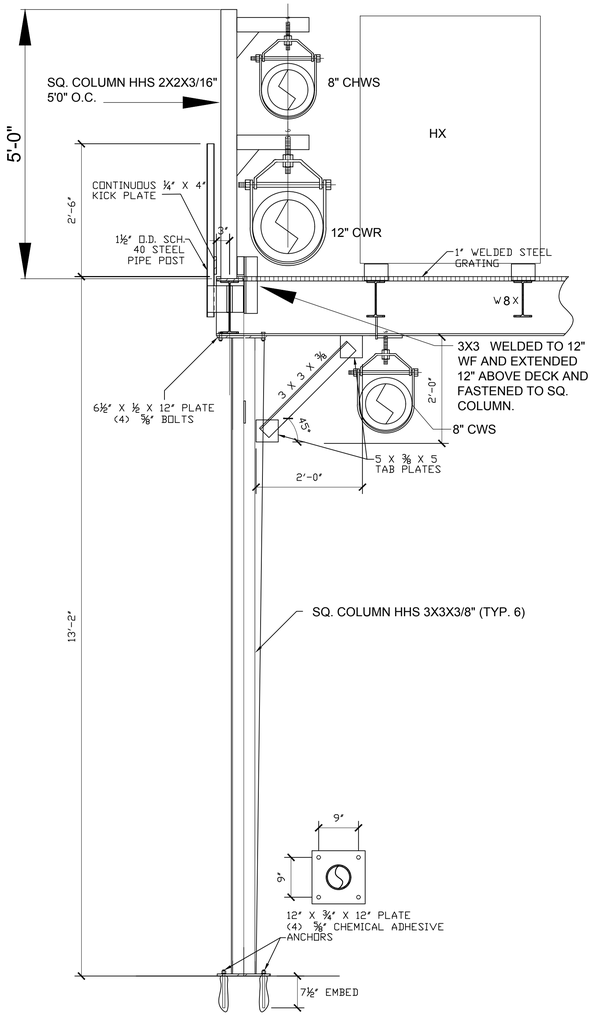
SHEET:

M-1

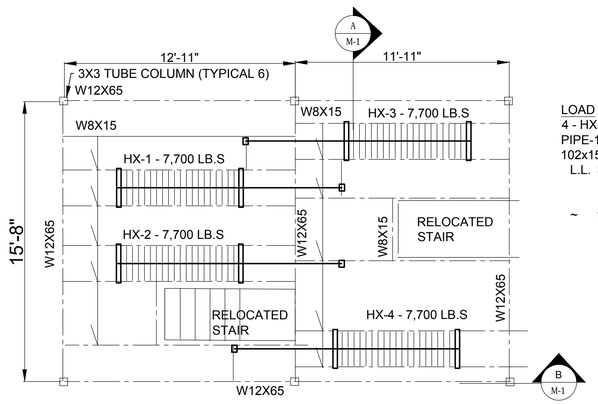
6/23/2017 5:07:57 PM P:\Tim Roos\2017 Projects\TEN-2017\Capitol Complex-Harrisburg\drawings\Mech\M-1 PLANS.dwg



1 SECTION A-A
SCALE: 1/4"=1'-0"



A M-1 SECTION
SCALE 3/4"= 1'-0"

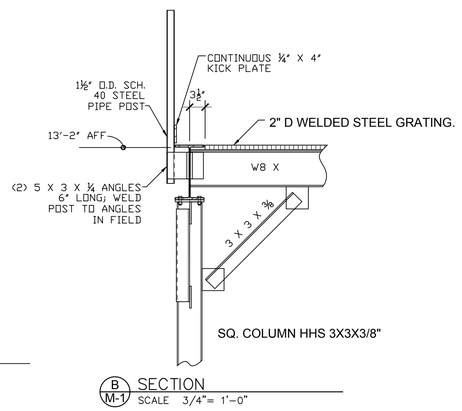


LOAD

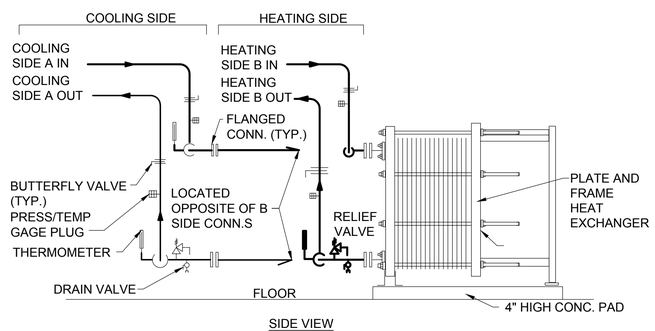
4 - HX-S -	30,800 LB.S
PIPE-150'@12"	
102x150=	15,300
L.L. 395X50=	19,750
	65,850 LB.S

~ 17 kips/COLUMN

2 STRUCTURAL FRAMING PLATFORM PLAN
SCALE: 1/4"=1'-0"



B M-1 SECTION
SCALE 3/4"= 1'-0"



SIDE VIEW

1 M-2 PLATE & FRAME HEAT EXCHANGER PIPING DETAIL
NO SCALE

HUCKESTEIN MECHANICAL

1505 METROPOLITAN ST.
PITTSBURGH PA 15233

PHONE: (412) 678-5900
FAX: (412) 678-5905

PA CAPITAL COMPLEX FREE COOLING HX

401 NORTH STREET,
Harrisburg, PA

P.E. STAMP

REV.	DESCRIPTION	DATE

DATE ISSUED: 5/25/2017

TITLE:

HVAC - SECTIONS, DETAILS

DRAWING SCALE: AS NOTED

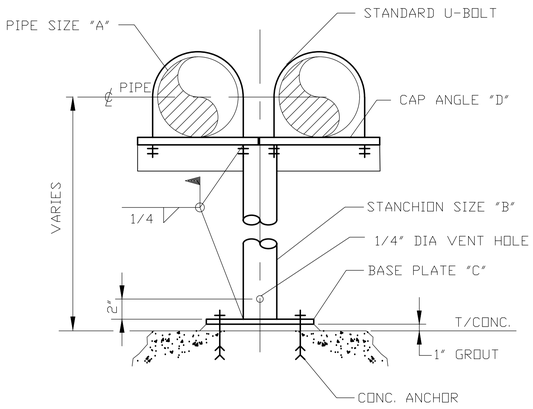
PROJECT NUMBER:	16-710
DESIGNER:	Mark W.
CHECKED BY:	TIM R.
APPROVED BY:	TIM R.

1" BAR
THIS BAR SCALES 1" LONG ON ORIGINAL DRAWING. IF LENGTH DIFFERS, ADJUST PRINT SCALE TO MATCH.

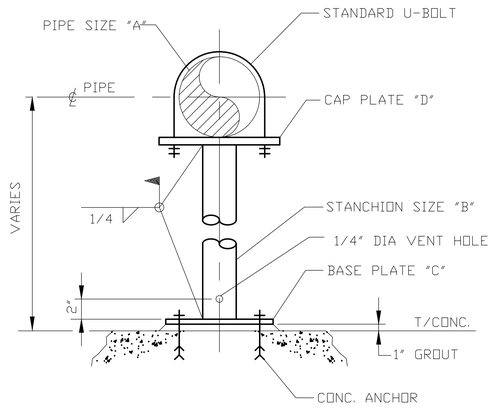
SHEET:

M-2

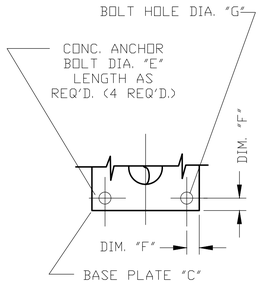
6/23/2017 5:11:07 PM P:\Tim Roos\2017 Projects\TEN-2017\Capital Complex-Harrisburg\drawings\Mech\M-1 PLANS.dwg



PIPE SUPPORT SH-1



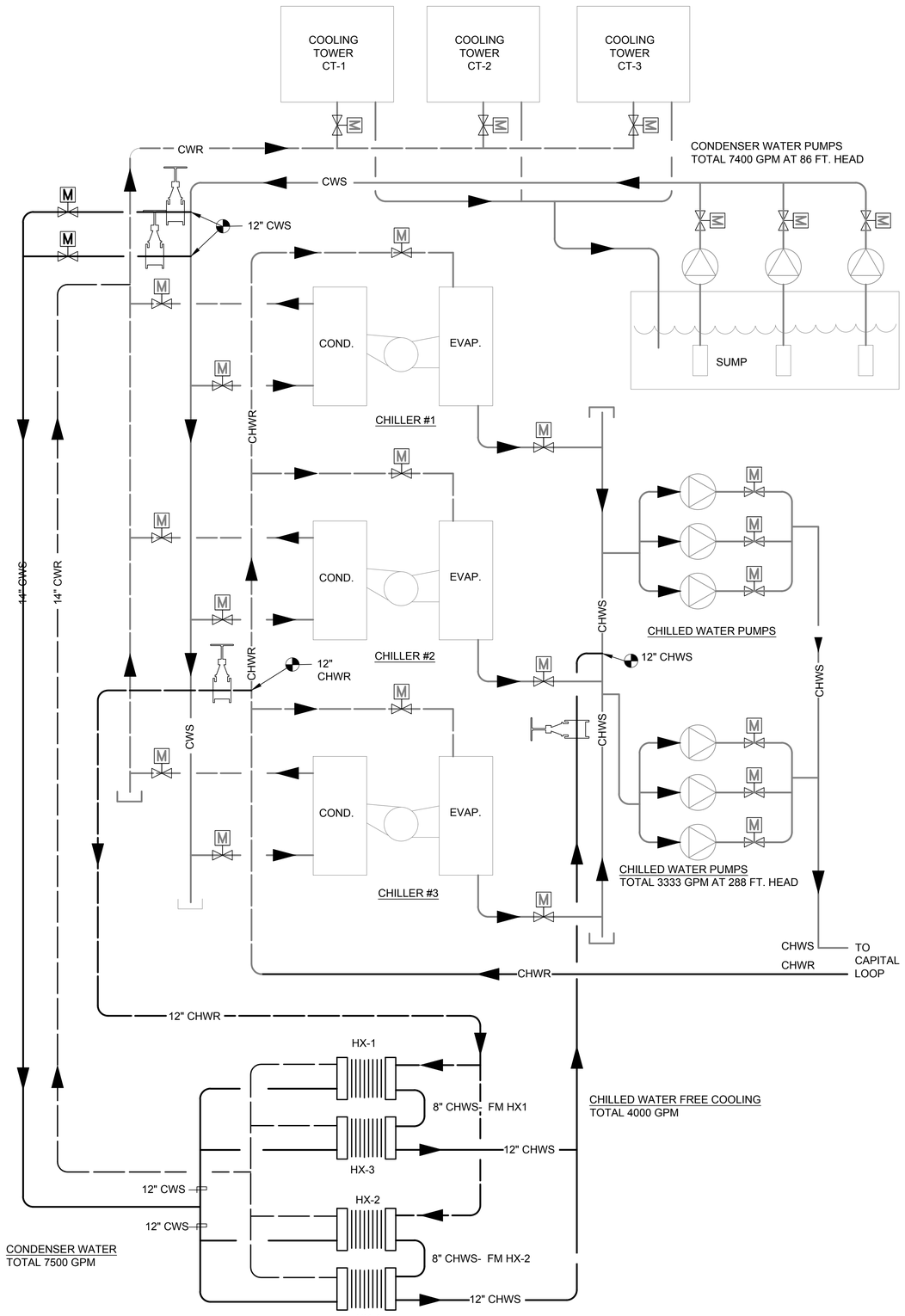
PIPE SUPPORT SH-2 & 3



PLAN

SUPPORT NO.	"A" PIPE SIZE	"B" STANCHION	"C" BASE PLATE	"D" CAP PLATE	"E" BOLT DIA.	"F" DIM.	"G" BOLT HOLE	QUANTITY
SH-1	(2) 12"	8"-SCH. 40	14"x14"x1/2"	24"LX5X4X1/2"ANGLE	7/8"	1 1/2"	15/16"	3
SH-2	12"&16"	6"-SCH. 40	8"x8"x1/2"	12 1/2"x15 3/4x5/8"	5/8"	1 1/4"	11/16"	6
SH-3	6"	2 1/2"-SCH.40	8"x8"x1/2"	8"x8"x1/2"	5/8"	1 1/4"	11/16"	0

1 PIPE SUPPORT DETAILS
SCALE: NONE



HEAT EXCHANGERS														
TAG	DESCRIPTION	MFG	MODEL	COOLING SIDE (A)				HEATING SIDE (B)				FOULING FACTOR		WGHT LBS. OPR.	REMARKS
				GPM	EFT	LFT	PD PSI	GPM	EFT	LFT	PD PSI	A	B		
HX-1	PLATE & FRAME	KELVION	BYF-150	1875	43	48.8	9.99	1000	55.8	45	3.2	0.005	0.005	7,600	1
HX-2	PLATE & FRAME	KELVION	BYF-150	1875	43	48.8	9.99	1000	55.8	45	3.2	0.005	0.005	7,600	1
HX-3	PLATE & FRAME	KELVION	BYF-150	1875	43	48.8	9.99	1000	55.8	45	3.2	0.005	0.005	7,600	1
HX-4	PLATE & FRAME	KELVION	BYF-150	1875	43	48.8	9.99	1000	55.8	45	3.2	0.005	0.005	7,600	1

NOTES:
1. 304 SS, PLATES, 150 PSIG RATING, NBR GASKETS, 6" CONNECTIONS

HUCKESTEIN MECHANICAL

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PITTSBURGH PA 15233

PHONE: (412) 678-5900
FAX: (412) 678-5905

PA CAPITAL COMPLEX FREE COOLING HX

401 NORTH STREET,
Harrisburg, PA

P.E. STAMP

REV.	DESCRIPTION	DATE

DATE ISSUED: 5/25/2017

TITLE:

HVAC - SUPPORT, DETAILS

DRAWING SCALE: NONE

PROJECT NUMBER: 16-710
DESIGNER: Mark W.
CHECKED BY: TIM R.
APPROVED BY: TIM R.

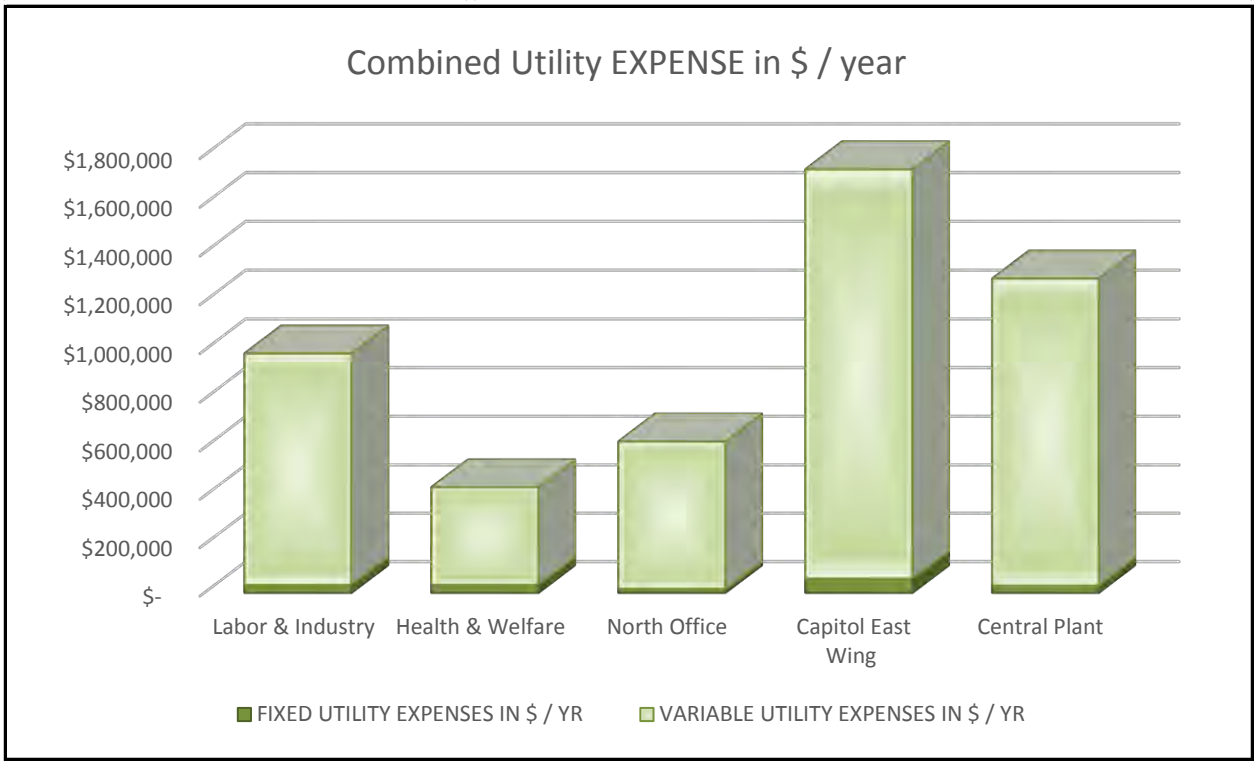
1" BAR
THIS BAR SCALES 1" LONG ON ORIGINAL DRAWING. IF LENGTH DIFFERS, ADJUST PRINT SCALE TO MATCH.

SHEET:

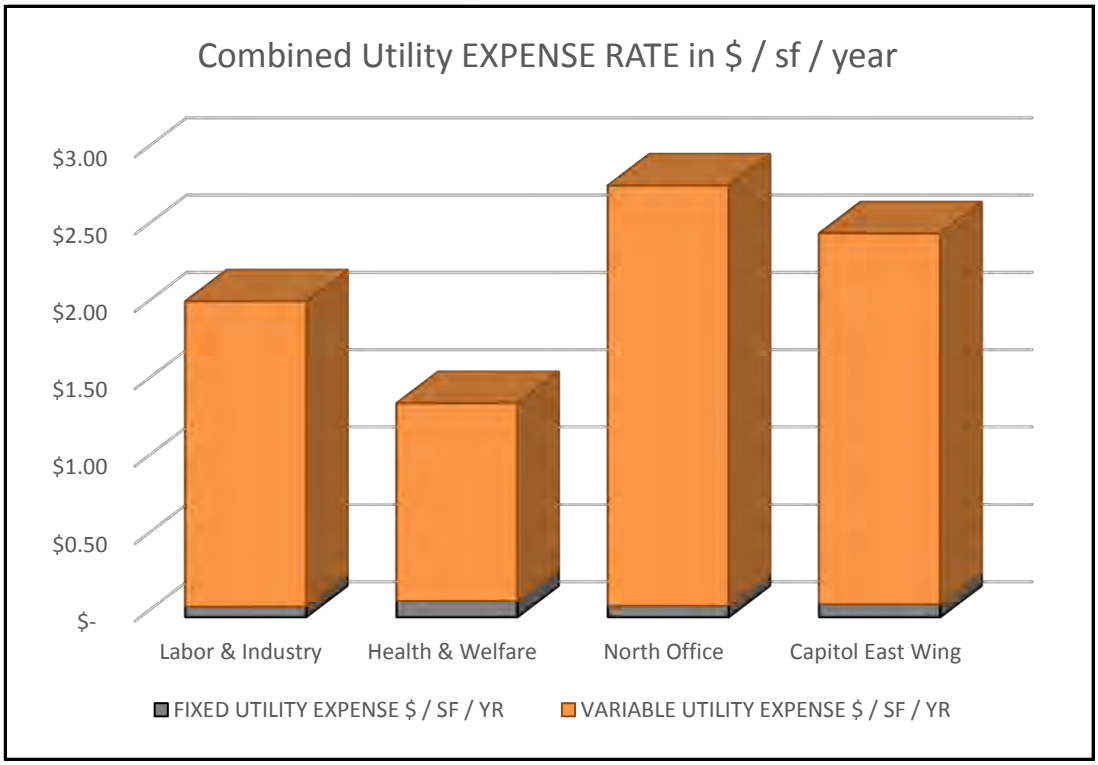
M-3

6/23/2017 5:14:33 PM P:\Tim Roos\2017 Projects\TEN-2017\Capitol Complex-Harrisburg\drawings\Mech\M-1 PLANS.dwg

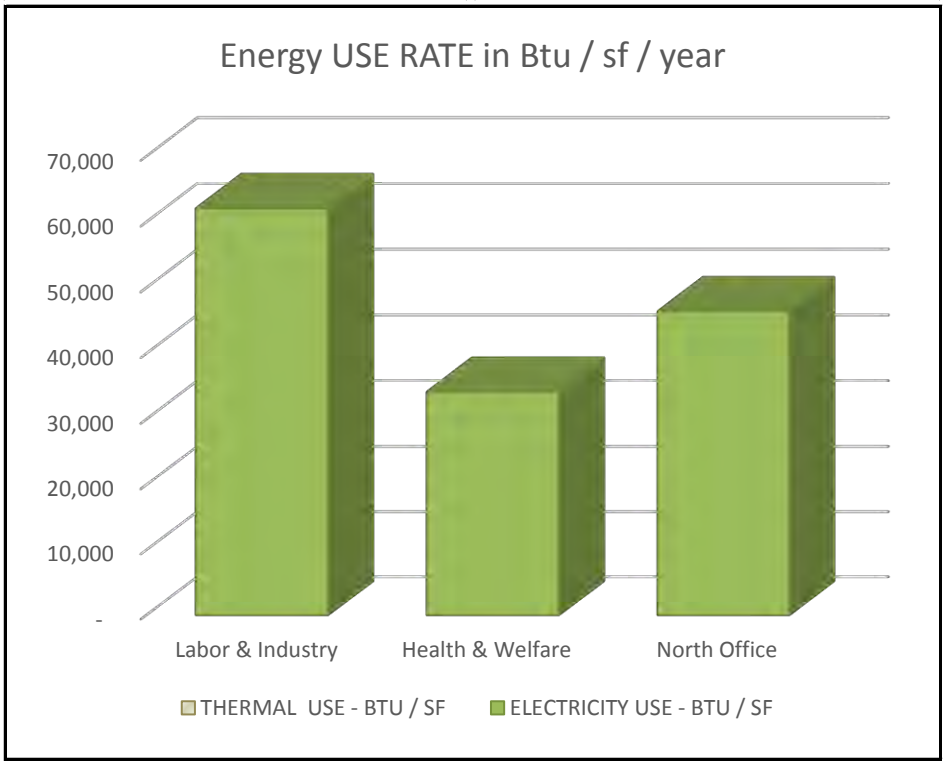
PA DGS	Labor & Industry	Health & Welfare	North Office	Capitol East Wing	Central Plant
FIXED UTILITY EXPENSES IN $ / YR	$ 32,778	$ 32,778	$ 16,389	$ 58,268	$ 29,134
VARIABLE UTILITY EXPENSES IN $ / YR	$ 952,957	$ 402,960	$ 608,286	$ 1,683,194	$ 1,264,214

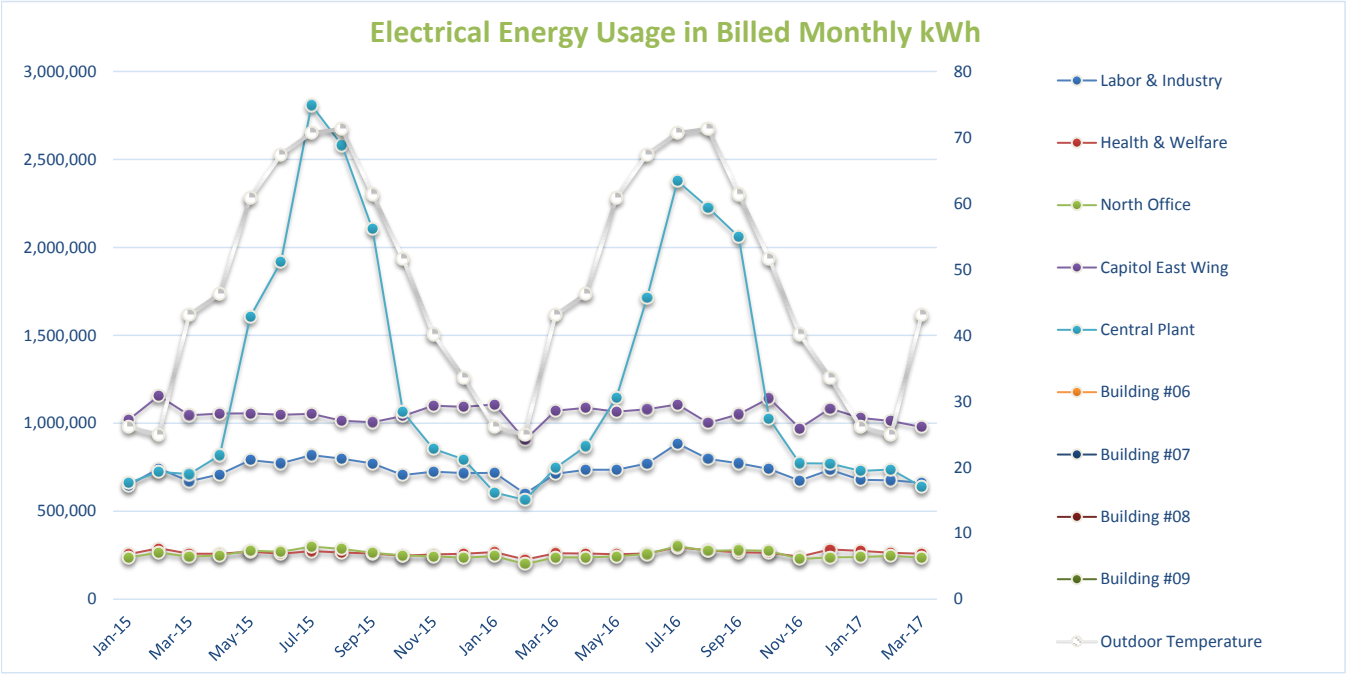


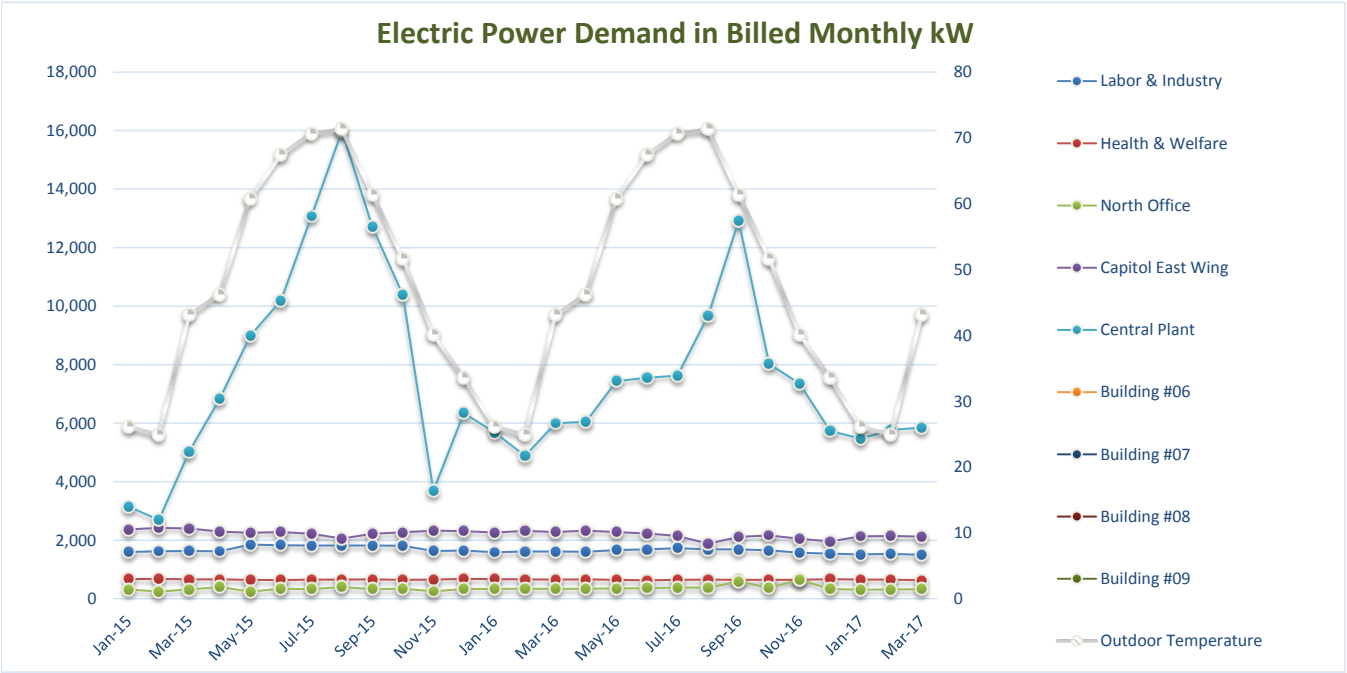
PA DGS	Labor & Industry	Health & Welfare	North Office	Capitol East Wing
FIXED UTILITY EXPENSE $ / SF / YR	$ 0.07	$ 0.10	$ 0.07	$ 0.08
VARIABLE UTILITY EXPENSE $ / SF / YR	$ 1.97	$ 1.28	$ 2.72	$ 2.40



PA DGS	Labor & Industry	Health & Welfare	North Office
ELECTRICITY USE - BTU / SF	62,044	34,133	46,397
THERMAL USE - BTU / SF	9	9	4




Electrical Energy Usage in Billed Monthly kWh
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
80
70
60
50
40
30
20
10
0
Jan-15
Mar-15
May-15
Jul-15
Sep-15
Nov-15
Jan-16
Mar-16
May-16
Jul-16
Sep-16
Nov-16
Jan-17
Mar-17
Labor & Industry
Health & Welfare
North Office
Capitol East Wing
Central Plant
Building #06
Building #07
Building #08
Building #09
Outdoor Temperature


Electric Power Demand in Billed Monthly kW
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
80
70
60
50
40
30
20
10
0
Jan-15
Mar-15
May-15
Jul-15
Sep-15
Nov-15
Jan-16
Mar-16
May-16
Jul-16
Sep-16
Nov-16
Jan-17
Mar-17
Labor & Industry
Health & Welfare
North Office
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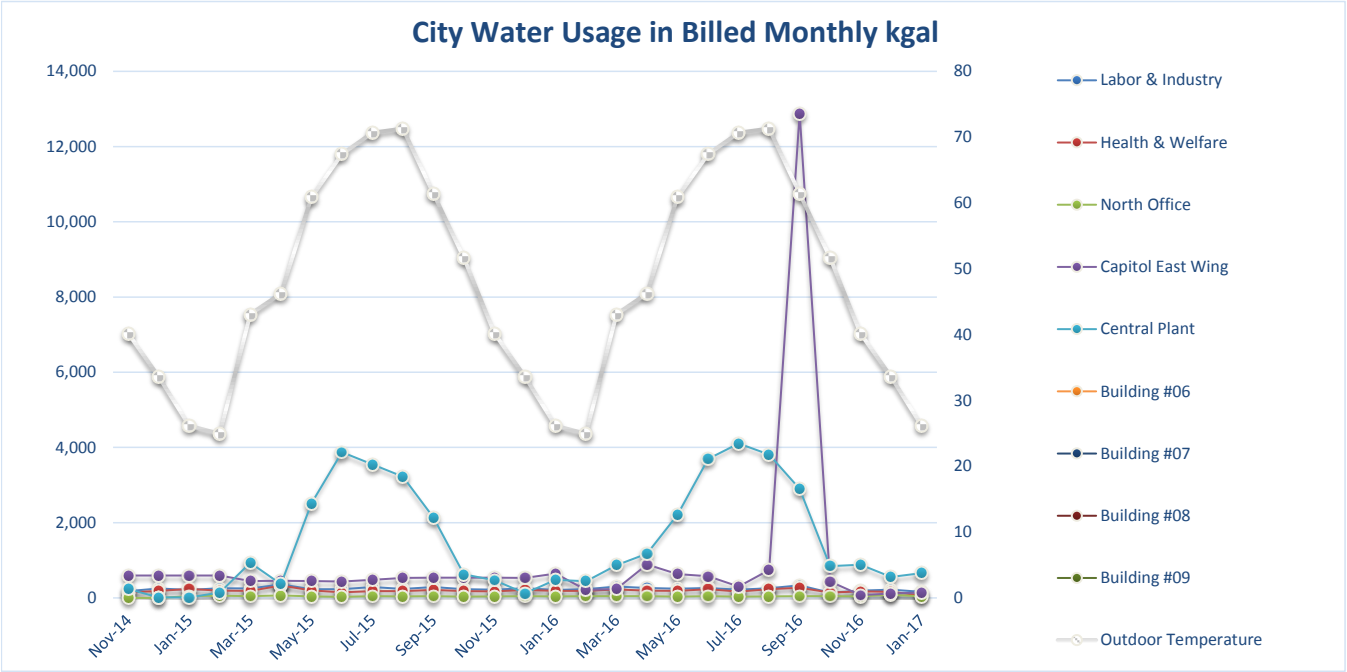
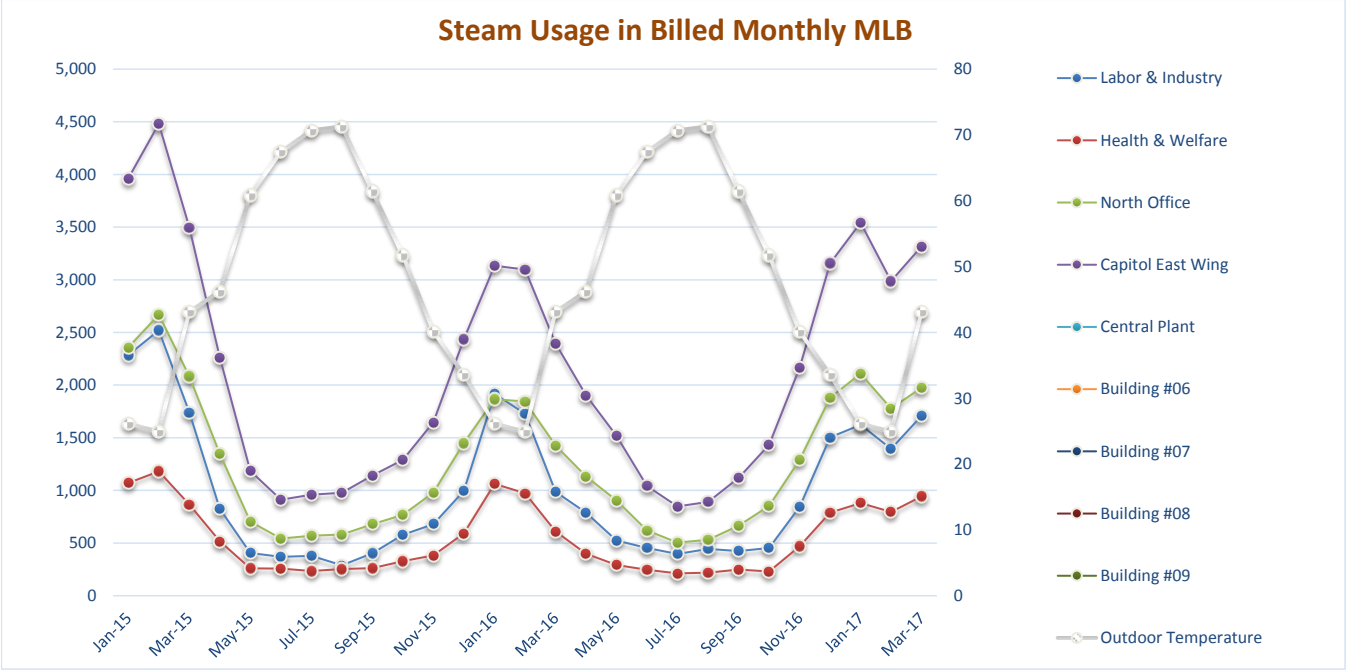

City Water Usage in Billed Monthly kgal
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
80
70
60
50
40
30
20
10
0
Nov-14
Jan-15
Mar-15
May-15
Jul-15
Sep-15
Nov-15
Jan-16
Mar-16
May-16
Jul-16
Sep-16
Nov-16
Jan-17
Labor & Industry
Health & Welfare
North Office
Capitol East Wing
Central Plant
Building #06
Building #07
Building #08
Building #09
Outdoor Temperature


Steam Usage in Billed Monthly MLB
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
80
70
60
50
40
30
20
10
0
Jan-15
Mar-15
May-15
Jul-15
Sep-15
Nov-15
Jan-16
Mar-16
May-16
Jul-16
Sep-16
Nov-16
Jan-17
Mar-17
Labor & Industry
Health & Welfare
North Office
Capitol East Wing
Central Plant
Building #06
Building #07
Building #08
Building #09
Outdoor Temperature

Project Analysis - Input Data & Generic Equipment Performance

PA DGS

GENERAL INFORMATION

location characteristics

Conditioned floor area			
Labor & Industry		483,161	sf
Health & Welfare		315,462	sf
North Office		223,946	sf
Capitol East Wing	Main Capitol, East Wing, Ryan Annex	702,245	sf
Central Plant	PLANT ONLY	26,076	sf
	project total conditioned floor area :	**1,750,890**	sf

Central Plant Service - Chilled Water Cooling

COLD GENERATION

Conditioned floor area			
Labor & Industry		483,161	sf
Health & Welfare		315,462	sf
North Office		223,946	sf
Capitol East Wing	Main Capitol, East Wing, Ryan Annex	702,245	sf
Central Plant	PLANT ONLY	26,076	sf
Irvis (South Office)		281,500	sf
Finance	Finance floor area is 429,520 sf; many perimeter zones cooled by window AC units	202,200	sf
Forum Auditorium		23,000	sf
PA Judicial Center		396,000	sf
Keystone		700,000	sf
	Central Plant Service - Chilled Water Cooling - total serviced floor area :	**3,353,590**	sf

Central Plant Service - Heating Water from Steam for Heat

DISTRICT STEAM
Hot Water Distribution

Conditioned floor area			
Labor & Industry			sf
Health & Welfare			sf
North Office		223,946	sf
Capitol East Wing	Main Capitol, East Wing, Ryan Annex	702,245	sf
Central Plant	PLANT ONLY	26,076	sf
Irvis (South Office)		281,500	sf
	Central Plant Service - Heating Water from Steam for Heat - total serviced floor area :	**1,233,767**	sf

PA DGS			Labor & Industry	Health & Welfare	North Office	Capitol East Wing	Central Plant
		SF	483,161	315,462	223,946	702,245	26,076
UTILITY CONSUMPTION - UNITS / YR							
Electric	kWh	Electric kWh/yr	8785777	3155867	3045267	12616911	14948755
Water	kgal	Water kgal/yr	2913	2316	511	11209	18162
Sewer	kgal	Sewer kgal/yr	2913	2316	511	11209	14707
Steam	MLB	Steam MLB/yr	11848	6478	15159	25467	0
CHW	ton-hr	CHW ton-hr/yr	0	0	0	0	0
UTILITY - BTU / SF / YR							
Electric	3412	Electric Btu/sf/yr	62,044	34,133	46,397	61,302	1,956,019
Water	1000	Water gal/sf/yr	6	7	2	16	697
Sewer	1000	Sewer Btu/sf/yr	6	7	2	16	564
Steam	1000000	Steam Btu/sf/yr	24,522	20,535	67,690	36,265	-
CHW	12000	CHW Btu/sf/yr	-	-	-	-	-
		total Btu/sf/yr	86,565	54,669	114,087	97,567	1,956,019
UTILITY EXPENSE - $ / YR							
Electric		Electric $/yr	$ 608,352	$ 218,521	$ 210,863	$ 873,630	$ 1,035,093
Water		Water $/yr	$ 56,522	$ 51,643	$ 20,613	$ 152,034	$ 180,725
Sewer		Sewer $/yr	$ 15,671	$ 12,459	$ 2,736	$ 59,821	$ 77,530
Steam		Steam $/yr	$ 305,189	$ 153,115	$ 390,463	$ 655,977	$ -
CHW		CHW $/yr	$ -	$ -	$ -	$ -	$ -
		total $/yr	$ 985,734	$ 435,738	$ 624,674	$ 1,741,463	$ 1,293,349
UTILITY EXPENSE RATE - $ / SF / YR							
Electric		Electric $/sf/yr	$ 1.26	$ 0.69	$ 0.94	$ 1.24	$ 39.70
Water		Water $/sf/yr	$ 0.12	$ 0.16	$ 0.09	$ 0.22	$ 6.93
Sewer		Sewer $/sf/yr	$ 0.03	$ 0.04	$ 0.01	$ 0.09	$ 2.97
Steam		Steam $/sf/yr	$ 0.63	$ 0.49	$ 1.74	$ 0.93	$ -
CHW		CHW $/sf/yr	$ -	$ -	$ -	$ -	$ -
		Total $/sf/yr	$ 2.04	$ 1.38	$ 2.79	$ 2.48	$ 49.60

ELECTRICITY			OA TEMP	Labor & Industry	Health & Welfare	North Office	Capitol East Wing	Central Plant
	units:	kWh	deg.F	energy kWh	energy kWh	energy kWh	energy kWh	energy kWh
FY 14-15	Jan-15	Jan	26	647,881	256,001	236,202	1,019,002	660,704
	Feb-15	Feb	25	742,281	289,226	264,678	1,156,155	724,067
	Mar-15	Mar	43	670,284	258,225	241,951	1,045,495	710,712
	Apr-15	Apr	46	709,829	258,939	248,203	1,055,013	817,848
	May-15	May	61	791,048	270,119	276,492	1,056,089	1,607,073
	Jun-15	June	67	772,239	257,801	269,142	1,048,809	1,918,207
FY 15-16	Jul-15	July	71	819,105	273,030	299,046	1,053,419	2,808,971
	Aug-15	Aug	71	799,015	265,274	285,000	1,014,421	2,580,871
	Sep-15	Sep	61	771,579	259,233	263,944	1,006,622	2,104,942
	Oct-15	Oct	52	706,358	247,505	248,610	1,040,955	1,064,871
	Nov-15	Nov	40	725,302	254,431	243,620	1,100,506	854,739
	Dec-15	Dec	34	716,522	258,644	236,788	1,093,179	795,145
	Jan-16	Jan	26	717,550	267,929	244,290	1,106,649	606,715
	Feb-16	Feb	25	599,917	225,177	199,362	905,370	564,055
	Mar-16	Mar	43	712,459	260,767	238,211	1,071,079	746,606
	Apr-16	Apr	46	735,689	260,246	237,507	1,088,219	869,678
	May-16	May	61	736,531	255,413	242,824	1,066,535	1,147,463
	Jun-16	June	67	771,762	259,458	257,564	1,079,858	1,712,364
FY 16-17	Jul-16	July	71	885,343	295,401	301,511	1,107,588	2,377,059
	Aug-16	Aug	71	797,074	277,299	274,826	1,002,140	2,225,731
	Sep-16	Sep	61	772,400	266,961	278,667	1,050,606	2,061,352
	Oct-16	Oct	52	740,188	263,317	274,839	1,142,902	1,027,145
	Nov-16	Nov	40	674,863	241,518	228,703	971,550	772,180
	Dec-16	Dec	34	736,248	283,010	238,505	1,083,512	770,879
	Jan-17	Jan	26	678,106	274,558	239,393	1,030,954	729,138
	Feb-17	Feb	25	676,436	263,413	245,728	1,012,448	737,749
	Mar-17	Mar	43	661,989	257,807	236,248	978,974	638,434
			annual	8,785,777	3,155,867	3,045,267	12,616,911	14,948,755

CITY WATER			OA TEMP	Labor & Industry	Health & Welfare	North Office	Capitol East Wing	Central Plant
	units:	kgal	deg.F	water kgal	water kgal	water kgal	water kgal	water kgal
FY 14-15	Nov-14	Nov	40	180	140	0	595	235
	Dec-14	Dec	34	250	185	0	595	15
	Jan-15	Jan	26	215	240	50	595	15
	Feb-15	Feb	25	255	195	60	595	140
	Mar-15	Mar	43	253	190	50	447	932
	Apr-15	Apr	46	359	330	65	458	368
	May-15	May	61	229	198	40	446	2,515
	Jun-15	June	67	229	150	30	434	3,875
FY 15-16	Jul-15	July	71	289	182	45	482	3,550
	Aug-15	Aug	71	240	180	40	532	3,225
	Sep-15	Sep	61	290	215	45	540	2,140
	Oct-15	Oct	52	230	180	35	540	625
	Nov-15	Nov	40	220	175	40	535	465
	Dec-15	Dec	34	260	210	45	530	125
	Jan-16	Jan	26	215	190	40	647	480
	Feb-16	Feb	25	230	185	45	211	440
	Mar-16	Mar	43	300	225	45	239	870
	Apr-16	Apr	46	265	195	50	886	1,175
	May-16	May	61	245	190	35	635	2,210
	Jun-16	June	67	265	235	50	576	3,700
FY 16-17	Jul-16	July	71	220	170	35	302	4,105
	Aug-16	Aug	71	260	230	40	744	3,810
	Sep-16	Sep	61	335	270	50	12,880	2,900
	Oct-16	Oct	52	140	145	45	434	845
	Nov-16	Nov	40	195	175	43	75	885
	Dec-16	Dec	34	220	165	87	120	560
	Jan-17	Jan	26	165	65	40	145	660
			annual	2,913	2,316	511	11,209	18,162

SEWAGE			OA TEMP	Labor & Industry	Health & Welfare	North Office	Capitol East Wing	Central Plant
	units:	kgal	deg.F	sewer kgal	sewer kgal	sewer kgal	sewer kgal	sewer kgal
FY 14-15	Nov-14	Nov	40	180	140	0	595	107
	Dec-14	Dec	34	250	185	0	595	14
	Jan-15	Jan	26	215	240	50	595	10
	Feb-15	Feb	25	255	195	60	595	136
	Mar-15	Mar	43	253	190	50	447	580
	Apr-15	Apr	46	359	330	65	458	140
	May-15	May	61	229	198	40	446	1,926
	Jun-15	June	67	229	150	30	434	3,268
FY 15-16	Jul-15	July	71	289	182	45	482	3,040
	Aug-15	Aug	71	240	180	40	532	2,771
	Sep-15	Sep	61	290	215	45	540	1,657
	Oct-15	Oct	52	230	180	35	540	378
	Nov-15	Nov	40	220	175	40	535	245
	Dec-15	Dec	34	260	210	45	530	47
	Jan-16	Jan	26	215	190	40	647	317
	Feb-16	Feb	25	230	185	45	211	178
	Mar-16	Mar	43	300	225	45	239	446
	Apr-16	Apr	46	265	195	50	886	782
	May-16	May	61	245	190	35	635	1,712
	Jun-16	June	67	265	235	50	576	3,020
FY 16-17	Jul-16	July	71	220	170	35	302	3,865
	Aug-16	Aug	71	260	230	40	744	3,649
	Sep-16	Sep	61	335	270	50	12,880	2,561
	Oct-16	Oct	52	140	145	45	434	845
	Nov-16	Nov	40	195	175	43	75	541
	Dec-16	Dec	34	220	165	87	120	443
	Jan-17	Jan	26	165	65	40	145	413
			annual	2,913	2,316	511	11,209	14,707

STEAM			OA TEMP	Labor & Industry	Health & Welfare	North Office	Capitol East Wing	Central Plant
	units:	MLB	deg.F	steam MLB	steam MLB	steam MLB	steam MLB	steam MLB
FY 14-15	Jan-15	Jan	26	2,286	1,072	2,359	3,963	
	Feb-15	Feb	25	2,520	1,180	2,667	4,481	
	Mar-15	Mar	43	1,741	866	2,083	3,499	
	Apr-15	Apr	46	824	516	1,347	2,263	
	May-15	May	61	407	261	705	1,184	
	Jun-15	June	67	370	257	543	911	
FY 15-16	Jul-15	July	71	377	236	571	959	
	Aug-15	Aug	71	289	253	582	977	
	Sep-15	Sep	61	404	262	680	1,142	
	Oct-15	Oct	52	580	329	768	1,290	
	Nov-15	Nov	40	680	383	981	1,648	
	Dec-15	Dec	34	995	593	1,450	2,436	
	Jan-16	Jan	26	1,917	1,061	1,866	3,134	
	Feb-16	Feb	25	1,727	973	1,843	3,096	
	Mar-16	Mar	43	987	612	1,426	2,395	
	Apr-16	Apr	46	788	400	1,133	1,903	
	May-16	May	61	523	292	904	1,518	
	Jun-16	June	67	454	246	620	1,041	
FY 16-17	Jul-16	July	71	397	212	505	848	
	Aug-16	Aug	71	444	218	530	890	
	Sep-16	Sep	61	425	248	667	1,120	
	Oct-16	Oct	52	453	230	853	1,433	
	Nov-16	Nov	40	842	470	1,289	2,166	
	Dec-16	Dec	34	1,503	788	1,879	3,157	
	Jan-17	Jan	26	1,623	879	2,108	3,541	
	Feb-17	Feb	25	1,394	796	1,778	2,987	
	Mar-17	Mar	43	1,709	943	1,976	3,319	
			annual	11,848	6,478	15,159	25,467	0

Labor & Industry	Health & Welfare	North Office	Capitol East Wing	Central Plant

SUMMARY OF VARIABLE ANNUAL UTILITY EXPENSES					
Electric variable $/yr	$ 608,352	$ 218,521	$ 210,863	$ 873,630	$ 1,035,093
Water variable $/yr	$ 23,745	$ 18,865	$ 4,225	$ 93,765	$ 151,591
Sewer variable $/yr	$ 15,671	$ 12,459	$ 2,736	$ 59,821	$ 77,530
Steam variable $/yr	$ 305,189	$ 153,115	$ 390,463	$ 655,977	$ -
CHW variable $/yr	$ -	$ -	$ -	$ -	$ -
total variable $/yr	$ 952,957	$ 402,960	$ 608,286	$ 1,683,194	$ 1,264,214

VARIABLE CHARGES - $ / SF / YR					
Electric $/sf/yr	$ 1.26	$ 0.69	$ 0.94	$ 1.24	$ 39.70
Water $/sf/yr	$ 0.05	$ 0.06	$ 0.02	$ 0.13	$ 5.81
Sewer $/sf/yr	$ 0.03	$ 0.04	$ 0.01	$ 0.09	$ 2.97
Steam $/sf/yr	$ 0.63	$ 0.49	$ 1.74	$ 0.93	$ -
CHW $/sf/yr	$ -	$ -	$ -	$ -	$ -
Total $/sf/yr	$ 1.97	$ 1.28	$ 2.72	$ 2.40	$ 48.48

ELECTRICITY	Labor & Industry	Health & Welfare	North Office	Capitol East Wing	Central Plant
VARIABLE BILLING $	VARIABLE payment $	VARIABLE payment $	VARIABLE payment $	VARIABLE payment $	VARIABLE payment $
Jan	$ 44,861	$ 17,726	$ 16,355	$ 70,559	$ 45,749
Feb	$ 51,398	$ 20,027	$ 18,327	$ 80,055	$ 50,136
Mar	$ 46,412	$ 17,880	$ 16,753	$ 72,393	$ 49,212
Apr	$ 49,151	$ 17,930	$ 17,186	$ 73,052	$ 56,630
May	$ 54,774	$ 18,704	$ 19,145	$ 73,127	$ 111,278
June	$ 53,472	$ 17,851	$ 18,636	$ 72,622	$ 132,822
July	$ 56,717	$ 18,905	$ 20,707	$ 72,942	$ 194,501
Aug	$ 55,326	$ 18,368	$ 19,734	$ 70,241	$ 178,707
Sep	$ 53,426	$ 17,950	$ 18,276	$ 69,701	$ 145,752
Oct	$ 48,910	$ 17,138	$ 17,214	$ 72,079	$ 73,735
Nov	$ 50,222	$ 17,618	$ 16,869	$ 76,202	$ 59,184
Dec	$ 49,614	$ 17,909	$ 16,396	$ 75,695	$ 55,058
Jan	$ 49,685	$ 18,552	$ 16,915	$ 76,627	$ 42,011
Feb	$ 41,540	$ 15,592	$ 13,804	$ 62,690	$ 39,057
Mar	$ 49,333	$ 18,056	$ 16,494	$ 74,164	$ 51,697
Apr	$ 50,941	$ 18,020	$ 16,446	$ 75,351	$ 60,219
May	$ 50,999	$ 17,685	$ 16,814	$ 73,850	$ 79,454
June	$ 53,439	$ 17,966	$ 17,834	$ 74,772	$ 118,569
July	$ 61,304	$ 20,454	$ 20,877	$ 76,692	$ 164,594
Aug	$ 55,192	$ 19,201	$ 19,030	$ 69,391	$ 154,116
Sep	$ 53,483	$ 18,485	$ 19,296	$ 72,747	$ 142,734
Oct	$ 51,253	$ 18,233	$ 19,031	$ 79,138	$ 71,122
Nov	$ 46,729	$ 16,723	$ 15,836	$ 67,273	$ 53,468
Dec	$ 50,980	$ 19,596	$ 16,515	$ 75,025	$ 53,378
Jan	$ 46,954	$ 19,011	$ 16,576	$ 71,386	$ 50,488
Feb	$ 46,838	$ 18,239	$ 17,015	$ 70,105	$ 51,084
Mar	$ 45,838	$ 17,851	$ 16,358	$ 67,787	$ 44,207
	$ 608,352	$ 218,521	$ 210,863	$ 873,630	$ 1,035,093

CITY WATER	Labor & Industry	Health & Welfare	North Office	Capitol East Wing	Central Plant
VARIABLE BILLING $	VARIABLE payment $	VARIABLE payment $	VARIABLE payment $	VARIABLE payment $	VARIABLE payment $
Nov	$ 1,190	$ 925	$ -	$ 3,933	$ 1,553
Dec	$ 1,653	$ 1,223	$ -	$ 3,933	$ 99
Jan	$ 1,544	$ 1,723	$ 359	$ 4,272	$ 108
Feb	$ 1,831	$ 1,400	$ 431	$ 4,272	$ 1,005
Mar	$ 2,019	$ 1,514	$ 399	$ 3,560	$ 7,429
Apr	$ 2,863	$ 2,630	$ 521	$ 3,647	$ 2,932
May	$ 1,828	$ 1,574	$ 319	$ 3,556	$ 20,045
June	$ 1,824	$ 1,197	$ 239	$ 3,457	$ 30,884
July	$ 2,305	$ 1,453	$ 359	$ 3,842	$ 28,294
Aug	$ 1,913	$ 1,435	$ 319	$ 4,238	$ 25,703
Sep	$ 2,311	$ 1,714	$ 359	$ 4,306	$ 17,056
Oct	$ 1,833	$ 1,435	$ 279	$ 4,303	$ 4,981
Nov	$ 1,753	$ 1,395	$ 319	$ 4,267	$ 3,706
Dec	$ 2,072	$ 1,674	$ 359	$ 4,227	$ 996
Jan	$ 1,864	$ 1,647	$ 347	$ 5,612	$ 4,162
Feb	$ 1,994	$ 1,604	$ 390	$ 1,833	$ 3,815
Mar	$ 2,601	$ 1,951	$ 390	$ 2,073	$ 7,543
Apr	$ 2,298	$ 1,691	$ 434	$ 7,686	$ 10,187
May	$ 2,124	$ 1,647	$ 303	$ 5,509	$ 19,161
June	$ 2,298	$ 2,037	$ 434	$ 4,996	$ 32,079
July	$ 1,907	$ 1,474	$ 303	$ 2,622	$ 35,590
Aug	$ 2,254	$ 1,994	$ 347	$ 6,450	$ 33,033
Sep	$ 2,904	$ 2,341	$ 434	$ 111,666	$ 25,143
Oct	$ 1,214	$ 1,257	$ 390	$ 3,764	$ 7,326
Nov	$ 1,691	$ 1,517	$ 372	$ 650	$ 7,673
Dec	$ 1,907	$ 1,431	$ 755	$ 1,040	$ 4,855
Jan	$ 1,431	$ 564	$ 347	$ 1,257	$ 5,722
	$ 23,745	$ 18,865	$ 4,225	$ 93,765	$ 151,591

SEWAGE	Labor & Industry	Health & Welfare	North Office	Capitol East Wing	Central Plant
VARIABLE BILLING $	VARIABLE payment $	VARIABLE payment $	VARIABLE payment $	VARIABLE payment $	VARIABLE payment $
Nov	$ 1,089	$ 847	$ -	$ 3,600	$ 647
Dec	$ 1,513	$ 1,119	$ -	$ 3,600	$ 85
Jan	$ 1,301	$ 1,452	$ 303	$ 3,600	$ 61
Feb	$ 1,543	$ 1,180	$ 363	$ 3,600	$ 823
Mar	$ 1,333	$ 999	$ 263	$ 2,349	$ 3,051
Apr	$ 1,889	$ 1,736	$ 344	$ 2,407	$ 736
May	$ 1,207	$ 1,039	$ 210	$ 2,347	$ 10,131
June	$ 1,204	$ 790	$ 158	$ 2,282	$ 17,190
July	$ 1,521	$ 959	$ 237	$ 2,535	$ 15,990
Aug	$ 1,262	$ 947	$ 210	$ 2,797	$ 14,575
Sep	$ 1,525	$ 1,131	$ 237	$ 2,842	$ 8,716
Oct	$ 1,210	$ 947	$ 184	$ 2,840	$ 1,988
Nov	$ 1,157	$ 921	$ 210	$ 2,816	$ 1,289
Dec	$ 1,368	$ 1,105	$ 237	$ 2,790	$ 247
Jan	$ 1,131	$ 999	$ 210	$ 3,404	$ 1,667
Feb	$ 1,210	$ 973	$ 237	$ 1,112	$ 936
Mar	$ 1,578	$ 1,184	$ 237	$ 1,257	$ 2,346
Apr	$ 1,394	$ 1,026	$ 263	$ 4,663	$ 4,113
May	$ 1,289	$ 999	$ 184	$ 3,342	$ 9,005
June	$ 1,394	$ 1,236	$ 263	$ 3,031	$ 15,885
July	$ 1,157	$ 894	$ 184	$ 1,590	$ 20,330
Aug	$ 1,368	$ 1,210	$ 210	$ 3,913	$ 19,194
Sep	$ 1,762	$ 1,420	$ 263	$ 67,747	$ 13,471
Oct	$ 736	$ 763	$ 237	$ 2,283	$ 4,445
Nov	$ 1,026	$ 921	$ 226	$ 395	$ 2,846
Dec	$ 1,157	$ 868	$ 458	$ 631	$ 2,330
Jan	$ 937	$ 369	$ 227	$ 824	$ 2,346
	$ 15,671	$ 12,459	$ 2,736	$ 59,821	$ 77,530

STEAM	Labor & Industry	Health & Welfare	North Office	Capitol East Wing	Central Plant
VARIABLE BILLING $	VARIABLE payment $	VARIABLE payment $	VARIABLE payment $	VARIABLE payment $	VARIABLE payment $
Jan	$ 57,080	$ 26,772	$ 58,907	$ 98,963	$ -
Feb	$ 86,967	$ 40,740	$ 92,048	$ 154,640	$ -
Mar	$ 46,119	$ 22,940	$ 55,152	$ 92,655	$ -
Apr	$ 21,776	$ 13,645	$ 35,586	$ 59,784	$ -
May	$ 10,741	$ 6,883	$ 18,622	$ 31,285	$ -
June	$ 9,766	$ 6,786	$ 14,335	$ 24,082	$ -
July	$ 9,970	$ 6,233	$ 15,081	$ 25,337	$ -
Aug	$ 7,644	$ 6,691	$ 15,365	$ 25,814	$ -
Sep	$ 9,903	$ 6,426	$ 16,684	$ 28,028	$ -
Oct	$ 14,233	$ 8,072	$ 18,843	$ 31,657	$ -
Nov	$ 16,891	$ 9,410	$ 24,077	$ 40,450	$ -
Dec	$ 24,421	$ 14,552	$ 37,383	$ 62,804	$ -
Jan	$ 43,446	$ 24,045	$ 42,272	$ 71,017	$ -
Feb	$ 37,364	$ 21,056	$ 39,883	$ 67,003	$ -
Mar	$ 24,951	$ 15,475	$ 36,057	$ 60,576	$ -
Apr	$ 19,934	$ -	$ 28,654	$ 48,138	$ -
May	$ 13,237	$ -	$ 22,856	$ 38,398	$ -
June	$ 11,472	$ -	$ 15,667	$ 26,321	$ -
July	$ 10,043	$ -	$ 12,765	$ 21,445	$ -
Aug	$ 11,236	$ 5,508	$ 13,404	$ 22,518	$ -
Sep	$ 10,859	$ 6,324	$ 17,029	$ 28,609	$ -
Oct	$ 11,547	$ 5,879	$ 21,788	$ 36,603	$ -
Nov	$ 21,521	$ 11,998	$ 32,940	$ 55,340	$ -
Dec	$ 38,402	$ 20,133	$ 48,015	$ 80,665	$ -
Jan	$ 37,895	$ 20,520	$ 49,222	$ 82,693	$ -
Feb	$ 35,609	$ 20,340	$ 45,434	$ 76,330	$ -
Mar	$ 43,652	$ 24,081	$ 50,474	$ 84,796	$ -
	$ 305,189	$ 153,115	$ 390,463	$ 655,977	$ -

Overview of Site Utilities

Capitol CHW Plant

UTILITY EXPENSE

Compilation of Utility Expenses

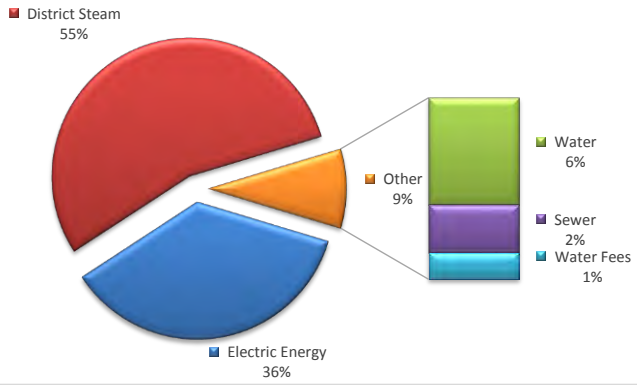
Aggregate Expenses[1] and Fixed Fees[2]	annual expense	annual $ / sf
Energy / Demand		
Electric Energy	$ 1,036,671	$ 39.76
Electric Power	$ -	$ -
District Steam	$ 1,564,232	$ 59.99
Water	$ 157,323	$ 6.03
Sewer	$ 69,961	$ 2.68
Fixed Charges / Fees		
Water Fees	$ 38,424	$ 1.47
Total Charges	$ 2,866,610	$ 109.93

[1] Based on most-recent rates from utility profile except as noted otherwise.

[2] Fees shown represent fixed monthly charges independent of consumption.

Capitol CHW Plant

Comparison of Utility Expenses



SITE UTILITIES

Annual Energy / Demand

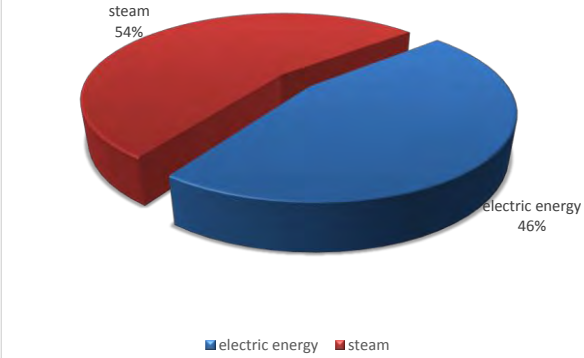
	Usage & Demand: annualized consumption	mmBtu / yr	Btu / sf / yr
electric energy	14,971,542 kWh	51,083	1,959,001
electric power demand	91,172 kW	n/a	n/a
steam	60,728 mlb	60,728	2,328,884
total energy:		111,811	4,287,885

Annual Water & Sewer

	Annualized Volume: use kgal	minimum kgal / mo	index
water	18,146		696 gal / sf / yr
sewer	14,694		563 gal / sf / yr
net water volume:	18,146		696 gal / sf / yr

Capitol CHW Plant

Utilities - Energy Only



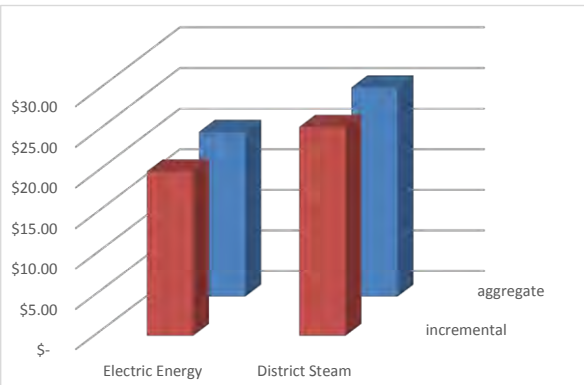
UTILITY EXPENSES

Aggregate vs Incremental Utility Charges	Cost & Rate Compilations: Unit Expense Rates[1] aggregate	incremental[2]		Rate in $ / mmBtu: aggregate	increment[2]
Electric Energy	$ 0.069	$ 0.069	per kWh	$ 20.29	$ 20.29
Electric Power	n/a	$ -	per kW	n/a	n/a
District Steam	$ 25.76	$ 25.52	per mlb	$ 25.76	$ 25.76
Water	$ 9.95	$ 8.67	per kgal		
Sewer	$ 5.27	$ 5.68	per kgal		

Incremental expense rates represent net avoidance potential. Excludes fixed cost and costs from lower consumption thresholds .

Capitol CHW Plant

Comparison of Energy Cost Rates



Tabulation of Utility Profiles

Capitol CHW Plant

ELECTRICITY RECORDS — PPL

	billing period			baseline	energy	demand	kVA	total bill amount ($)		aggregate	re-calculate charges ($) at current rates					incremental costs	
	mo / yr	start	days		kWh	kW	adjust	broker	LDC	$ / kWh	demand	kVAr / kVArh	LDC kWh	broker kWh	service fee	$ / kW	$ / kWh
FY 14-15	Jan-15	01/01/15	31	1	660,704	3,154		$45,749		$0.0692	$0	$0	$45,749	$0	$0.00	$0.00	$0.0692
	Feb-15	02/01/15	28	1	724,067	2,693		$50,136		$0.0692	$0	$0	$50,136	$0	$0.00	$0.00	$0.0692
	Mar-15	03/01/15	31	1	710,712	5,038		$49,212		$0.0692	$0	$0	$49,212	$0	$0.00	$0.00	$0.0692
	Apr-15	04/01/15	30	1	817,848	6,839		$56,630		$0.0692	$0	$0	$56,630	$0	$0.00	$0.00	$0.0692
	May-15	05/01/15	31	1	1,607,073	8,992		$111,278		$0.0692	$0	$0	$111,278	$0	$0.00	$0.00	$0.0692
	Jun-15	06/01/15	30	1	1,918,207	10,199		$132,822		$0.0692	$0	$0	$132,822	$0	$0.00	$0.00	$0.0692
FY 15-16	Jul-15	07/01/15	31	1	2,808,971	13,078		$194,501		$0.0692	$0	$0	$194,501	$0	$0.00	$0.00	$0.0692
	Aug-15	08/01/15	31	1	2,580,871	15,988		$178,707		$0.0692	$0	$0	$178,707	$0	$0.00	$0.00	$0.0692
	Sep-15	09/01/15	30	1	2,104,942	12,704		$145,752		$0.0692	$0	$0	$145,752	$0	$0.00	$0.00	$0.0692
	Oct-15	10/01/15	31	1	1,064,871	10,384		$73,735		$0.0692	$0	$0	$73,735	$0	$0.00	$0.00	$0.0692
	Nov-15	11/01/15	30	1	854,739	3,688		$59,184		$0.0692	$0	$0	$59,184	$0	$0.00	$0.00	$0.0692
	Dec-15	12/01/15	31	1	795,145	6,350		$55,058		$0.0692	$0	$0	$55,058	$0	$0.00	$0.00	$0.0692
	Jan-16	01/01/16	31	1	606,715	5,682		$42,011		$0.0692	$0	$0	$42,011	$0	$0.00	$0.00	$0.0692
	Feb-16	02/01/16	28	1	564,055	4,891		$39,057		$0.0692	$0	$0	$39,057	$0	$0.00	$0.00	$0.0692
	Mar-16	02/29/16	31	1	746,606	5,995		$51,697		$0.0692	$0	$0	$51,697	$0	$0.00	$0.00	$0.0692
	Apr-16	03/31/16	30	1	869,678	6,051		$60,219		$0.0692	$0	$0	$60,219	$0	$0.00	$0.00	$0.0692
	May-16	04/30/16	31	1	1,147,463	7,436		$79,454		$0.0692	$0	$0	$79,454	$0	$0.00	$0.00	$0.0692
	Jun-16	05/31/16	30	1	1,712,364	7,554		$118,569		$0.0692	$0	$0	$118,569	$0	$0.00	$0.00	$0.0692
FY 16-17	Jul-16	06/30/16	31	1	2,377,059	7,628		$164,594		$0.0692	$0	$0	$164,594	$0	$0.00	$0.00	$0.0692
	Aug-16	07/31/16	31	1	2,225,731	9,675		$154,116		$0.0692	$0	$0	$154,116	$0	$0.00	$0.00	$0.0692
	Sep-16	08/31/16	30	1	2,061,352	12,916		$142,734		$0.0692	$0	$0	$142,734	$0	$0.00	$0.00	$0.0692
	Oct-16	09/30/16	31	1	1,027,145	8,028		$71,122		$0.0692	$0	$0	$71,122	$0	$0.00	$0.00	$0.0692
	Nov-16	10/31/16	30	1	772,180	7,347		$53,468		$0.0692	$0	$0	$53,468	$0	$0.00	$0.00	$0.0692
	Dec-16	11/30/16	31	1	770,879	5,739		$53,378		$0.0692	$0	$0	$53,378	$0	$0.00	$0.00	$0.0692
	Jan-17	12/31/16	31	1	729,138	5,467		$50,488		$0.0692	$0	$0	$50,488	$0	$0.00	$0.00	$0.0692
	Feb-17	01/31/17	28	1	737,749	5,773		$51,084		$0.0692	$0	$0	$51,084	$0	$0.00	$0.00	$0.0692
	Mar-17	02/28/17	31	1	638,434	5,849		$44,207		$0.0692	$0	$0	$44,207	$0	$0.00	$0.00	$0.0692
6	months		181	na	6,438,611	36,915	0	$445,827	$0	$0.0692							
12	months		365	na	15,856,420	99,801	0	$1,097,942	$0	$0.0692							
9	months		274	na	11,339,667	68,422	0	$785,190	$0	$0.0692	$0	$0	$785,190	$0	$0	$0.000	$0.0692
12	months		365	#2/...	14,971,542	91,172	0	$1,036,671	$0	$0.0692	$0	$0	$1,036,671	$0	$0	$0.000	$0.0692
	annual rates:				1,959,001	Btu / sf			$ 39.76	/ sf	$ -	$ -	$ 0.0692	$ -	$ -	← average	

WATER RECORDS — Capitol Region Water

	billing period			baseline	1 & 2	mtr 1	mtr 2	total bill amount ($)		aggregate	re-calculate charges ($) at current rates				total	fixed	marginal
	mo / yr	start	days		kgal	kgal	kgal	municipality	supplier	$ / kgal	bin 1 kgal	bin 2 kgal	bin 3 kgal	bin 4 kgal	water $	fee $	$ / kgal
FY 14-15	Nov-14	11/01/14	30	1	235	235		$ 3,692		$ 16	235	0	0		$2,037	$3,202	$8.67
	Dec-14	12/01/14	31	1	15	15		$ 2,238		$ 149	15	0	0		$130	$3,202	$8.67
	Jan-15	01/01/15	31	1	15	15		$ 2,430		$ 162	15	0	0		$130	$3,202	$8.67
	Feb-15	02/01/15	28	1	140	140		$ 3,327		$ 24	140	0	0		$1,214	$3,202	$8.67
	Mar-15	03/01/15	31	1	932	932		$ 9,751		$ 10	932	0	0		$8,081	$3,202	$8.67
	Apr-15	04/01/15	30	1	368	368		$ 5,254		$ 14	368	0	0		$3,190	$3,202	$8.67
	May-15	05/01/15	31	1	2,515	2,515		$ 22,367		$ 9	2,515	0	0		$21,805	$3,202	$8.67
	Jun-15	06/01/15	30	1	3,875	3,875		$ 33,206		$ 9	3,875	0	0		$33,596	$3,202	$8.67
FY 15-16	Jul-15	07/01/15	31	1	3,550	3,550		$ 30,616		$ 9	3,550	0	0		$30,779	$3,202	$8.67
	Aug-15	08/01/15	31	1	3,225	3,225		$ 28,025		$ 9	3,225	0	0		$27,961	$3,202	$8.67
	Sep-15	09/01/15	30	1	2,140	2,140		$ 19,378		$ 9	2,140	0	0		$18,554	$3,202	$8.67
	Oct-15	10/01/15	31	1	625	625		$ 7,303		$ 12	625	0	0		$5,419	$3,202	$8.67
	Nov-15	11/01/15	30	1	465	465		$ 6,028		$ 13	465	0	0		$4,032	$3,202	$8.67
	Dec-15	12/01/15	31	1	125	125		$ 3,318		$ 27	125	0	0		$1,084	$3,202	$8.67
	Jan-16	01/01/16	31	1	480	480		$ 6,709		$ 14	480	0	0		$4,162	$3,202	$8.67
	Feb-16	02/01/16	28	1	440	440		$ 6,362		$ 14	440	0	0		$3,815	$3,202	$8.67
	Mar-16	02/29/16	31	1	870	870		$ 10,090		$ 12	870	0	0		$7,543	$3,202	$8.67
	Apr-16	03/31/16	30	1	1,175	1,175		$ 12,734		$ 11	1,175	0	0		$10,187	$3,202	$8.67
	May-16	04/30/16	31	1	2,210	2,210		$ 21,708		$ 10	2,210	0	0		$19,161	$3,202	$8.67
	Jun-16	05/31/16	30	1	3,700	3,700		$ 34,626		$ 9	3,700	0	0		$32,079	$3,202	$8.67
FY 16-17	Jul-16	06/30/16	31	1	4,105	4,105		$ 38,137		$ 9	4,105	0	0		$35,590	$3,202	$8.67
	Aug-16	07/31/16	31	1	3,810	3,810		$ 35,580		$ 9	3,810	0	0		$33,033	$3,202	$8.67
	Sep-16	08/31/16	30	1	2,900	2,900		$ 27,690		$ 10	2,900	0	0		$25,143	$3,202	$8.67
	Oct-16	09/30/16	31	1	845	845		$ 9,873		$ 12	845	0	0		$7,326	$3,202	$8.67
	Nov-16	10/31/16	30	1	885	885		$ 10,220		$ 12	885	0	0		$7,673	$3,202	$8.67
	Dec-16	11/30/16	31	1	560	560		$ 7,402		$ 13	560	0	0		$4,855	$3,202	$8.67
	Jan-17	12/31/16	31	1	660	660		$ 8,568		$ 13	660	0	0		$5,722	$3,202	$8.67
			242	na	8,095	8,095	0	$ 82,265	$ -		100,000						
			365	na	19,005	19,005	0	$ 186,896	$ -	$ 9.83							
			215	na	13,765	13,765	0	$ 137,471	$ -	$ 9.99	13,765	0	0	0	$ 119,343	$22,414	$8.67
			365	#2/...	18,146	18,146	0	$ 180,560	$ -	$ 9.95	18,146	0	0	0	$ 157,323	$38,424	$8.67
	annual rates:				696	gal / sf			$ 6.92	/ sf	$ 8.670					$ 3,202	$8.67

Tabulation of Utility Profiles

Capitol CHW Plant

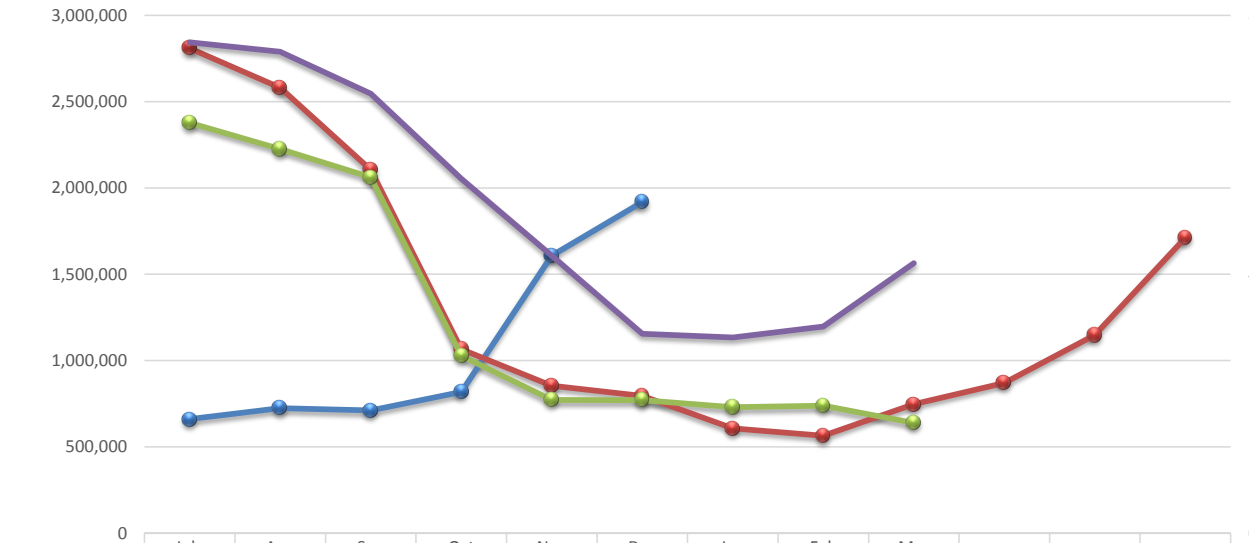
SEWER RECORDS — Capitol Region Water

	billing period			baseline	sewage			total bill amount ($)		aggregate	re-calculate charges ($) at current rates			total	fixed	marginal
	mo / yr	start	days		kgal			municipality	processor	$ / kgal	bin 1 kgal	bin 2 kgal		sewage $	fee $	$ / kgal
FY 14-15	Nov-14	11/01/14	30	1	107	107		$ 647		$ 6.1	107	0				
	Dec-14	12/01/14	31	1	14	14		$ 85		$ 6.1	14	0		$80	$0	$5.68
	Jan-15	01/01/15	31	1	10	10		$ 61		$ 6.1	10	0		$57	$0	$5.68
	Feb-15	02/01/15	28	1	136	136		$ 823		$ 6.1	136	0		$772	$0	$5.68
	Mar-15	03/01/15	31	1	580	580		$ 3,051		$ 5.3	580	0		$3,295	$0	$5.68
	Apr-15	04/01/15	30	1	140	140		$ 736		$ 5.3	140	0		$795	$0	$5.68
	May-15	05/01/15	31	1	1,926	1,926		$ 10,131		$ 5.3	1,926	0		$10,940	$0	$5.68
	Jun-15	06/01/15	30	1	3,268	3,268		$ 17,190		$ 5.3	3,268	0		$18,562	$0	$5.68
FY 15-16	Jul-15	07/01/15	31	1	3,040	3,040		$ 15,990		$ 5.3	3,040	0		$17,267	$0	$5.68
	Aug-15	08/01/15	31	1	2,771	2,771		$ 14,575		$ 5.3	2,771	0		$15,739	$0	$5.68
	Sep-15	09/01/15	30	1	1,657	1,657		$ 8,716		$ 5.3	1,657	0		$9,412	$0	$5.68
	Oct-15	10/01/15	31	1	378	378		$ 1,988		$ 5.3	378	0		$2,147	$0	$5.68
	Nov-15	11/01/15	30	1	245	245		$ 1,289		$ 5.3	245	0		$1,392	$0	$5.68
	Dec-15	12/01/15	31	1	47	47		$ 247		$ 5.3	47	0		$267	$0	$5.68
	Jan-16	01/01/16	31	1	317	317		$ 1,667		$ 5.3	317	0		$1,801	$0	$5.68
	Feb-16	02/01/16	28	1	178	178		$ 936		$ 5.3	178	0		$1,011	$0	$5.68
	Mar-16	02/29/16	31	1	446	446		$ 2,346		$ 5.3	446	0		$2,533	$0	$5.68
	Apr-16	03/31/16	30	1	782	782		$ 4,113		$ 5.3	782	0		$4,442	$0	$5.68
	May-16	04/30/16	31	1	1,712	1,712		$ 9,005		$ 5.3	1,712	0		$9,724	$0	$5.68
	Jun-16	05/31/16	30	1	3,020	3,020		$ 15,885		$ 5.3	3,020	0		$17,154	$0	$5.68
FY 16-17	Jul-16	06/30/16	31	1	3,865	3,865		$ 20,330		$ 5.3	3,865	0		$21,953	$0	$5.68
	Aug-16	07/31/16	31	1	3,649	3,649		$ 19,194		$ 5.3	3,649	0		$20,726	$0	$5.68
	Sep-16	08/31/16	30	1	2,561	2,561		$ 13,471		$ 5.3	2,561	0		$14,546	$0	$5.68
	Oct-16	09/30/16	31	1	845	845		$ 4,445		$ 5.3	845	0		$4,800	$0	$5.68
	Nov-16	10/31/16	30	1	541	541		$ 2,846		$ 5.3	541	0		$3,073	$0	$5.68
	Dec-16	11/30/16	31	1	443	443		$ 2,330		$ 5.3	443	0		$2,516	$0	$5.68
	Jan-17	12/31/16	31	1	413	413		$ 2,346		$ 5.7	413	0		$2,346	$0	$5.68
			242	na	6,181	6,181	0	$ 32,723	$ -	$ 5.294	100,000					
			365	na	14,593	14,593	0	$ 76,759	$ -	$ 5.26						
			215	na	12,317	12,317	0	$ 64,961	$ -	$ 5.27	12,317	0		$ 69,961	$0	
			365	[illegible]	14,694			$ 77,460	$ -	$ 5.27	12,317	0		$ 69,961	$0	$5.68
		annual rates:			563.5	gal / sf			$ 2.97	/ sf	$ 5.68				$ -	$5.68

DISTRICT STEAM RECORDS — LDC: NRG — Commodity: ---

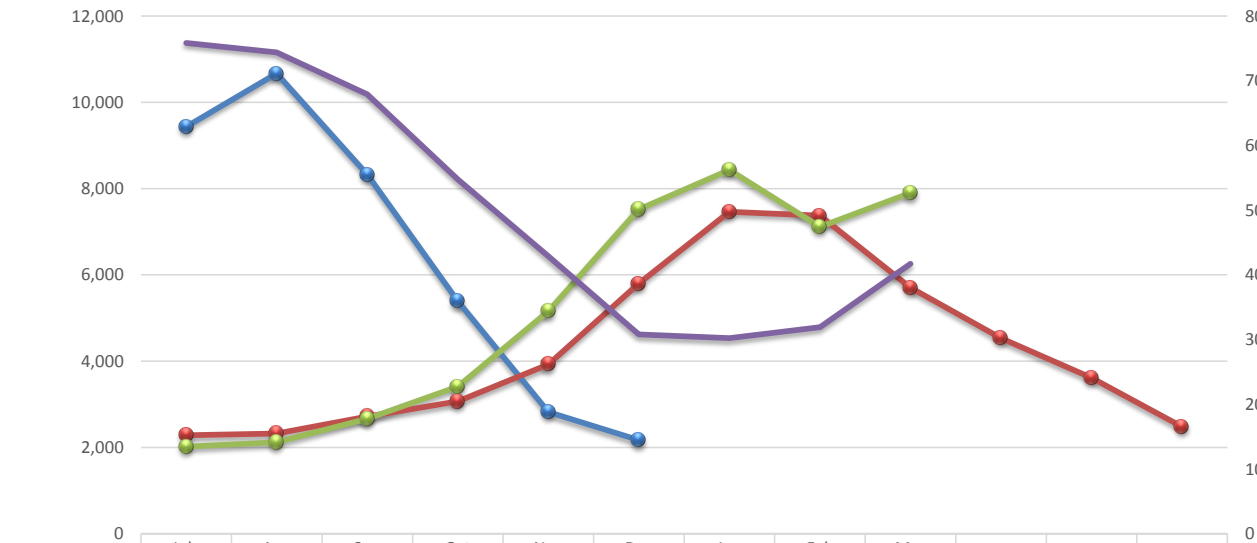
	billing period			baseline	energy	demand		total bill amount ($)		aggregate	re-calculate charges ($) at current rates					incremental costs	
	mo / yr	start	days		mlb	pk mlb		base	EA	$ / mlb	demand		base mlb	EA mlb	service fee	$ / pk mlb	$ / mlb
FY 14-15	Jan-15	01/01/15	31	1	9,435			$235,626		$24.97	$0	$0	$240,828	$0	$0	$0.00	$25.52
	Feb-15	02/01/15	28	1	10,668			$368,191		$34.51	$0	$0	$272,301	$0	$0	$0.00	$25.52
	Mar-15	03/01/15	31	1	8,330			$220,608		$26.48	$0	$0	$212,623	$0	$0	$0.00	$25.52
	Apr-15	04/01/15	30	1	5,387			$142,343		$26.42	$0	$0	$137,503	$0	$0	$0.00	$25.52
	May-15	05/01/15	31	1	2,819			$74,488		$26.42	$0	$0	$71,955	$0	$0	$0.00	$25.52
	Jun-15	06/01/15	30	1	2,170			$57,339		$26.42	$0	$0	$55,389	$0	$0	$0.00	$25.52
FY 15-16	Jul-15	07/01/15	31	1	2,283			$60,325		$26.42	$0	$0	$58,274	$0	$0	$0.00	$25.52
	Aug-15	08/01/15	31	1	2,326			$61,461		$26.42	$0	$0	$59,371	$0	$0	$0.00	$25.52
	Sep-15	09/01/15	30	1	2,719			$66,734		$24.54	$0	$0	$69,402	$0	$0	$0.00	$25.52
	Oct-15	10/01/15	31	1	3,071			$75,373		$24.54	$0	$0	$78,387	$0	$0	$0.00	$25.52
	Nov-15	11/01/15	30	1	3,924			$96,309		$24.54	$0	$0	$100,160	$0	$0	$0.00	$25.52
	Dec-15	12/01/15	31	1	5,799			$149,532		$25.79	$0	$0	$148,019	$0	$0	$0.00	$25.52
	Jan-16	01/01/16	31	1	7,462			$169,088		$22.66	$0	$0	$190,467	$0	$0	$0.00	$25.52
	Feb-16	02/01/16	28	1	7,372			$159,530		$21.64	$0	$0	$188,170	$0	$0	$0.00	$25.52
	Mar-16	02/29/16	31	1	5,703			$144,229		$25.29	$0	$0	$145,569	$0	$0	$0.00	$25.52
	Apr-16	03/31/16	30	1	4,532			$114,614		$25.29	$0	$0	$115,679	$0	$0	$0.00	$25.52
	May-16	04/30/16	31	1	3,615			$91,423		$25.29	$0	$0	$92,273	$0	$0	$0.00	$25.52
	Jun-16	05/31/16	30	1	2,478			$62,668		$25.29	$0	$0	$63,251	$0	$0	$0.00	$25.52
FY 16-17	Jul-16	06/30/16	31	1	2,019			$51,061		$25.29	$0	$0	$51,535	$0	$0	$0.00	$25.52
	Aug-16	07/31/16	31	1	2,120			$53,615		$25.29	$0	$0	$54,113	$0	$0	$0.00	$25.52
	Sep-16	08/31/16	30	1	2,666			$68,116		$25.55	$0	$0	$68,050	$0	$0	$0.00	$25.52
	Oct-16	09/30/16	31	1	3,411			$87,151		$25.55	$0	$0	$87,066	$0	$0	$0.00	$25.52
	Nov-16	10/31/16	30	1	5,157			$131,761		$25.55	$0	$0	$131,632	$0	$0	$0.00	$25.52
	Dec-16	11/30/16	31	1	7,517			$192,059		$25.55	$0	$0	$191,871	$0	$0	$0.00	$25.52
	Jan-17	12/31/16	31	1	8,432			$196,887		$23.35	$0	$0	$215,227	$0	$0	$0.00	$25.52
	Feb-17	01/31/17	28	1	7,113			$181,737		$25.55	$0	$0	$181,559	$0	$0	$0.00	$25.52
	Mar-17	02/28/17	31	1	7,902			$201,896		$25.55	$0	$0	$201,698	$0	$0	$0.00	$25.52
6	months		365	na	38,809	0	0	$ 1,098,595	$ -	$ 28.31							
12	months		365	na	51,284	0	0	$ 1,251,287	$ -	$ 24.40							
9	months		365	na	46,337	0	0	$ 1,164,282	$ -	$ 25.13	$ -	$ -	$ 1,182,751	$ -	$ -	$ -	$ 25.52
12	months		365	[illegible]	60,728	0	0	$ 1,564,232	$ -	$ 25.76	$ -	$ -	$ 1,550,081	$ -	$ -	$ -	$ 25.52
		annual rates:			2,328,884	Btu / sf			$ 59.99	/ sf			$ 25.525				

Capitol CHW Plant **Electricity (kWh) vs Outdoor Temperature (˚F)**



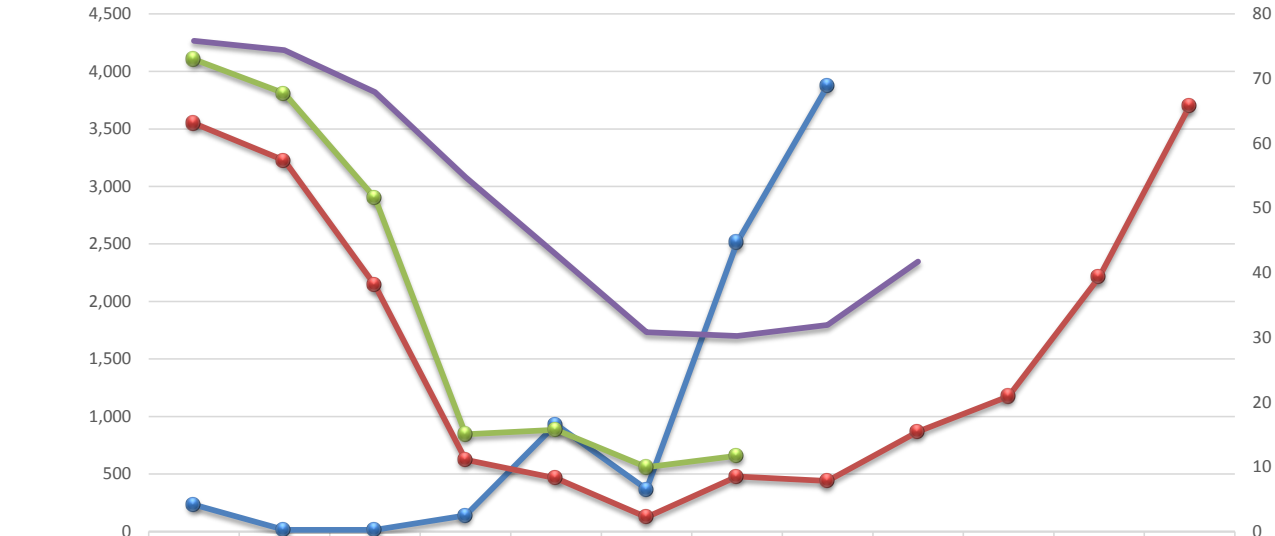
	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar			
2014-2015	660,704	724,067	710,712	817,848	1,607,073	1,918,207						
2015-2016	2,808,971	2,580,871	2,104,942	1,064,871	854,739	795,145	606,715	564,055	746,606	869,678	1,147,463	1,712,364
2016-2017	2,377,059	2,225,731	2,061,352	1,027,145	772,180	770,879	729,138	737,749	638,434			
OAT (˚F)	76	74	68	55	43	31	30	32	42			

Capitol CHW Plant **Steam (MLB) vs Outdoor Temperature (˚F)**



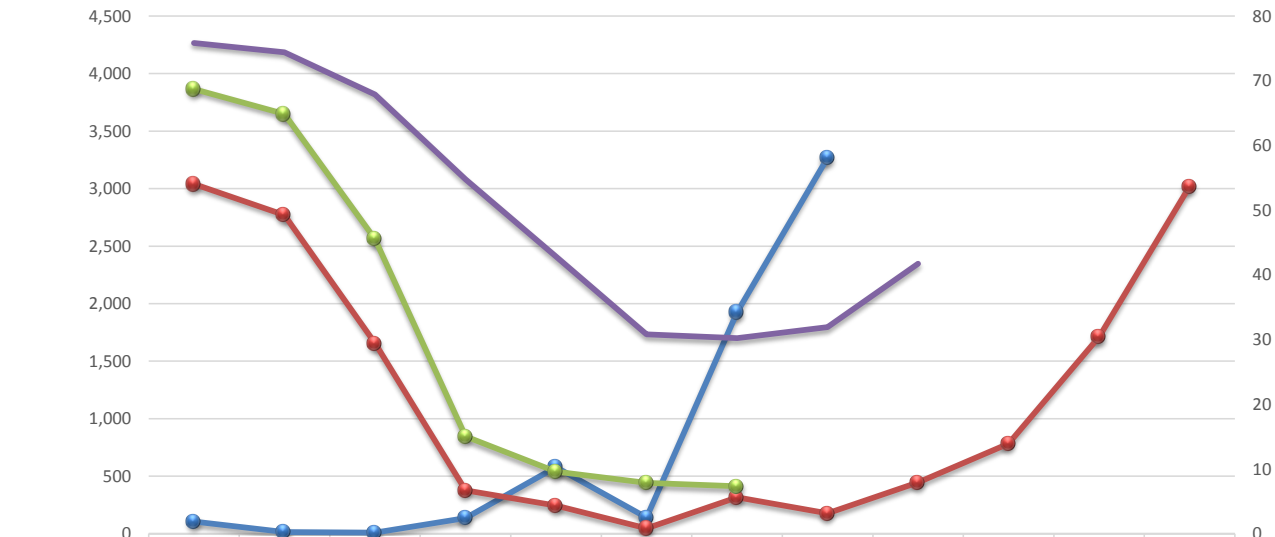
	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar			
2014-2015	9,435	10,668	8,330	5,387	2,819	2,170						
2015-2016	2,283	2,326	2,719	3,071	3,924	5,799	7,462	7,372	5,703	4,532	3,615	2,478
2016-2017	2,019	2,120	2,666	3,411	5,157	7,517	8,432	7,113	7,902			
OAT (˚F)	76	74	68	55	43	31	30	32	42			

Capitol CHW Plant **Public Water vs Outdoor Temperature (˚F)**



	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar			
2014-2015	235	15	15	140	932	368	2,515	3,875				
2015-2016	3,550	3,225	2,140	625	465	125	480	440	870	1,175	2,210	3,700
2016-2017	4,105	3,810	2,900	845	885	560	660					
OAT (˚F)	76	74	68	55	43	31	30	32	42			

Capitol CHW Plant **Sewage vs Outdoor Temperature (˚F)**



	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar			
2014-2015	107	14	10	136	580	140	1,926	3,268				
2015-2016	3,040	2,771	1,657	378	245	47	317	178	446	782	1,712	3,020
2016-2017	3,865	3,649	2,561	845	541	443	413					
OAT (˚F)	76	74	68	55	43	31	30	32	42			

Estimate of Utilities **EXISTING CONDITIONS** **Capitol CHW Plant**

Zone 1: General Operations		CALCULATION OF OPERATING HOURS BY ZONE						ADJUST VENTILATION - DEMAND CONTROL (CO2 DCV)					
		OCCUPIED (OCC) SEQUENCE			UNOCCUPIED (UNO) SEQUENCE			OCCUPIED (OCC) SEQUENCE			UNOCCUPIED (UNO) SEQUENCE		
	dy / wk	0 - 8	8 - 16	16 - 24	0 - 8	8 - 16	16 - 24	0 - 8	8 - 16	16 - 24	0 - 8	8 - 16	16 - 24
weekdays	5.0	2.0	8.0	2.0	6.0	0.0	6.0	100%	100%	100%	100%	100%	100%
Saturday	1.0	0.0	0.0	0.0	8.0	8.0	8.0	100%	100%	100%	100%	100%	100%
Sunday	1.0	0.0	0.0	0.0	8.0	8.0	8.0	100%	100%	100%	100%	100%	100%
subtotals:		10.0	40.0	10.0	46.0	16.0	46.0	100%	100%	100%	100%	100%	100%
percentage hours:		18%	71%	18%	82%	29%	82%	18%	71%	18%	82%	29%	82%

Weather Station: Harrisburg, PA 14751							Specifics - Moist Air		Zone Hours		DCV Adjustment		Solar Impact - SOL-AIR OA Temperature (˚F)				
Outdoor Air (OA) temp. (˚F)			enthalpy	TMY2 occurrences - duration (hr)			humidity	volume	Operations (hr / yr)		% of Design OA Min		assume rise in air temperature due to solar impact (˚F)				
range	average	MCWB	Btu/lb	0 - 8	8 - 16	16 - 24	W (gr / lb)	V (cf / lb)	OCC SEQ	UNO SEQ	OCC SEQ	UNO SEQ	0 - 8	8 - 16	16 - 24	OCC SEQ	UNO SEQ
95 / 99	97.5	76.0	39.7	0	16	0	103.5	13.6	11	5	100%	100%	0	28	7	28	28
90 / 94	92.5	74.0	37.9	0	28	11	99.4	13.5	22	17	100%	100%	0	26	7	24	16
85 / 89	87.5	72.9	36.8	0	113	46	100.6	13.5	89	70	100%	100%	0	24	6	23	14
80 / 84	82.5	69.2	33.6	7	309	144	87.8	13.4	248	212	100%	100%	0	22	5	21	12
75 / 79	77.5	67.9	32.6	114	259	238	89.2	13.4	248	363	100%	100%	0	21	5	16	7
70 / 74	72.5	64.7	30.0	165	202	236	80.9	13.3	216	387	100%	100%	0	19	4	13	5
65 / 69	67.5	61.1	27.4	321	231	246	71.6	13.2	266	532	100%	100%	0	17	4	11	3
60 / 64	62.5	56.9	24.5	306	221	296	61.0	13.1	265	558	100%	100%	0	15	3	9	3
55 / 59	57.5	51.6	21.2	249	199	221	48.0	12.9	226	443	100%	100%	0	13	2	9	3
50 / 54	52.5	47.0	18.8	215	202	204	39.9	12.8	219	402	100%	100%	0	11	2	8	2
45 / 49	47.5	42.7	16.6	184	196	156	33.9	12.7	201	335	100%	100%	0	9	1	7	2
40 / 44	42.5	37.7	14.3	220	214	237	26.5	12.6	234	437	100%	100%	0	7	0	5	1
35 / 39	37.5	32.9	12.2	290	286	354	20.8	12.5	319	611	100%	100%	0	5	0	3	1
30 / 34	32.5	28.6	10.4	332	219	192	16.9	12.4	250	493	100%	100%	0	3	0	2	0
25 / 29	27.5	23.8	8.5	221	96	160	12.5	12.3	137	340	100%	100%	0	2	0	1	0
20 / 24	22.5	19.4	6.9	132	80	89	10.0	12.2	97	204	100%	100%	0	0	0	0	0
15 / 19	17.5	15.0	5.4	101	39	71	8.1	12.1	59	152	100%	100%	0	0	0	0	0
10 / 14	12.5	10.5	4.0	56	9	18	6.4	12.0	20	63	100%	100%	0	0	0	0	0
5 / 9	7.5	5.9	2.6	7	1	0	5.2	11.9	2	6	100%	100%	0	0	0	0	0
0 / 4	2.5	0.0	0.9	0	0	0	1.8	11.7	0	0	0%	0%	0	0	0	0	0
-5 / -1	-2.5	0.0	0.0	0	0	0	0.0	11.7	0	0	0%	0%	0	0	0	0	0
		subtotals:		2,920	2,920	2,919			3,128	5,631							

Estimate of Utilities | **EXISTING CONDITIONS** | **Capitol CHW Plant**

ASSUMPTIONS

GENERAL OPERATIONS		COOLING MODE (AIR CONDITIONING)		HEATING MODE	
		Cooling Tower Cycles of Concentration	*3*		
		blowdown flow rate (of design gpm)	0.512%		
130˚F DHW gal/person/yr	116.7	evaporation & drift flow rate (of design gpm)	1.040%		

Chilled Water System and Cooling Plant Calculations - OCCUPIED SEQUENCE HOURS ONLY

OA bin averages		Variable Primary Circulation (gpm)				Cooling Load (tons)				Cooling Generation (kW/ton)			Cooling Equipment Power (kW)				months of demand
average DB (˚F)	average WB (˚F)	loop flow	converted SCHW Pumps with VFDs			plant output	2008 Millennium		retrofitted turbo-master	2008 Millennium		retrofitted turbo-master	power input (kW)				
			Pump #1	Pump #2	Pump #3		first on	next on		first on	next on		chillers #1, #2, #3	CV CDW pumps	VV Tower Fans	Vari-Prime CHWPs	
97.5	76.0	9741	3,247	3,247	3,247	4698	1566	1566	1,566	0.62	0.62	0.77	3129	479	75	215	2
92.5	74.0	9141	3,047	3,047	3,047	4296	1432	1432	1,432	0.61	0.61	0.76	2828	479	59	180	2
87.5	72.9	8540	2,847	2,847	2,847	3895	1298	1298	1,298	0.61	0.61	0.75	2547	479	45	150	2
82.5	69.2	7940	2,647	2,647	2,647	3494	1165	1165	1,165	0.60	0.60	0.75	2283	479	34	122	1
77.5	67.9	7339	3,670	3,670	0	3093	1546	1546	0	0.61	0.61	0.00	1902	319	71	201	1
72.5	64.7	6739	3,369	3,369	0	2692	1346	1346	0	0.61	0.61	0.00	1633	319	49	159	2
67.5	61.1	6138	3,069	3,069	0	2291	1145	1145	0	0.60	0.60	0.00	1385	319	32	123	2
62.5	56.9	5538	2,769	2,769	0	1890	945	945	0	0.61	0.61	0.00	1154	319	22	92	0
57.5	51.6	4937	2,469	2,469	0	1488	744	744	0	0.63	0.63	0.00	940	319	22	67	0
52.5	47.0	4481	2,240	2,240	0	1099	549	549	0	0.68	0.68	0.00	743	319	22	52	0
47.5	42.7	4266	2,133	2,133	0	1029	514	514	0	0.69	0.69	0.00	708	319	22	45	0
42.5	37.7	4052	2,026	2,026	0	959	480	480	0	0.70	0.70	0.00	674	319	22	39	0
37.5	32.9	3837	1,919	1,919	0	889	445	445	0	0.72	0.72	0.00	639	319	22	34	0
32.5	28.6	3623	3,623	0	0	820	820	0	0	0.62	0.00	0.00	510	160	22	97	0
27.5	23.8	3408	3,408	0	0	750	750	0	0	0.63	0.00	0.00	473	160	22	82	0
22.5	19.4	3193	3,193	0	0	680	680	0	0	0.64	0.00	0.00	437	160	22	68	0
17.5	15.0	2979	2,979	0	0	611	611	0	0	0.66	0.00	0.00	402	160	22	57	0
12.5	10.5	2764	2,764	0	0	541	541	0	0	0.68	0.00	0.00	367	160	22	46	0
7.5	5.9	2550	2,550	0	0	471	471	0	0	0.71	0.00	0.00	333	160	22	37	0
2.5	0.0	2335	2,335	0	0	402	402	0	0	0.74	0.00	0.00	298	160	22	29	0
-2.5	0.0	2121	2,121	0	0	332	332	0	0	0.79	0.00	0.00	263	160	22	22	0
					cooling (ton-hr / yr):	5,531,890						energy use (kWh / yr):	3,534,038	967,229	96,641	292,979	
					peak demand (tons):	4,698						demand (kW / yr):	27,230	4,945	624	1,975	12

Chilled Water System and Cooling Plant Calculations - UNOCCUPIED SEQUENCE HOURS ONLY

OA bin averages		Variable Primary Circulation (gpm)				Cooling Load (tons)				Cooling Generation (kW/ton)			Cooling Equipment Power (kW)				months of demand
average DB (˚F)	average WB (˚F)	loop flow	converted SCHW Pumps with VFDs			plant output	2008 Millennium		retrofitted turbo-master	2008 Millennium		retrofitted turbo-master	power input (kW)				
			Pump #1	Pump #2	Pump #3		first on	next on		first on	next on		chillers #1, #2, #3	CV CDW pumps	VV Tower Fans	Vari-Prime CHWPs	
97.5	76.0	9741	3,247	3,247	3,247	4698	1566	1566	1,566	0.62	0.62	0.77	3129	479	75	215	0
92.5	74.0	9141	3,047	3,047	3,047	4296	1432	1432	1,432	0.61	0.61	0.76	2828	479	59	180	0
87.5	72.9	8540	2,847	2,847	2,847	3895	1298	1298	1,298	0.61	0.61	0.75	2547	479	45	150	0
82.5	69.2	7940	2,647	2,647	2,647	3494	1165	1165	1,165	0.60	0.60	0.75	2283	479	34	122	0
77.5	67.9	7339	2,446	2,446	0	3093	1546	1546	0	0.61	0.61	0.00	1902	319	69	66	0
72.5	64.7	6739	2,246	2,246	0	2692	1346	1346	0	0.61	0.61	0.00	1633	319	48	52	0
67.5	61.1	6138	2,046	2,046	0	2291	1145	1145	0	0.60	0.60	0.00	1385	319	31	40	0
62.5	56.9	5538	1,846	1,846	0	1890	945	945	0	0.61	0.61	0.00	1154	319	22	30	0
57.5	51.6	4937	1,646	1,646	0	1488	744	744	0	0.63	0.63	0.00	940	319	22	22	0
52.5	47.0	4481	1,494	1,494	0	1099	549	549	0	0.68	0.68	0.00	743	319	22	20	0
47.5	42.7	4266	1,422	1,422	0	1029	514	514	0	0.69	0.69	0.00	708	319	22	20	0
42.5	37.7	4052	1,351	1,351	0	959	480	480	0	0.70	0.70	0.00	674	319	22	20	0
37.5	32.9	3837	1,279	1,279	0	889	445	445	0	0.72	0.72	0.00	639	319	22	20	0
32.5	28.6	3623	3,623	0	0	820	820	0	0	0.62	0.00	0.00	510	160	22	97	0
27.5	23.8	3408	3,408	0	0	750	750	0	0	0.63	0.00	0.00	473	160	22	82	0
22.5	19.4	3193	3,193	0	0	680	680	0	0	0.64	0.00	0.00	437	160	22	68	0
17.5	15.0	2979	2,979	0	0	611	611	0	0	0.66	0.00	0.00	402	160	22	57	0
12.5	10.5	2764	2,764	0	0	541	541	0	0	0.68	0.00	0.00	367	160	22	46	0
7.5	5.9	2550	2,550	0	0	471	471	0	0	0.71	0.00	0.00	333	160	22	37	0
2.5	0.0	2335	2,335	0	0	402	402	0	0	0.74	0.00	0.00	298	160	22	29	0
-2.5	0.0	2121	2,121	0	0	332	332	0	0	0.79	0.00	0.00	263	160	22	22	0
					cooling (ton-hr / yr):	8,882,673						energy use (kWh / yr):	5,653,691	1,643,945	162,443	270,411	
					peak demand (tons):	4,698						demand (kW / yr):	0	0	0	0	0

Estimate CHW Plant Power Requirements	CHW Loop & Equipment**									
	Temperatures		Chiller	Flow	Pressure	assume efficiencies			power input	
	Supply (˚F)	Return (˚F)	Output (tons)	Rate (gpm)	drop (ft w.c.)	device (%)	motor (%)	VFD (%)	power kW	cooling kW/ton
Speed-Regulated Variable Volume Auxiliaries - Estimate the Design Condition										
• CHW Pump #1	42	57	2500	4000	***139***	***88%***	***96%***	***97%***	127	
• CHW Pump #2	42	57	2500	4000	***139***	***88%***	***96%***	***97%***	127	
• CHW Pump #3	42	57	2500	4000	***139***	***88%***	***96%***	***97%***	127	
		total capacity:	7500	12000					381	0.051
• Gannett Fleming Diversified Loa	42	57	7024	11239	122	***88%***	***96%***	***97%***	313	0.045
• Cooling Tower Fans										
(3) 150 HP fans 75% loaded at design & 100% speed				capacity			***94%***	***96%***	279	0.037
Assume (3) 150 HP fans 75% loaded at design & 93.7% speed				design condition			***94%***	***96%***	233	0.033
								Net kW / ton for Speed-Regulated Variable Volume Auxilaries - at design:		0.115
Chillers - observed conditions and cooling generation rate at 63%-67% of capacity (6/13/2017)										
• Design is 2500 tons with 4000 gpm at 57F-42F with 15.5' PD at evaporator and 7500 gpm at 85F-95F with 5.8' PD at condenser										
CH-1	80.2	86.5	53.7	42.0	1674	3433	79%	1005	1272	1005	0.600
CH-2	80.3	85.9	53.0	42.0	1574	3433	78%	1004	1287	1004	0.638
									Peak kW / ton for Chillers operating winter:		0.619
• 1 retrofitted York: 2500 tons, 3333 gpm, 22', 60F-42F, 7410 gpm, 6.5', 85-94.7F, 2404 rated HP after retrofit										
CH-3	81.3	88.2	54.3	43.2	1588	3433	65%	1227	1888	1227	0.773
				totals	4835	10300				3236	0.669
									Net kW / ton for 3 Chillers observed 6/13/2017 (90F):		0.669
			adjustment to 94F peak:		5331	11356				3591	0.674
									Net kW / ton for Chillers at peak:		0.674
Staged Auxiliaries										
• Condenser Water Pump #1						7410	86	***80%***	***94%***	160	0.064
• Condenser Water Pump #2						7410	86	***80%***	***94%***	160	0.064
• Condenser Water Pump #3						7410	86	***80%***	***94%***	160	0.064

* Condenser pumps are staged with respective chillers. Condenser pump power remains constant between thresholds.

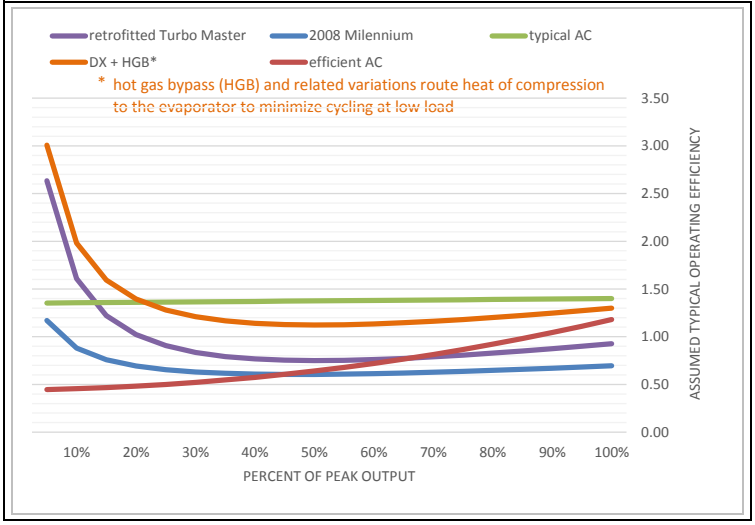
** Plant design parameters reflect conditions identified in the 2003 Gannett Fleming / WM Group chilled water study.

COLD GENERATION

heat transfer	Various Equipment Configurations				
	retrofitted Turbo Master	2008 Milennium	typical AC	DX + HGB*	efficient AC
100%	0.93	0.70	1.40	1.30	1.18
95%	0.90	0.68	1.40	1.27	1.11
90%	0.87	0.67	1.40	1.25	1.04
85%	0.85	0.66	1.39	1.22	0.98
80%	0.83	0.65	1.39	1.20	0.92
75%	0.81	0.64	1.39	1.18	0.87
70%	0.79	0.63	1.39	1.16	0.81
65%	0.773	0.619	1.38	1.15	0.77
60%	0.76	0.61	1.38	1.13	0.72
55%	0.75	0.61	1.38	1.13	0.68
50%	0.75	0.60	1.38	1.12	0.64
45%	0.75	0.60	1.37	1.13	0.61
40%	0.77	0.61	1.37	1.14	0.57
35%	0.79	0.62	1.37	1.17	0.55
30%	0.84	0.63	1.37	1.21	0.52
25%	0.91	0.65	1.36	1.28	0.50
20%	1.02	0.69	1.36	1.40	0.48
15%	1.22	0.76	1.36	1.59	0.47
10%	1.61	0.88	1.36	1.98	0.46
5%	2.63	1.17	1.35	3.01	0.45

Comparison of Various Cold Generation Sets

Assumed Power Input Rate in kW / ton



PA Capitol Campus Chilled Water Loop - Estimate of Peak Load adapted from Gannett Fleming / WM Group Hydraulic Study 2003

Peak Load Estimate	assumed sf	CHW SF	design tons	design flow (gpm) 10°F ΔT	design flow (gpm) **15°F ΔT**	diversity factor	peak tons	bldg sf	sf / design ton
Finance (2003 future)	429,520	***143,173***	358	859	**573**	65.5%	234	***143,173***	400
Finance									
PA Judicial Center (2003 future)	396,000	396,000	1,000	2,401	**1,601**	65.5%	655	419,415	419
L&I	483,161	483,161	1,199	2,879	**1,919**	65.5%	785	483,161	403
Forum w/o Auditorium (2003 future)	362,395								
Forum Auditorium	23,000	23,000	84	202	**134**	65.5%	55	23,000	274
H&W	293,000	293,000	628	1,508	**1,005**	65.5%	411	293,000	467
Keystone	700,000	700,000	2,300	5,522	**3,681**	65.5%	1,507	700,000	304
North Office	224,000	224,000	700	1,681	**1,120**	65.5%	459	224,000	320
Irvis	281,500	281,500	700	1,681	**1,120**	65.5%	459	281,500	402
Ryan (Capitol Annex)	75,700	75,700	252	605	**403**	65.5%	165	75,701	300
Main Capitol	453,000	453,000	1,430	3,433	**2,289**	65.5%	937	425,842	298
East Wing	200,000	200,000	720	1,729	**1,152**	65.5%	472	200,703	279
Chiller Plant	26,076	26,076	65	156	**104**	65.5%	43	26,076	400
Campus CHW Service:	3,947,352	***3,298,610***	9,436	22,655	**15,104**	65.5%	6,181	3,295,571	349
Finance-Judicial Center-L&I CHW:	1,308,681	***1,022,334***	2,557	6,139	**4,093**	65.5%	1,675	1,045,749	409

Estimate of Utilities | **ADJUSTED BASELINE** | **Capitol CHW Plant**

Zone 1: General Operations		CALCULATION OF OPERATING HOURS BY ZONE						ADJUST VENTILATION - DEMAND CONTROL (CO2 DCV)					
		OCCUPIED (OCC) SEQUENCE			UNOCCUPIED (UNO) SEQUENCE			OCCUPIED (OCC) SEQUENCE			UNOCCUPIED (UNO) SEQUENCE		
	dy / wk	0 - 8	8 - 16	16 - 24	0 - 8	8 - 16	16 - 24	0 - 8	8 - 16	16 - 24	0 - 8	8 - 16	16 - 24
weekdays	5.0	2.0	8.0	2.0	6.0	0.0	6.0	100%	100%	100%	100%	100%	100%
Saturday	1.0	0.0	0.0	0.0	8.0	8.0	8.0	100%	100%	100%	100%	100%	100%
Sunday	1.0	0.0	0.0	0.0	8.0	8.0	8.0	100%	100%	100%	100%	100%	100%
subtotals:		10.0	40.0	10.0	46.0	16.0	46.0	100%	100%	100%	100%	100%	100%
percentage hours:		18%	71%	18%	82%	29%	82%	18%	71%	18%	82%	29%	82%

Weather Station: Harrisburg, PA 14751							Specifics - Moist Air		Zone Hours		DCV Adjustment		Solar Impact - SOL-AIR OA Temperature (˚F)				
Outdoor Air (OA) temp. (˚F)			enthalpy	TMY2 occurrences - duration (hr)			humidity	volume	Operations (hr / yr)		% of Design OA Min		assume rise in air temperature due to solar impact (˚F)				
range	average	MCWB	Btu/lb	0 - 8	8 - 16	16 - 24	W (gr / lb)	V (cf / lb)	OCC SEQ	UNO SEQ	OCC SEQ	UNO SEQ	0 - 8	8 - 16	16 - 24	OCC SEQ	UNO SEQ
90 / 94	92.5	74.0	37.9	0	28	11	99.4	13.5	22	17	100%	100%	0	26	7	24	16
85 / 89	87.5	72.9	36.8	0	113	46	100.6	13.5	89	70	100%	100%	0	24	6	23	14
80 / 84	82.5	69.2	33.6	7	309	144	87.8	13.4	248	212	100%	100%	0	22	5	21	12
75 / 79	77.5	67.9	32.6	114	259	238	89.2	13.4	248	363	100%	100%	0	21	5	16	7
70 / 74	72.5	64.7	30.0	165	202	236	80.9	13.3	216	387	100%	100%	0	19	4	13	5
65 / 69	67.5	61.1	27.4	321	231	246	71.6	13.2	266	532	100%	100%	0	17	4	11	3
60 / 64	62.5	56.9	24.5	306	221	296	61.0	13.1	265	558	100%	100%	0	15	3	9	3
55 / 59	57.5	51.6	21.2	249	199	221	48.0	12.9	226	443	100%	100%	0	13	2	9	3
50 / 54	52.5	47.0	18.8	215	202	204	39.9	12.8	219	402	100%	100%	0	11	2	8	2
45 / 49	47.5	42.7	16.6	184	196	156	33.9	12.7	201	335	100%	100%	0	9	1	7	2
40 / 44	42.5	37.7	14.3	220	214	237	26.5	12.6	234	437	100%	100%	0	7	0	5	1
35 / 39	37.5	32.9	12.2	290	286	354	20.8	12.5	319	611	100%	100%	0	5	0	3	1
30 / 34	32.5	28.6	10.4	332	219	192	16.9	12.4	250	493	100%	100%	0	3	0	2	0
25 / 29	27.5	23.8	8.5	221	96	160	12.5	12.3	137	340	100%	100%	0	2	0	1	0
20 / 24	22.5	19.4	6.9	132	80	89	10.0	12.2	97	204	100%	100%	0	0	0	0	0
15 / 19	17.5	15.0	5.4	101	39	71	8.1	12.1	59	152	100%	100%	0	0	0	0	0
10 / 14	12.5	10.5	4.0	56	9	18	6.4	12.0	20	63	100%	100%	0	0	0	0	0
5 / 9	7.5	5.9	2.6	7	1	0	5.2	11.9	2	6	100%	100%	0	0	0	0	0
0 / 4	2.5	0.0	0.9	0	0	0	1.8	14.0	0	0	0%	0%	0	0	0	0	0
-5 / -1	-2.5	0.0	0.0	0	0	0	0.0	11.7	0	0	0%	0%	0	0	0	0	0
			subtotals:	2,920	2,920	2,919			3,128	5,631							

Estimate of Utilities | **ADJUSTED BASELINE** | **Capitol CHW Plant**

ASSUMPTIONS

GENERAL OPERATIONS		COOLING MODE (AIR CONDITIONING)		HEATING MODE	
		Cooling Tower Cycles of Concentration	*8*		
		blowdown flow rate (of design gpm)	0.143%		
130˚F DHW gal/person/yr	116.7	evaporation & drift flow rate (of design gpm)	1.040%		

Chilled Water System and Cooling Plant Calculations - OCCUPIED SEQUENCE HOURS ONLY

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			Pump #1	Pump #2	Pump #3		first on	next on		first on	next on		chillers #1, #2, #3	CV CDW pumps	VV Tower Fans	Vari-Prime CHWPs	
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92.5	74.0	9141	3,047	3,047	3,047	4296	1432	1432	1,432	0.61	0.61	0.76	2828	479	59	180	2
87.5	72.9	8540	2,847	2,847	2,847	3895	1298	1298	1,298	0.61	0.61	0.75	2547	479	45	150	2
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77.5	67.9	7339	3,670	3,670	0	3093	1546	1546	0	0.61	0.61	0.00	1902	319	71	201	1
72.5	64.7	6739	3,369	3,369	0	2692	1346	1346	0	0.61	0.61	0.00	1633	319	49	159	2
67.5	61.1	6138	3,069	3,069	0	2291	1145	1145	0	0.60	0.60	0.00	1385	319	32	123	2
62.5	56.9	5538	2,769	2,769	0	1890	945	945	0	0.61	0.61	0.00	1154	319	22	92	0
57.5	51.6	4937	2,469	2,469	0	1488	744	744	0	0.63	0.63	0.00	940	319	22	67	0
52.5	47.0	4481	2,240	2,240	0	1099	549	549	0	0.68	0.68	0.00	743	319	22	52	0
47.5	42.7	4266	2,133	2,133	0	1029	514	514	0	0.69	0.69	0.00	708	319	22	45	0
42.5	37.7	4052	2,026	2,026	0	959	480	480	0	0.70	0.70	0.00	674	319	22	39	0
37.5	32.9	3837	1,919	1,919	0	889	445	445	0	0.72	0.72	0.00	639	319	22	34	0
32.5	28.6	3623	3,623	0	0	820	820	0	0	0.62	0.00	0.00	510	160	22	97	0
27.5	23.8	3408	3,408	0	0	750	750	0	0	0.63	0.00	0.00	473	160	22	82	0
22.5	19.4	3193	3,193	0	0	680	680	0	0	0.64	0.00	0.00	437	160	22	68	0
17.5	15.0	2979	2,979	0	0	611	611	0	0	0.66	0.00	0.00	402	160	22	57	0
12.5	10.5	2764	2,764	0	0	541	541	0	0	0.68	0.00	0.00	367	160	22	46	0
7.5	5.9	2550	2,550	0	0	471	471	0	0	0.71	0.00	0.00	333	160	22	37	0
2.5	0.0	2335	2,335	0	0	402	402	0	0	0.74	0.00	0.00	298	160	22	29	0
-2.5	0.0	2121	2,121	0	0	332	332	0	0	0.79	0.00	0.00	263	160	22	22	0
					cooling (ton-hr / yr):	5,531,890						energy use (kWh / yr):	3,534,038	967,229	96,641	292,979	
					peak demand (tons):	4,698						demand (kW / yr):	27,230	4,945	624	1,975	12

Chilled Water System and Cooling Plant Calculations - UNOCCUPIED SEQUENCE HOURS ONLY

OA bin averages		Variable Primary Circulation (gpm)				Cooling Load (tons)				Cooling Generation (kW/ton)			Cooling Equipment Power (kW)				months of demand
average DB (˚F)	average WB (˚F)	loop flow	converted SCHW Pumps with VFDs			plant output	2008 Millennium		retrofitted turbo-master	2008 Millennium		retrofitted turbo-master	power input (kW)				
			Pump #1	Pump #2	Pump #3		first on	next on		first on	next on		chillers #1, #2, #3	CV CDW pumps	VV Tower Fans	Vari-Prime CHWPs	
97.5	76.0	9741	3,247	3,247	3,247	4698	1566	1566	1,566	0.62	0.62	0.77	3129	479	75	215	0
92.5	74.0	9141	3,047	3,047	3,047	4296	1432	1432	1,432	0.61	0.61	0.76	2828	479	59	180	0
87.5	72.9	7631	2,544	2,544	2,544	3462	1154	1154	1,154	0.60	0.60	0.75	2263	479	33	110	0
82.5	69.2	7166	2,389	2,389	0	3126	1563	1563	0	0.62	0.62	0.00	1924	319	71	62	0
77.5	67.9	6643	2,214	2,214	0	2762	1381	1381	0	0.61	0.61	0.00	1679	319	51	50	0
72.5	64.7	5926	1,975	1,975	0	2305	1153	1153	0	0.60	0.60	0.00	1393	319	31	37	0
67.5	61.1	5547	1,849	1,849	0	2009	1005	1005	0	0.61	0.61	0.00	1221	319	22	30	0
62.5	56.9	5227	1,742	1,742	0	1742	871	871	0	0.62	0.62	0.00	1074	319	22	26	0
57.5	51.6	4861	1,620	1,620	0	1452	726	726	0	0.63	0.63	0.00	921	319	22	21	0
52.5	47.0	4619	1,540	1,540	0	1164	582	582	0	0.67	0.67	0.00	775	319	22	20	0
47.5	42.7	4266	1,422	1,422	0	1029	514	514	0	0.69	0.69	0.00	708	319	22	20	0
42.5	37.7	4052	1,351	1,351	0	959	480	480	0	0.70	0.70	0.00	674	319	22	20	0
37.5	32.9	3837	1,279	1,279	0	889	445	445	0	0.72	0.72	0.00	639	319	22	20	0
32.5	28.6	3623	3,623	0	0	820	820	0	0	0.62	0.00	0.00	510	160	22	97	0
27.5	23.8	3408	3,408	0	0	750	750	0	0	0.63	0.00	0.00	473	160	22	82	0
22.5	19.4	3193	3,193	0	0	680	680	0	0	0.64	0.00	0.00	437	160	22	68	0
17.5	15.0	2979	2,979	0	0	611	611	0	0	0.66	0.00	0.00	402	160	22	57	0
12.5	10.5	2764	2,764	0	0	541	541	0	0	0.68	0.00	0.00	367	160	22	46	0
7.5	5.9	2550	2,550	0	0	471	471	0	0	0.71	0.00	0.00	333	160	22	37	0
2.5	0.0	2335	2,335	0	0	402	402	0	0	0.74	0.00	0.00	298	160	22	29	0
-2.5	0.0	2121	2,121	0	0	332	332	0	0	0.79	0.00	0.00	263	160	22	22	0
					cooling (ton-hr / yr):	8,282,217						energy use (kWh / yr):	5,256,663	1,610,075	152,142	234,896	
					peak demand (tons):	4,698						demand (kW / yr):	0	0	0	0	0

Estimate of Utilities | **ECM: PLATE FRAME FREE COOLING** | **Capitol CHW Plant**

Zone 1: General Operations		CALCULATION OF OPERATING HOURS BY ZONE						ADJUST VENTILATION - DEMAND CONTROL (CO2 DCV)					
		OCCUPIED (OCC) SEQUENCE			UNOCCUPIED (UNO) SEQUENCE			OCCUPIED (OCC) SEQUENCE			UNOCCUPIED (UNO) SEQUENCE		
	dy / wk	0 - 8	8 - 16	16 - 24	0 - 8	8 - 16	16 - 24	0 - 8	8 - 16	16 - 24	0 - 8	8 - 16	16 - 24
weekdays	5.0	2.0	8.0	2.0	6.0	0.0	6.0	100%	100%	100%	100%	100%	100%
Saturday	1.0	0.0	0.0	0.0	8.0	8.0	8.0	100%	100%	100%	100%	100%	100%
Sunday	1.0	0.0	0.0	0.0	8.0	8.0	8.0	100%	100%	100%	100%	100%	100%
subtotals:		10.0	40.0	10.0	46.0	16.0	46.0	100%	100%	100%	100%	100%	100%
percentage hours:		18%	71%	18%	82%	29%	82%	18%	71%	18%	82%	29%	82%

Weather Station: Harrisburg, PA 14751							Specifics - Moist Air		Zone Hours		DCV Adjustment		Solar Impact - SOL-AIR OA Temperature (˚F)				
Outdoor Air (OA) temp. (˚F)			enthalpy	TMY2 occurrences - duration (hr)			humidity	volume	Operations (hr / yr)		% of Design OA Min		assume rise in air temperature due to solar impact (˚F)				
range	average	MCWB	Btu/lb	0 - 8	8 - 16	16 - 24	W (gr / lb)	V (cf / lb)	OCC SEQ	UNO SEQ	OCC SEQ	UNO SEQ	0 - 8	8 - 16	16 - 24	OCC SEQ	UNO SEQ
95 / 99	97.5	76.0	39.7	0	16	0	103.5	13.6	11	5	100%	100%	0	28	7	28	28
90 / 94	92.5	74.0	37.9	0	28	11	99.4	13.5	22	17	100%	100%	0	26	7	24	16
85 / 89	87.5	72.9	36.8	0	113	46	100.6	13.5	89	70	100%	100%	0	24	6	23	14
80 / 84	82.5	69.2	33.6	7	309	144	87.8	13.4	248	212	100%	100%	0	22	5	21	12
75 / 79	77.5	67.9	32.6	114	259	238	89.2	13.4	248	363	100%	100%	0	21	5	16	7
70 / 74	72.5	64.7	30.0	165	202	236	80.9	13.3	216	387	100%	100%	0	19	4	13	5
65 / 69	67.5	61.1	27.4	321	231	246	71.6	13.2	266	532	100%	100%	0	17	4	11	3
60 / 64	62.5	56.9	24.5	306	221	296	61.0	13.1	265	558	100%	100%	0	15	3	9	3
55 / 59	57.5	51.6	21.2	249	199	221	48.0	12.9	226	443	100%	100%	0	13	2	9	3
50 / 54	52.5	47.0	18.8	215	202	204	39.9	12.8	219	402	100%	100%	0	11	2	8	2
45 / 49	47.5	42.7	16.6	184	196	156	33.9	12.7	201	335	100%	100%	0	9	1	7	2
40 / 44	42.5	37.7	14.3	220	214	237	26.5	12.6	234	437	100%	100%	0	7	0	5	1
35 / 39	37.5	32.9	12.2	290	286	354	20.8	12.5	319	611	100%	100%	0	5	0	3	1
30 / 34	32.5	28.6	10.4	332	219	192	16.9	12.4	250	493	100%	100%	0	3	0	2	0
25 / 29	27.5	23.8	8.5	221	96	160	12.5	12.3	137	340	100%	100%	0	2	0	1	0
20 / 24	22.5	19.4	6.9	132	80	89	10.0	12.2	97	204	100%	100%	0	0	0	0	0
15 / 19	17.5	15.0	5.4	101	39	71	8.1	12.1	59	152	100%	100%	0	0	0	0	0
10 / 14	12.5	10.5	4.0	56	9	18	6.4	12.0	20	63	100%	100%	0	0	0	0	0
5 / 9	7.5	5.9	2.6	7	1	0	5.2	11.9	2	6	100%	100%	0	0	0	0	0
0 / 4	2.5	0.0	0.9	0	0	0	1.8	11.7	0	0	0%	0%	0	0	0	0	0
-5 / -1	-2.5	0.0	0.0	0	0	0	0.0	11.7	0	0	0%	0%	0	0	0	0	0
		subtotals:		2,920	2,920	2,919			3,128	5,631							

Estimate of Utilities | **ECM: PLATE FRAME FREE COOLING** | **Capitol CHW Plant**

ASSUMPTIONS

GENERAL OPERATIONS		COOLING MODE (AIR CONDITIONING)		HEATING MODE	
		Cooling Tower Cycles of Concentration	*8*		
		blowdown flow rate (of design gpm)	0.143%		
130˚F DHW gal/person/yr	116.7	evaporation & drift flow rate (of design gpm)	1.040%		

Chilled Water System and Cooling Plant Calculations - OCCUPIED SEQUENCE HOURS ONLY

OA bin averages		Variable Primary Circulation (gpm)				Cooling Load (tons)				Cooling Generation (kW/ton)			Cooling Equipment Power (kW)				months
average	average	loop	converted SCHW Pumps with VFDs			plant	2008 Millennium		retrofitted	2008 Millennium		retrofitted	power input (kW)				of
DB (˚F)	WB (˚F)	flow	Pump #1	Pump #2	Pump #3	output	first on	next on	turbo-master	first on	next on	turbo-master	chillers #1, #2, #3	CV CDW pumps	VV Tower Fans	Vari-Prime CHWPs	demand
97.5	76.0	9741	3,247	3,247	3,247	4698	1566	1566	1,566	0.62	0.62	0.77	3129	479	75	215	2
92.5	74.0	9141	3,047	3,047	3,047	4296	1432	1432	1,432	0.61	0.61	0.76	2828	479	59	180	2
87.5	72.9	8540	2,847	2,847	2,847	3895	1298	1298	1,298	0.61	0.61	0.75	2547	479	45	150	2
82.5	69.2	7940	2,647	2,647	2,647	3494	1165	1165	1,165	0.60	0.60	0.75	2283	479	34	122	1
77.5	67.9	7339	3,670	3,670	0	3093	1546	1546	0	0.61	0.61	0.00	1902	319	71	201	1
72.5	64.7	6739	3,369	3,369	0	2692	1346	1346	0	0.61	0.61	0.00	1633	319	49	159	2
67.5	61.1	6138	3,069	3,069	0	2291	1145	1145	0	0.60	0.60	0.00	1385	319	32	123	2
62.5	56.9	5538	2,769	2,769	0	1890	945	945	0	0.61	0.61	0.00	1154	319	22	92	0
57.5	51.6	4937	2,469	2,469	0	1488	744	744	0	0.63	0.63	0.00	940	319	22	67	0
52.5	47.0	4481	2,240	2,240	0	1099	549	549	0	0.68	0.68	0.00	743	319	22	52	0
47.5	42.7	4266	2,133	2,133	0	1029	514	514	0	0.69	0.69	0.00	708	319	22	45	0
42.5	37.7	4052	2,026	2,026	0	959	480	480	0	0.70	0.70	0.00	674	319	22	39	0
37.5	32.9	3837	1,919	1,919	0	889	0	0	0	0.00	0.00	0.00	0	160	22	34	0
32.5	28.6	3623	3,623	0	0	820	0	0	0	0.00	0.00	0.00	0	160	22	97	0
27.5	23.8	3408	3,408	0	0	750	0	0	0	0.00	0.00	0.00	0	160	22	82	0
22.5	19.4	3193	3,193	0	0	680	0	0	0	0.00	0.00	0.00	0	160	22	68	0
17.5	15.0	2979	2,979	0	0	611	0	0	0	0.00	0.00	0.00	0	160	22	57	0
12.5	10.5	2764	2,764	0	0	541	0	0	0	0.00	0.00	0.00	0	160	22	46	0
7.5	5.9	2550	2,550	0	0	471	0	0	0	0.00	0.00	0.00	0	160	22	37	0
2.5	0.0	2335	2,335	0	0	402	0	0	0	0.00	0.00	0.00	0	160	22	29	0
-2.5	0.0	2121	2,121	0	0	332	0	0	0	0.00	0.00	0.00	0	160	22	22	0
PLATE FRAME PROVIDES FULL COOLING when WB°F ≤ [42°F LWT - (1.5°F PFHX + 8°F tower) combined approach]			cooling (ton-hr / yr):			5,531,890					energy use (kWh / yr):		3,064,284	916,297	96,641	292,979	
			peak demand (tons):			4,698					demand (kW / yr):		27,230	4,945	624	1,975	12

Chilled Water System and Cooling Plant Calculations - UNOCCUPIED SEQUENCE HOURS ONLY

OA bin averages		Variable Primary Circulation (gpm)				Cooling Load (tons)				Cooling Generation (kW/ton)			Cooling Equipment Power (kW)				months
average	average	loop	converted SCHW Pumps with VFDs			plant	2008 Millennium		retrofitted	2008 Millennium		retrofitted	power input (kW)				of
DB (˚F)	WB (˚F)	flow	Pump #1	Pump #2	Pump #3	output	first on	next on	turbo-master	first on	next on	turbo-master	chillers #1, #2, #3	CV CDW pumps	VV Tower Fans	Vari-Prime CHWPs	demand
97.5	76.0	9741	3,247	3,247	3,247	4698	1566	1566	1,566	0.62	0.62	0.77	3129	479	75	215	0
92.5	74.0	9141	3,047	3,047	3,047	4296	1432	1432	1,432	0.61	0.61	0.76	2828	479	59	180	0
87.5	72.9	7631	2,544	2,544	2,544	3462	1154	1154	1,154	0.60	0.60	0.75	2263	479	33	110	0
82.5	69.2	7166	2,389	2,389	0	3126	1563	1563	0	0.62	0.62	0.00	1924	319	71	62	0
77.5	67.9	6643	2,214	2,214	0	2762	1381	1381	0	0.61	0.61	0.00	1679	319	51	50	0
72.5	64.7	5926	1,975	1,975	0	2305	1153	1153	0	0.60	0.60	0.00	1393	319	31	37	0
67.5	61.1	5547	1,849	1,849	0	2009	1005	1005	0	0.61	0.61	0.00	1221	319	22	30	0
62.5	56.9	5227	1,742	1,742	0	1742	871	871	0	0.62	0.62	0.00	1074	319	22	26	0
57.5	51.6	4861	1,620	1,620	0	1452	726	726	0	0.63	0.63	0.00	921	319	22	21	0
52.5	47.0	4619	1,540	1,540	0	1164	582	582	0	0.67	0.67	0.00	775	319	22	20	0
47.5	42.7	4266	1,422	1,422	0	1029	514	514	0	0.69	0.69	0.00	708	319	22	20	0
42.5	37.7	4052	1,351	1,351	0	959	480	480	0	0.70	0.70	0.00	674	319	22	20	0
37.5	32.9	3837	1,919	1,919	0	889	0	0	0	0.00	0.00	0.00	0	160	22	34	0
32.5	28.6	3623	3,623	0	0	820	0	0	0	0.00	0.00	0.00	0	160	22	97	0
27.5	23.8	3408	3,408	0	0	750	0	0	0	0.00	0.00	0.00	0	160	22	82	0
22.5	19.4	3193	3,193	0	0	680	0	0	0	0.00	0.00	0.00	0	160	22	68	0
17.5	15.0	2979	2,979	0	0	611	0	0	0	0.00	0.00	0.00	0	160	22	57	0
12.5	10.5	2764	2,764	0	0	541	0	0	0	0.00	0.00	0.00	0	160	22	46	0
7.5	5.9	2550	2,550	0	0	471	0	0	0	0.00	0.00	0.00	0	160	22	37	0
2.5	0.0	2335	2,335	0	0	402	0	0	0	0.00	0.00	0.00	0	160	22	29	0
-2.5	0.0	2121	2,121	0	0	332	0	0	0	0.00	0.00	0.00	0	160	22	22	0
PLATE FRAME PROVIDES FULL COOLING when WB°F ≤ [42°F LWT - (1.5°F PFHX + 8°F tower) combined approach]			cooling (ton-hr / yr):			8,282,217					energy use (kWh / yr):		4,278,132	1,512,654	152,142	242,987	
			peak demand (tons):			4,698					demand (kW / yr):		0	0	0	0	0

Estimate of Utilities | **ECM: VFD for 460V Condenser Water Pump** | **Capitol CHW Plant**

Zone 1: General Operations		CALCULATION OF OPERATING HOURS BY ZONE						ADJUST VENTILATION - DEMAND CONTROL (CO2 DCV)					
		OCCUPIED (OCC) SEQUENCE			UNOCCUPIED (UNO) SEQUENCE			OCCUPIED (OCC) SEQUENCE			UNOCCUPIED (UNO) SEQUENCE		
	dy / wk	0 - 8	8 - 16	16 - 24	0 - 8	8 - 16	16 - 24	0 - 8	8 - 16	16 - 24	0 - 8	8 - 16	16 - 24
weekdays	5.0	2.0	8.0	2.0	6.0	0.0	6.0	100%	100%	100%	100%	100%	100%
Saturday	1.0	0.0	0.0	0.0	8.0	8.0	8.0	100%	100%	100%	100%	100%	100%
Sunday	1.0	0.0	0.0	0.0	8.0	8.0	8.0	100%	100%	100%	100%	100%	100%
subtotals:		10.0	40.0	10.0	46.0	16.0	46.0	100%	100%	100%	100%	100%	100%
percentage hours:		18%	71%	18%	82%	29%	82%	18%	71%	18%	82%	29%	82%

Weather Station: Harrisburg, PA 14751							Specifics - Moist Air		Zone Hours		DCV Adjustment		Solar Impact - SOL-AIR OA Temperature (˚F)				
Outdoor Air (OA) temp. (˚F)			enthalpy	TMY2 occurrences - duration (hr)			humidity	volume	Operations (hr / yr)		% of Design OA Min		assume rise in air temperature due to solar impact (˚F)				
range	average	MCWB	Btu/lb	0 - 8	8 - 16	16 - 24	W (gr / lb)	V (cf / lb)	OCC SEQ	UNO SEQ	OCC SEQ	UNO SEQ	0 - 8	8 - 16	16 - 24	OCC SEQ	UNO SEQ
95 / 99	97.5	76.0	39.7	0	16	0	103.5	13.6	11	5	100%	100%	0	28	7	28	28
90 / 94	92.5	74.0	37.9	0	28	11	99.4	13.5	22	17	100%	100%	0	26	7	24	16
85 / 89	87.5	72.9	36.8	0	113	46	100.6	13.5	89	70	100%	100%	0	24	6	23	14
80 / 84	82.5	69.2	33.6	7	309	144	87.8	13.4	248	212	100%	100%	0	22	5	21	12
75 / 79	77.5	67.9	32.6	114	259	238	89.2	13.4	248	363	100%	100%	0	21	5	16	7
70 / 74	72.5	64.7	30.0	165	202	236	80.9	13.3	216	387	100%	100%	0	19	4	13	5
65 / 69	67.5	61.1	27.4	321	231	246	71.6	13.2	266	532	100%	100%	0	17	4	11	3
60 / 64	62.5	56.9	24.5	306	221	296	61.0	13.1	265	558	100%	100%	0	15	3	9	3
55 / 59	57.5	51.6	21.2	249	199	221	48.0	12.9	226	443	100%	100%	0	13	2	9	3
50 / 54	52.5	47.0	18.8	215	202	204	39.9	12.8	219	402	100%	100%	0	11	2	8	2
45 / 49	47.5	42.7	16.6	184	196	156	33.9	12.7	201	335	100%	100%	0	9	1	7	2
40 / 44	42.5	37.7	14.3	220	214	237	26.5	12.6	234	437	100%	100%	0	7	0	5	1
35 / 39	37.5	32.9	12.2	290	286	354	20.8	12.5	319	611	100%	100%	0	5	0	3	1
30 / 34	32.5	28.6	10.4	332	219	192	16.9	12.4	250	493	100%	100%	0	3	0	2	0
25 / 29	27.5	23.8	8.5	221	96	160	12.5	12.3	137	340	100%	100%	0	2	0	1	0
20 / 24	22.5	19.4	6.9	132	80	89	10.0	12.2	97	204	100%	100%	0	0	0	0	0
15 / 19	17.5	15.0	5.4	101	39	71	8.1	12.1	59	152	100%	100%	0	0	0	0	0
10 / 14	12.5	10.5	4.0	56	9	18	6.4	12.0	20	63	100%	100%	0	0	0	0	0
5 / 9	7.5	5.9	2.6	7	1	0	5.2	11.9	2	6	100%	100%	0	0	0	0	0
0 / 4	2.5	0.0	0.9	0	0	0	1.8	11.7	0	0	0%	0%	0	0	0	0	0
-5 / -1	-2.5	0.0	0.0	0	0	0	0.0	11.7	0	0	0%	0%	0	0	0	0	0
		subtotals:		2,920	2,920	2,919			3,128	5,631							

Estimate of Utilities | **ECM: VFD for 460V Condenser Water Pump** | **Capitol CHW Plant**

ASSUMPTIONS

GENERAL OPERATIONS		COOLING MODE (AIR CONDITIONING)		HEATING MODE	
		Cooling Tower Cycles of Concentration	*8*		
		blowdown flow rate (of design gpm)	0.143%		
130˚F DHW gal/person/yr	116.7	evaporation & drift flow rate (of design gpm)	1.040%		

Chilled Water System and Cooling Plant Calculations - OCCUPIED SEQUENCE HOURS ONLY

OA bin averages		Variable Primary Circulation (gpm)				Cooling Load (tons)				Cooling Generation (kW/ton)			Cooling Equipment Power (kW)				months of demand
average DB (˚F)	average WB (˚F)	loop flow	converted SCHW Pumps with VFDs			plant output	2008 Millennium		retrofitted turbo-master	2008 Millennium		retrofitted turbo-master	power input (kW)				
			Pump #1	Pump #2	Pump #3		first on	next on		first on	next on		chillers #1, #2, #3	CV CDW pumps	VV Tower Fans	Vari-Prime CHWPs	
97.5	76.0	9741	3,247	3,247	3,247	4698	1566	1566	1,566	0.62	0.62	0.77	3129	479	75	215	2
92.5	74.0	9141	3,047	3,047	3,047	4296	1432	1432	1,432	0.61	0.61	0.76	2828	479	59	180	2
87.5	72.9	8540	2,847	2,847	2,847	3895	1298	1298	1,298	0.61	0.61	0.75	2547	479	45	150	2
82.5	69.2	7940	2,647	2,647	2,647	3494	1165	1165	1,165	0.60	0.60	0.75	2283	479	34	122	1
77.5	67.9	7339	3,670	3,670	0	3093	1546	1546	0	0.61	0.61	0.00	1902	319	71	201	1
72.5	64.7	6739	3,369	3,369	0	2692	1346	1346	0	0.61	0.61	0.00	1633	319	49	159	2
67.5	61.1	6138	3,069	3,069	0	2291	1145	1145	0	0.60	0.60	0.00	1385	319	32	123	2
62.5	56.9	5538	2,769	2,769	0	1890	945	945	0	0.61	0.61	0.00	1154	319	22	92	0
57.5	51.6	4937	2,469	2,469	0	1488	744	744	0	0.63	0.63	0.00	940	319	22	67	0
52.5	47.0	4481	2,240	2,240	0	1099	549	549	0	0.68	0.68	0.00	743	319	22	52	0
47.5	42.7	4266	2,133	2,133	0	1029	514	514	0	0.69	0.69	0.00	708	319	22	45	0
42.5	37.7	4052	2,026	2,026	0	959	480	480	0	0.70	0.70	0.00	674	319	22	39	0
37.5	32.9	3837	1,919	1,919	0	889	0	0	0	0.00	0.00	0.00	0	90	22	34	0
32.5	28.6	3623	3,623	0	0	820	0	0	0	0.00	0.00	0.00	0	90	22	97	0
27.5	23.8	3408	3,408	0	0	750	0	0	0	0.00	0.00	0.00	0	90	22	82	0
22.5	19.4	3193	3,193	0	0	680	0	0	0	0.00	0.00	0.00	0	90	22	68	0
17.5	15.0	2979	2,979	0	0	611	0	0	0	0.00	0.00	0.00	0	90	22	57	0
12.5	10.5	2764	2,764	0	0	541	0	0	0	0.00	0.00	0.00	0	90	22	46	0
7.5	5.9	2550	2,550	0	0	471	0	0	0	0.00	0.00	0.00	0	90	22	37	0
2.5	0.0	2335	2,335	0	0	402	0	0	0	0.00	0.00	0.00	0	90	22	29	0
-2.5	0.0	2121	2,121	0	0	332	0	0	0	0.00	0.00	0.00	0	0	22	22	0
PLATE FRAME PROVIDES FULL COOLING when WB˚F ≤ [42˚F LWT - (1.5˚F PFHX + 8˚F tower) combined approach]			cooling (ton-hr / yr):			5,531,890					energy use (kWh / yr):		3,064,284	854,995	96,641	292,979	
			peak demand (tons):			4,698					demand (kW / yr):		27,230	4,945	624	1,975	12

Chilled Water System and Cooling Plant Calculations - UNOCCUPIED SEQUENCE HOURS ONLY

OA bin averages		Variable Primary Circulation (gpm)				Cooling Load (tons)				Cooling Generation (kW/ton)			Cooling Equipment Power (kW)				months of demand
average DB (˚F)	average WB (˚F)	loop flow	converted SCHW Pumps with VFDs			plant output	2008 Millennium		retrofitted turbo-master	2008 Millennium		retrofitted turbo-master	power input (kW)				
			Pump #1	Pump #2	Pump #3		first on	next on		first on	next on		chillers #1, #2, #3	CV CDW pumps	VV Tower Fans	Vari-Prime CHWPs	
97.5	76.0	9741	3,247	3,247	3,247	4698	1566	1566	1,566	0.62	0.62	0.77	3129	479	75	215	0
92.5	74.0	9141	3,047	3,047	3,047	4296	1432	1432	1,432	0.61	0.61	0.76	2828	479	59	180	0
87.5	72.9	7631	2,544	2,544	2,544	3462	1154	1154	1,154	0.60	0.60	0.75	2263	479	33	110	0
82.5	69.2	7166	2,389	2,389	0	3126	1563	1563	0	0.62	0.62	0.00	1924	319	71	62	0
77.5	67.9	6643	2,214	2,214	0	2762	1381	1381	0	0.61	0.61	0.00	1679	319	51	50	0
72.5	64.7	5926	1,975	1,975	0	2305	1153	1153	0	0.60	0.60	0.00	1393	319	31	37	0
67.5	61.1	5547	1,849	1,849	0	2009	1005	1005	0	0.61	0.61	0.00	1221	319	22	30	0
62.5	56.9	5227	1,742	1,742	0	1742	871	871	0	0.62	0.62	0.00	1074	319	22	26	0
57.5	51.6	4861	1,620	1,620	0	1452	726	726	0	0.63	0.63	0.00	921	319	22	21	0
52.5	47.0	4619	1,540	1,540	0	1164	582	582	0	0.67	0.67	0.00	775	319	22	20	0
47.5	42.7	4266	1,422	1,422	0	1029	514	514	0	0.69	0.69	0.00	708	319	22	20	0
42.5	37.7	4052	1,351	1,351	0	959	480	480	0	0.70	0.70	0.00	674	319	22	20	0
37.5	32.9	3837	1,919	1,919	0	889	0	0	0	0.00	0.00	0.00	0	90	22	34	0
32.5	28.6	3623	3,623	0	0	820	0	0	0	0.00	0.00	0.00	0	90	22	97	0
27.5	23.8	3408	3,408	0	0	750	0	0	0	0.00	0.00	0.00	0	90	22	82	0
22.5	19.4	3193	3,193	0	0	680	0	0	0	0.00	0.00	0.00	0	90	22	68	0
17.5	15.0	2979	2,979	0	0	611	0	0	0	0.00	0.00	0.00	0	90	22	57	0
12.5	10.5	2764	2,764	0	0	541	0	0	0	0.00	0.00	0.00	0	90	22	46	0
7.5	5.9	2550	2,550	0	0	471	0	0	0	0.00	0.00	0.00	0	90	22	37	0
2.5	0.0	2335	2,335	0	0	402	0	0	0	0.00	0.00	0.00	0	90	22	29	0
-2.5	0.0	2121	2,121	0	0	332	0	0	0	0.00	0.00	0.00	0	0	22	22	0
PLATE FRAME PROVIDES FULL COOLING when WB˚F ≤ [42˚F LWT - (1.5˚F PFHX + 8˚F tower) combined approach]			cooling (ton-hr / yr):			8,282,217					energy use (kWh / yr):		4,278,132	1,382,762	152,142	242,987	
			peak demand (tons):			4,698					demand (kW / yr):		0	0	0	0	0

Condenser Circulation			Condenser Water Circulation - 460V pump VFD retrofit												
outdoor air DB (deg.F)	average output (tons)	annual duration (hr / yr)			CDW loop head loss			chiller output (tons)	CDW flow (gpm)	differential		efficiencies			power input kW
			condition	speed	static (ft w.c.)	dynamic (ft w.c.)	total (ft w.c.)			TDH (ft w.c.)	excess (ft w.c.)	device (%)	motor (%)	VFD (%)	
			EXISTING	100%	31.4	20.4	52	2,500	7,410	86	34	*80%*	*94%*	*100%*	160
			new VFD	100%	31.4	20.4	52	2,500	7,410	86	34	*80%*	*94%*	*97%*	164
			new VFD	99%	31.4	20.0	51	2,475	7,336	84	33	*80%*	*94%*	*97%*	160
			new VFD	98%	31.4	19.6	51	2,450	7,262	83	32	*80%*	*94%*	*97%*	156
			new VFD	97%	31.4	19.2	51	2,425	7,188	81	30	*79%*	*93%*	*97%*	152
			new VFD	96%	31.4	18.8	50	2,400	7,114	79	29	*79%*	*93%*	*97%*	148
			new VFD	95%	31.4	18.4	50	2,375	7,040	78	28	*79%*	*93%*	*97%*	145
			new VFD	94%	31.4	18.0	49	2,350	6,965	76	27	*79%*	*93%*	*97%*	141
			new VFD	93%	31.4	17.6	49	2,325	6,891	74	25	*79%*	*92%*	*97%*	137
			new VFD	92%	31.4	17.3	49	2,300	6,817	73	24	*78%*	*92%*	*97%*	133
			new VFD	91%	31.4	16.9	48	2,275	6,743	71	23	*78%*	*92%*	*97%*	130
			new VFD	90%	31.4	16.5	48	2,250	6,669	70	22	*78%*	*92%*	*97%*	126
			new VFD	89%	31.4	16.2	48	2,225	6,595	68	21	*78%*	*91%*	*97%*	122
			new VFD	88%	31.4	15.8	47	2,200	6,521	67	19	*78%*	*91%*	*97%*	119
			new VFD	87%	31.4	15.4	47	2,175	6,447	65	18	*77%*	*91%*	*97%*	116
			new VFD	86%	31.4	15.1	47	2,150	6,373	64	17	*77%*	*91%*	*97%*	112
			new VFD	85%	31.4	14.7	46	2,125	6,299	62	16	*77%*	*91%*	*97%*	109
			new VFD	84%	31.4	14.4	46	2,100	6,224	61	15	*77%*	*90%*	*97%*	106
			new VFD	83%	31.4	14.1	45	2,075	6,150	59	14	*77%*	*90%*	*97%*	102
			new VFD	82%	31.4	13.7	45	2,050	6,076	58	13	*76%*	*90%*	*97%*	99
			new VFD	81%	31.4	13.4	45	2,025	6,002	56	12	*76%*	*90%*	*97%*	96
			new VFD	80%	31.4	13.1	44	2,000	5,928	55	11	*76%*	*89%*	*97%*	93
ASSUME SPEED			new VFD	79%	31.4	12.7	44	1,975	5,854	54	10	*76%*	*89%*	*97%*	90.1
37.5	889	930	**new VFD**	79%	31.4	12.7	44	1,975	5,854	54	10	*76%*	*89%*	*97%*	90.1
32.5	820	743	**new VFD**	79%	31.4	12.7	44	1,975	5,854	54	10	*76%*	*89%*	*97%*	90.1
27.5	750	477	**new VFD**	79%	31.4	12.7	44	1,975	5,854	54	10	*76%*	*89%*	*97%*	90.1
22.5	680	301	**new VFD**	79%	31.4	12.7	44	1,975	5,854	54	10	*76%*	*89%*	*97%*	90.1
17.5	611	211	**new VFD**	79%	31.4	12.7	44	1,975	5,854	54	10	*76%*	*89%*	*97%*	90.1
12.5	541	83	**new VFD**	79%	31.4	12.7	44	1,975	5,854	54	10	*76%*	*89%*	*97%*	90.1
7.5	471	8	**new VFD**	79%	31.4	12.7	44	1,975	5,854	54	10	*76%*	*89%*	*97%*	90.1
2.5	0	0	**new VFD**	79%	31.4	12.7	44	1,975	5,854	54	10	*76%*	*89%*	*97%*	90.1
	total hours	2753													

Estimate of Static Head

sump lower water line to FF	2.8	feet
height of CDW column FF to centerline of 30" main	27.3	feet
centerline to top of 30" main	1.3	feet
other	0.0	feet
total static head	31.4	feet

Estimate of Dynamic Head

condenser pressure drop at design	***6.0***	feet
assumed piping pressure drop	***7.4***	feet
other	***0.0***	feet
assumed strainer & nozzle pressure drop	***7.0***	feet
total dynamic head	***20.4***	feet

Condenser Circulation

outdoor air DB (deg.F)	average output (tons)	annual duration (hr / yr)
77.5	3108	460
72.5	2736	579
67.5	2299	653
62.5	1969	797
57.5	1669	784
52.5	1335	662
47.5	1119	603
42.5	1000	570
	total hours	5108

Condenser Water Circulation - (1) 460V and (1) 4160Vpump VFD retrofit

condition	speed	CDW loop head loss: static (ft w.c.)	CDW loop head loss: dynamic (ft w.c.)	CDW loop head loss: total (ft w.c.)	chiller output (tons)	CDW flow (gpm)	differential: TDH (ft w.c.)	differential: excess (ft w.c.)	efficiencies: device (%)	efficiencies: motor (%)	efficiencies: VFD (%)	power input kW
EXISTING	100%	31.4	24.8	56	5,000	14,820	86	30	*80%*	*94%*	*100%*	319
new VFD	100%	31.4	24.8	56	5,000	14,820	86	30	*80%*	*94%*	*97%*	329
new VFD	99%	31.4	24.3	56	4,950	14,672	84	29	*80%*	*94%*	*97%*	321
new VFD	98%	31.4	23.9	55	4,900	14,524	83	27	*80%*	*94%*	*97%*	313
new VFD	97%	31.4	23.4	55	4,850	14,375	81	26	*79%*	*93%*	*97%*	305
new VFD	96%	31.4	22.9	54	4,800	14,227	79	25	*79%*	*93%*	*97%*	297
new VFD	95%	31.4	22.4	54	4,750	14,079	78	24	*79%*	*93%*	*97%*	289
new VFD	94%	31.4	21.9	53	4,700	13,931	76	23	*79%*	*93%*	*97%*	282
new VFD	93%	31.4	21.5	53	4,650	13,783	74	21	*79%*	*92%*	*97%*	274
new VFD	92%	31.4	21.0	52	4,600	13,634	73	20	*78%*	*92%*	*97%*	267
new VFD	91%	31.4	20.6	52	4,550	13,486	71	19	*78%*	*92%*	*97%*	259
new VFD	90%	31.4	20.1	52	4,500	13,338	70	18	*78%*	*92%*	*97%*	252
new VFD	89%	31.4	19.7	51	4,450	13,190	68	17	*78%*	*91%*	*97%*	245
new VFD	88%	31.4	19.2	51	4,400	13,042	67	16	*78%*	*91%*	*97%*	238
new VFD	87%	31.4	18.8	50	4,350	12,893	65	15	*77%*	*91%*	*97%*	231
new VFD	86%	31.4	18.4	50	4,300	12,745	64	14	*77%*	*91%*	*97%*	224
new VFD	85%	31.4	17.9	49	4,250	12,597	62	13	*77%*	*91%*	*97%*	218
new VFD	84%	31.4	17.5	49	4,200	12,449	61	12	*77%*	*90%*	*97%*	211
new VFD	83%	31.4	17.1	49	4,150	12,301	59	11	*77%*	*90%*	*97%*	205
ASSUME SPEED → new VFD	82%	31.4	16.7	48	4,100	12,152	58	10	*76%*	*90%*	*97%*	198
new VFD	82%	31.4	16.7	48	4,100	12,152	57.83	10	*76%*	*90%*	*97%*	198
new VFD	82%	31.4	16.7	48	4,100	12,152	58	10	*76%*	*90%*	*97%*	198
new VFD	82%	31.4	16.7	48	4,100	12,152	58	10	*76%*	*90%*	*97%*	198
new VFD	82%	31.4	16.7	48	4,100	12,152	58	10	*76%*	*90%*	*97%*	198
new VFD	82%	31.4	16.7	48	4,100	12,152	58	10	*76%*	*90%*	*97%*	198
new VFD	82%	31.4	16.7	48	4,100	12,152	58	10	*76%*	*90%*	*97%*	198
new VFD	82%	31.4	16.7	48	4,100	12,152	58	10	*76%*	*90%*	*97%*	198
new VFD	82%	31.4	16.7	48	4,100	12,152	58	10	*76%*	*90%*	*97%*	198

Estimate of Static Head

sump lower water line to FF	2.8	feet
height of CDW column FF to centerline of 30" main	27.3	feet
centerline to top of 30" main	1.3	feet
other	0.0	feet
total static head	31.4	feet

Estimate of Dynamic Head

condenser pressure drop at design	***6.0***	feet
assumed piping pressure drop	***7.4***	feet
other	***4.4***	feet
assumed strainer & nozzle pressure drop	***7.0***	feet
total dynamic head	***24.8***	feet

Estimate of Utilities | **ECM: VFD for 4160V Condenser Water Pump** | **Capitol CHW Plant**

Zone 1: General Operations		CALCULATION OF OPERATING HOURS BY ZONE						ADJUST VENTILATION - DEMAND CONTROL (CO2 DCV)					
		OCCUPIED (OCC) SEQUENCE			UNOCCUPIED (UNO) SEQUENCE			OCCUPIED (OCC) SEQUENCE			UNOCCUPIED (UNO) SEQUENCE		
	dy / wk	0 - 8	8 - 16	16 - 24	0 - 8	8 - 16	16 - 24	0 - 8	8 - 16	16 - 24	0 - 8	8 - 16	16 - 24
weekdays	5.0	2.0	8.0	2.0	6.0	0.0	6.0	100%	100%	100%	100%	100%	100%
Saturday	1.0	0.0	0.0	0.0	8.0	8.0	8.0	100%	100%	100%	100%	100%	100%
Sunday	1.0	0.0	0.0	0.0	8.0	8.0	8.0	100%	100%	100%	100%	100%	100%
subtotals:		10.0	40.0	10.0	46.0	16.0	46.0	100%	100%	100%	100%	100%	100%
percentage hours:		18%	71%	18%	82%	29%	82%	18%	71%	18%	82%	29%	82%

Weather Station: Harrisburg, PA 14751							Specifics - Moist Air		Zone Hours		DCV Adjustment		Solar Impact - SOL-AIR OA Temperature (˚F)				
Outdoor Air (OA) temp. (˚F)			enthalpy	TMY2 occurrences - duration (hr)			humidity	volume	Operations (hr / yr)		% of Design OA Min		assume rise in air temperature due to solar impact (˚F)				
range	average	MCWB	Btu/lb	0 - 8	8 - 16	16 - 24	W (gr / lb)	V (cf / lb)	OCC SEQ	UNO SEQ	OCC SEQ	UNO SEQ	0 - 8	8 - 16	16 - 24	OCC SEQ	UNO SEQ
95 / 99	97.5	76.0	39.7	0	16	0	103.5	13.6	11	5	100%	100%	0	28	7	28	28
90 / 94	92.5	74.0	37.9	0	28	11	99.4	13.5	22	17	100%	100%	0	26	7	24	16
85 / 89	87.5	72.9	36.8	0	113	46	100.6	13.5	89	70	100%	100%	0	24	6	23	14
80 / 84	82.5	69.2	33.6	7	309	144	87.8	13.4	248	212	100%	100%	0	22	5	21	12
75 / 79	77.5	67.9	32.6	114	259	238	89.2	13.4	248	363	100%	100%	0	21	5	16	7
70 / 74	72.5	64.7	30.0	165	202	236	80.9	13.3	216	387	100%	100%	0	19	4	13	5
65 / 69	67.5	61.1	27.4	321	231	246	71.6	13.2	266	532	100%	100%	0	17	4	11	3
60 / 64	62.5	56.9	24.5	306	221	296	61.0	13.1	265	558	100%	100%	0	15	3	9	3
55 / 59	57.5	51.6	21.2	249	199	221	48.0	12.9	226	443	100%	100%	0	13	2	9	3
50 / 54	52.5	47.0	18.8	215	202	204	39.9	12.8	219	402	100%	100%	0	11	2	8	2
45 / 49	47.5	42.7	16.6	184	196	156	33.9	12.7	201	335	100%	100%	0	9	1	7	2
40 / 44	42.5	37.7	14.3	220	214	237	26.5	12.6	234	437	100%	100%	0	7	0	5	1
35 / 39	37.5	32.9	12.2	290	286	354	20.8	12.5	319	611	100%	100%	0	5	0	3	1
30 / 34	32.5	28.6	10.4	332	219	192	16.9	12.4	250	493	100%	100%	0	3	0	2	0
25 / 29	27.5	23.8	8.5	221	96	160	12.5	12.3	137	340	100%	100%	0	2	0	1	0
20 / 24	22.5	19.4	6.9	132	80	89	10.0	12.2	97	204	100%	100%	0	0	0	0	0
15 / 19	17.5	15.0	5.4	101	39	71	8.1	12.1	59	152	100%	100%	0	0	0	0	0
10 / 14	12.5	10.5	4.0	56	9	18	6.4	12.0	20	63	100%	100%	0	0	0	0	0
5 / 9	7.5	5.9	2.6	7	1	0	5.2	11.9	2	6	100%	100%	0	0	0	0	0
0 / 4	2.5	0.0	0.9	0	0	0	1.8	11.7	0	0	0%	0%	0	0	0	0	0
-5 / -1	-2.5	0.0	0.0	0	0	0	0.0	11.7	0	0	0%	0%	0	0	0	0	0
			subtotals:	2,920	2,920	2,919			3,128	5,631							

Estimate of Utilities | **ECM: VFD for 4160V Condenser Water Pump** | **Capitol CHW Plant**

ASSUMPTIONS

GENERAL OPERATIONS		COOLING MODE (AIR CONDITIONING)		HEATING MODE	
		Cooling Tower Cycles of Concentration	*8*		
		blowdown flow rate (of design gpm)	0.143%		
130˚F DHW gal/person/yr	116.7	evaporation & drift flow rate (of design gpm)	1.040%		

Chilled Water System and Cooling Plant Calculations - OCCUPIED SEQUENCE HOURS ONLY

OA bin averages		Variable Primary Circulation (gpm)				Cooling Load (tons)				Cooling Generation (kW/ton)			Cooling Equipment Power (kW)				months of demand
average DB (˚F)	average WB (˚F)	loop flow	converted SCHW Pumps with VFDs			plant output	2008 Millennium		retrofitted turbo-master	2008 Millennium		retrofitted turbo-master	power input (kW)				
			Pump #1	Pump #2	Pump #3		first on	next on		first on	next on		chillers #1, #2, #3	CV CDW pumps	VV Tower Fans	Vari-Prime CHWPs	
97.5	76.0	9741	3,247	3,247	3,247	4698	1566	1566	1,566	0.62	0.62	0.77	3129	479	75	215	2
92.5	74.0	9141	3,047	3,047	3,047	4296	1432	1432	1,432	0.61	0.61	0.76	2828	479	59	180	2
87.5	72.9	8540	2,847	2,847	2,847	3895	1298	1298	1,298	0.61	0.61	0.75	2547	479	45	150	2
82.5	69.2	7940	2,647	2,647	2,647	3494	1165	1165	1,165	0.60	0.60	0.75	2283	479	34	122	1
77.5	67.9	7339	3,670	3,670	0	3093	1546	1546	0	0.61	0.61	0.00	1902	198	70	201	1
72.5	64.7	6739	3,369	3,369	0	2692	1346	1346	0	0.61	0.61	0.00	1633	198	47	159	2
67.5	61.1	6138	3,069	3,069	0	2291	1145	1145	0	0.60	0.60	0.00	1385	198	30	123	2
62.5	56.9	5538	2,769	2,769	0	1890	945	945	0	0.61	0.61	0.00	1154	198	22	92	0
57.5	51.6	4937	2,469	2,469	0	1488	744	744	0	0.63	0.63	0.00	940	198	22	67	0
52.5	47.0	4481	2,240	2,240	0	1099	549	549	0	0.68	0.68	0.00	743	198	22	52	0
47.5	42.7	4266	2,133	2,133	0	1029	514	514	0	0.69	0.69	0.00	708	198	22	45	0
42.5	37.7	4052	2,026	2,026	0	959	480	480	0	0.70	0.70	0.00	674	198	22	39	0
37.5	32.9	3837	1,919	1,919	0	889	0	0	0	0.00	0.00	0.00	0	90	22	34	0
32.5	28.6	3623	3,623	0	0	820	0	0	0	0.00	0.00	0.00	0	90	22	97	0
27.5	23.8	3408	3,408	0	0	750	0	0	0	0.00	0.00	0.00	0	90	22	82	0
22.5	19.4	3193	3,193	0	0	680	0	0	0	0.00	0.00	0.00	0	90	22	68	0
17.5	15.0	2979	2,979	0	0	611	0	0	0	0.00	0.00	0.00	0	90	22	57	0
12.5	10.5	2764	2,764	0	0	541	0	0	0	0.00	0.00	0.00	0	90	22	46	0
7.5	5.9	2550	2,550	0	0	471	0	0	0	0.00	0.00	0.00	0	90	22	37	0
2.5	0.0	2335	2,335	0	0	402	0	0	0	0.00	0.00	0.00	0	90	22	29	0
-2.5	0.0	2121	2,121	0	0	332	0	0	0	0.00	0.00	0.00	0	0	22	22	0
PLATE FRAME PROVIDES FULL COOLING when WB˚F ≤ [42˚F LWT - (1.5˚F PFHX + 8˚F tower) combined approach]			cooling (ton-hr / yr):			5,531,890					energy use (kWh / yr):		3,064,284	628,803	95,626	292,979	
			peak demand (tons):			4,698					demand (kW / yr):		27,230	4,342	617	1,975	12

Chilled Water System and Cooling Plant Calculations - UNOCCUPIED SEQUENCE HOURS ONLY

OA bin averages		Variable Primary Circulation (gpm)				Cooling Load (tons)				Cooling Generation (kW/ton)			Cooling Equipment Power (kW)				months of demand
average DB (˚F)	average WB (˚F)	loop flow	converted SCHW Pumps with VFDs			plant output	2008 Millennium		retrofitted turbo-master	2008 Millennium		retrofitted turbo-master	power input (kW)				
			Pump #1	Pump #2	Pump #3		first on	next on		first on	next on		chillers #1, #2, #3	CV CDW pumps	VV Tower Fans	Vari-Prime CHWPs	
97.5	76.0	9741	3,247	3,247	3,247	4698	1566	1566	1,566	0.62	0.62	0.77	3129	479	75	215	0
92.5	74.0	9141	3,047	3,047	3,047	4296	1432	1432	1,432	0.61	0.61	0.76	2828	479	59	180	0
87.5	72.9	7631	2,544	2,544	2,544	3462	1154	1154	1,154	0.60	0.60	0.75	2263	479	33	110	0
82.5	69.2	7166	2,389	2,389	0	3126	1563	1563	0	0.62	0.62	0.00	1924	198	70	62	0
77.5	67.9	6643	2,214	2,214	0	2762	1381	1381	0	0.61	0.61	0.00	1679	198	49	50	0
72.5	64.7	5926	1,975	1,975	0	2305	1153	1153	0	0.60	0.60	0.00	1393	198	30	37	0
67.5	61.1	5547	1,849	1,849	0	2009	1005	1005	0	0.61	0.61	0.00	1221	198	22	30	0
62.5	56.9	5227	1,742	1,742	0	1742	871	871	0	0.62	0.62	0.00	1074	198	22	26	0
57.5	51.6	4861	1,620	1,620	0	1452	726	726	0	0.63	0.63	0.00	921	198	22	21	0
52.5	47.0	4619	1,540	1,540	0	1164	582	582	0	0.67	0.67	0.00	775	198	22	20	0
47.5	42.7	4266	1,422	1,422	0	1029	514	514	0	0.69	0.69	0.00	708	198	22	20	0
42.5	37.7	4052	1,351	1,351	0	959	480	480	0	0.70	0.70	0.00	674	198	22	20	0
37.5	32.9	3837	1,919	1,919	0	889	0	0	0	0.00	0.00	0.00	0	90	22	34	0
32.5	28.6	3623	3,623	0	0	820	0	0	0	0.00	0.00	0.00	0	90	22	97	0
27.5	23.8	3408	3,408	0	0	750	0	0	0	0.00	0.00	0.00	0	90	22	82	0
22.5	19.4	3193	3,193	0	0	680	0	0	0	0.00	0.00	0.00	0	90	22	68	0
17.5	15.0	2979	2,979	0	0	611	0	0	0	0.00	0.00	0.00	0	90	22	57	0
12.5	10.5	2764	2,764	0	0	541	0	0	0	0.00	0.00	0.00	0	90	22	46	0
7.5	5.9	2550	2,550	0	0	471	0	0	0	0.00	0.00	0.00	0	90	22	37	0
2.5	0.0	2335	2,335	0	0	402	0	0	0	0.00	0.00	0.00	0	90	22	29	0
-2.5	0.0	2121	2,121	0	0	332	0	0	0	0.00	0.00	0.00	0	0	22	22	0
PLATE FRAME PROVIDES FULL COOLING when WB˚F ≤ [42˚F LWT - (1.5˚F PFHX + 8˚F tower) combined approach]			cooling (ton-hr / yr):			8,282,217					energy use (kWh / yr):		4,278,132	940,365	150,847	242,987	
			peak demand (tons):			4,698					demand (kW / yr):		0	0	0	0	0

Estimate of Utilities | **ECM: RETRO-COMMISSION CAPITOL & PLANT CONTROLS** | **Capitol CHW Plant**

Zone 1: General Operations		CALCULATION OF OPERATING HOURS BY ZONE						ADJUST VENTILATION - DEMAND CONTROL (CO2 DCV)					
		OCCUPIED (OCC) SEQUENCE			UNOCCUPIED (UNO) SEQUENCE			OCCUPIED (OCC) SEQUENCE			UNOCCUPIED (UNO) SEQUENCE		
	dy / wk	0 - 8	8 - 16	16 - 24	0 - 8	8 - 16	16 - 24	0 - 8	8 - 16	16 - 24	0 - 8	8 - 16	16 - 24
weekdays	5.0	2.0	8.0	2.0	6.0	0.0	6.0	100%	100%	100%	100%	100%	100%
Saturday	1.0	0.0	0.0	0.0	8.0	8.0	8.0	100%	100%	100%	100%	100%	100%
Sunday	1.0	0.0	0.0	0.0	8.0	8.0	8.0	100%	100%	100%	100%	100%	100%
subtotals:		10.0	40.0	10.0	46.0	16.0	46.0	100%	100%	100%	100%	100%	100%
percentage hours:		18%	71%	18%	82%	29%	82%	18%	71%	18%	82%	29%	82%

Weather Station: Harrisburg, PA 14751							Specifics - Moist Air		Zone Hours		DCV Adjustment		Solar Impact - SOL-AIR OA Temperature (˚F)				
Outdoor Air (OA) temp. (˚F)			enthalpy	TMY2 occurrences - duration (hr)			humidity	volume	Operations (hr / yr)		% of Design OA Min		assume rise in air temperature due to solar impact (˚F)				
range	average	MCWB	Btu/lb	0 - 8	8 - 16	16 - 24	W (gr / lb)	V (cf / lb)	OCC SEQ	UNO SEQ	OCC SEQ	UNO SEQ	0 - 8	8 - 16	16 - 24	OCC SEQ	UNO SEQ
95 / 99	97.5	76.0	39.7	0	16	0	103.5	13.6	11	5	100%	100%	0	28	7	28	28
90 / 94	92.5	74.0	37.9	0	28	11	99.4	13.5	22	17	100%	100%	0	26	7	24	16
85 / 89	87.5	72.9	36.8	0	113	46	100.6	13.5	89	70	100%	100%	0	24	6	23	14
80 / 84	82.5	69.2	33.6	7	309	144	87.8	13.4	248	212	100%	100%	0	22	5	21	12
75 / 79	77.5	67.9	32.6	114	259	238	89.2	13.4	248	363	100%	100%	0	21	5	16	7
70 / 74	72.5	64.7	30.0	165	202	236	80.9	13.3	216	387	100%	100%	0	19	4	13	5
65 / 69	67.5	61.1	27.4	321	231	246	71.6	13.2	266	532	100%	100%	0	17	4	11	3
60 / 64	62.5	56.9	24.5	306	221	296	61.0	13.1	265	558	100%	100%	0	15	3	9	3
55 / 59	57.5	51.6	21.2	249	199	221	48.0	12.9	226	443	100%	100%	0	13	2	9	3
50 / 54	52.5	47.0	18.8	215	202	204	39.9	12.8	219	402	100%	100%	0	11	2	8	2
45 / 49	47.5	42.7	16.6	184	196	156	33.9	12.7	201	335	100%	100%	0	9	1	7	2
40 / 44	42.5	37.7	14.3	220	214	237	26.5	12.6	234	437	100%	100%	0	7	0	5	1
35 / 39	37.5	32.9	12.2	290	286	354	20.8	12.5	319	611	100%	100%	0	5	0	3	1
30 / 34	32.5	28.6	10.4	332	219	192	16.9	12.4	250	493	100%	100%	0	3	0	2	0
25 / 29	27.5	23.8	8.5	221	96	160	12.5	12.3	137	340	100%	100%	0	2	0	1	0
20 / 24	22.5	19.4	6.9	132	80	89	10.0	12.2	97	204	100%	100%	0	0	0	0	0
15 / 19	17.5	15.0	5.4	101	39	71	8.1	12.1	59	152	100%	100%	0	0	0	0	0
10 / 14	12.5	10.5	4.0	56	9	18	6.4	12.0	20	63	100%	100%	0	0	0	0	0
5 / 9	7.5	5.9	2.6	7	1	0	5.2	11.9	2	6	100%	100%	0	0	0	0	0
0 / 4	2.5	0.0	0.9	0	0	0	1.8	14.0	0	0	0%	0%	0	0	0	0	0
-5 / -1	-2.5	0.0	0.0	0	0	0	0.0	11.7	0	0	0%	0%	0	0	0	0	0
		subtotals:		2,920	2,920	2,919			3,128	5,631							

Estimate of Utilities | **ECM: RETRO-COMMISSION CAPITOL & PLANT CONTROLS** | **Capitol CHW Plant**

ASSUMPTIONS

GENERAL OPERATIONS		COOLING MODE (AIR CONDITIONING)		HEATING MODE	
		Cooling Tower Cycles of Concentration	*8*		
		blowdown flow rate (of design gpm)	0.143%		
130˚F DHW gal/person/yr	116.7	evaporation & drift flow rate (of design gpm)	1.040%		

Chilled Water System and Cooling Plant Calculations - OCCUPIED SEQUENCE HOURS ONLY

OA bin averages		Variable Primary Circulation (gpm)				Cooling Load (tons)				Cooling Generation (kW/ton)			Cooling Equipment Power (kW)				months of demand
average DB (˚F)	average WB (˚F)	loop flow	converted SCHW Pumps with VFDs			plant output	2008 Millennium		retrofitted turbo-master	2008 Millennium		retrofitted turbo-master	power input (kW)				
			Pump #1	Pump #2	Pump #3		first on	next on		first on	next on		chillers #1, #2, #3	CV CDW pumps	VV Tower Fans	Vari-Prime CHWPs	
97.5	76.0	8397	2,799	2,799	2,799	4204	1401	1401	1,401	0.61	0.61	0.75	2762	479	55	143	2
92.5	74.0	7879	2,626	2,626	2,626	3845	1282	1282	1,282	0.61	0.61	0.75	2513	479	43	120	2
87.5	72.9	7362	3,681	3,681	0	3486	1743	1743	0	0.63	0.63	0.00	2185	319	99	202	2
82.5	69.2	6844	3,422	3,422	0	3127	1564	1564	0	0.62	0.62	0.00	1926	198	71	165	1
77.5	67.9	6326	3,163	3,163	0	2768	1384	1384	0	0.61	0.61	0.00	1683	198	51	133	1
72.5	64.7	5809	2,904	2,904	0	2409	1205	1205	0	0.60	0.60	0.00	1456	198	35	105	2
67.5	61.1	5291	2,646	2,646	0	2050	1025	1025	0	0.61	0.61	0.00	1245	198	22	82	2
62.5	56.9	4773	2,387	2,387	0	1691	846	846	0	0.62	0.62	0.00	1047	198	22	61	0
57.5	51.6	4256	2,128	2,128	0	1332	666	666	0	0.65	0.65	0.00	860	198	22	45	0
52.5	47.0	3863	1,931	1,931	0	983	492	492	0	0.70	0.70	0.00	686	198	22	34	0
47.5	42.7	3678	3,678	0	0	921	921	0	0	0.61	0.00	0.00	564	198	22	101	0
42.5	37.7	3493	3,493	0	0	858	858	0	0	0.62	0.00	0.00	530	198	22	88	0
37.5	32.9	3308	3,308	0	0	796	0	0	0	0.00	0.00	0.00	0	0	22	75	0
32.5	28.6	3123	3,123	0	0	734	0	0	0	0.00	0.00	0.00	0	90	22	64	0
27.5	23.8	2938	2,938	0	0	671	0	0	0	0.00	0.00	0.00	0	90	22	54	0
22.5	19.4	2753	2,753	0	0	609	0	0	0	0.00	0.00	0.00	0	90	22	45	0
17.5	15.0	2568	2,568	0	0	547	0	0	0	0.00	0.00	0.00	0	90	22	38	0
12.5	10.5	2383	2,383	0	0	484	0	0	0	0.00	0.00	0.00	0	90	22	31	0
7.5	5.9	2198	2,198	0	0	422	0	0	0	0.00	0.00	0.00	0	90	22	24	0
2.5	0.0	2013	2,013	0	0	359	0	0	0	0.00	0.00	0.00	0	90	22	19	0
-2.5	0.0	1828	1,828	0	0	297	0	0	0	0.00	0.00	0.00	0	0	22	15	0
PLATE FRAME PROVIDES FULL COOLING when WB˚F ≤ [42˚F LWT - (1.5˚F PFHX + 8˚F tower) combined approach]			cooling (ton-hr / yr):			4,951,042	The rCx project assumes a 13.8% reduction in flow and a 10.5% reduction in load.			energy use (kWh / yr):			2,680,745	545,240	99,602	270,268	
			peak demand (tons):			4,204				demand (kW / yr):			23,930	3,743	631	1,603	12

Chilled Water System and Cooling Plant Calculations - UNOCCUPIED SEQUENCE HOURS ONLY

OA bin averages		Variable Primary Circulation (gpm)				Cooling Load (tons)				Cooling Generation (kW/ton)			Cooling Equipment Power (kW)				months of demand
average DB (˚F)	average WB (˚F)	loop flow	converted SCHW Pumps with VFDs			plant output	2008 Millennium		retrofitted turbo-master	2008 Millennium		retrofitted turbo-master	power input (kW)				
			Pump #1	Pump #2	Pump #3		first on	next on		first on	next on		chillers #1, #2, #3	CV CDW pumps	VV Tower Fans	Vari-Prime CHWPs	
97.5	76.0	8397	2,799	2,799	2,799	4204	1401	1401	1,401	0.61	0.61	0.75	2762	479	55	143	0
92.5	74.0	7879	2,626	2,626	2,626	3845	1282	1282	1,282	0.61	0.61	0.75	2513	479	43	120	0
87.5	72.9	6578	2,193	2,193	0	3099	1549	1549	0	0.61	0.61	0.00	1906	198	68	49	0
82.5	69.2	6177	2,059	2,059	0	2797	1399	1399	0	0.61	0.61	0.00	1702	198	51	41	0
77.5	67.9	5727	1,909	1,909	0	2472	1236	1236	0	0.60	0.60	0.00	1495	198	36	33	0
72.5	64.7	5109	1,703	1,703	0	2063	1032	1032	0	0.61	0.61	0.00	1252	198	22	24	0
67.5	61.1	4781	1,594	1,594	0	1798	899	899	0	0.61	0.61	0.00	1104	198	22	20	0
62.5	56.9	4506	1,502	1,502	0	1559	779	779	0	0.63	0.63	0.00	977	198	22	20	0
57.5	51.6	4190	1,397	1,397	0	1300	650	650	0	0.65	0.65	0.00	844	198	22	20	0
52.5	47.0	3981	1,327	1,327	0	1042	521	521	0	0.69	0.69	0.00	715	198	22	20	0
47.5	42.7	3678	3,678	0	0	921	921	0	0	0.61	0.00	0.00	564	198	22	101	0
42.5	37.7	3493	3,493	0	0	858	858	0	0	0.62	0.00	0.00	530	198	22	88	0
37.5	32.9	3308	3,308	0	0	796	0	0	0	0.00	0.00	0.00	0	0	22	75	0
32.5	28.6	3123	3,123	0	0	734	0	0	0	0.00	0.00	0.00	0	90	22	64	0
27.5	23.8	2938	2,938	0	0	671	0	0	0	0.00	0.00	0.00	0	90	22	54	0
22.5	19.4	2753	2,753	0	0	609	0	0	0	0.00	0.00	0.00	0	90	22	45	0
17.5	15.0	2568	2,568	0	0	547	0	0	0	0.00	0.00	0.00	0	90	22	38	0
12.5	10.5	2383	2,383	0	0	484	0	0	0	0.00	0.00	0.00	0	90	22	31	0
7.5	5.9	2198	2,198	0	0	422	0	0	0	0.00	0.00	0.00	0	90	22	24	0
2.5	0.0	2013	2,013	0	0	359	0	0	0	0.00	0.00	0.00	0	90	22	19	0
-2.5	0.0	1828	1,828	0	0	297	0	0	0	0.00	0.00	0.00	0	0	22	15	0
PLATE FRAME PROVIDES FULL COOLING when WB˚F ≤ [42˚F LWT - (1.5˚F PFHX + 8˚F tower) combined approach]			cooling (ton-hr / yr):			7,412,584	The rCx project assumes a 13.8% reduction in flow and a 10.5% reduction in load.			energy use (kWh / yr):			3,791,052	920,737	141,284	261,200	
			peak demand (tons):			4,204				demand (kW / yr):			0	0	0	0	0

Overall Coefficient of Heat Transmission - ASHRAE Window Product Class "C"

Tabulation of U-Values for Class "C" commercial window products

simulation references highlighted data

		frame		glazing	emissivity	space between panes		U-Value
		material	break		ε	depth (in)	fill	Btu/hr/sf/°F
CA-S---	aluminum frame no break single-glazed std -	aluminum	no	single	std	-	n/a	1.23
CA-T---	aluminum frame no break acrylic-glazed std -	aluminum	no	acrylic	std	-	n/a	1.16
CA-D-¼"-	aluminum frame no break double-glazed std ¼" airspace	aluminum	no	double	std	¼"	air	0.78
CA-D-⅜"-	aluminum frame no break double-glazed std ⅜" airspace	aluminum	no	double	std	⅜"	air	0.74
CA-D-½"-	aluminum frame no break double-glazed std ½" airspace	aluminum	no	double	std	½"	air	0.72
CATBD-¼"-	aluminum frame thermal break double-glazed std ¼" airspace	aluminum	thermal	double	std	¼"	air	0.65
CATBD-⅜"-	aluminum frame thermal break double-glazed std ⅜" airspace	aluminum	thermal	double	std	⅜"	air	0.6
CATBD-½"-	aluminum frame thermal break double-glazed std ½" airspace	aluminum	thermal	double	std	½"	air	0.59
CA-Dε¼"-	aluminum frame no break double-glazed low-ε ¼" airspace	aluminum	no	double	low-ε	¼"	air	0.68
CA-Dε⅜"-	aluminum frame no break double-glazed low-ε ⅜" airspace	aluminum	no	double	low-ε	⅜"	air	0.62
CA-Dε½"-	aluminum frame no break double-glazed low-ε ½" airspace	aluminum	no	double	low-ε	½"	air	0.6
CATBDε¼"-	aluminum frame thermal break double-glazed low-ε ¼" airspace	aluminum	thermal	double	low-ε	¼"	air	0.55
CATBDε⅜"-	aluminum frame thermal break double-glazed low-ε ⅜" airspace	aluminum	thermal	double	low-ε	⅜"	air	0.48
CATBDε½"-	aluminum frame thermal break double-glazed low-ε ½" airspace	aluminum	thermal	double	low-ε	½"	air	0.46
CVTBDε¼"-	wood / vinyl frame thermal break double-glazed low-ε ¼" airspace	wood / vinyl	thermal	double	low-ε	¼"	air	0.46
CVTBDε⅜"-	wood / vinyl frame thermal break double-glazed low-ε ⅜" airspace	wood / vinyl	thermal	double	low-ε	⅜"	air	0.39
CVTBDε½"-	wood / vinyl frame thermal break double-glazed low-ε ½" airspace	wood / vinyl	thermal	double	low-ε	½"	air	0.37
CA-Dε¼"A	aluminum frame no break double-glazed low-ε ¼" argon fill	aluminum	no	double	low-ε	¼"	argon	0.62
CA-Dε⅜"A	aluminum frame no break double-glazed low-ε ⅜" argon fill	aluminum	no	double	low-ε	⅜"	argon	0.57
CA-Dε½"A	aluminum frame no break double-glazed low-ε ½" argon fill	aluminum	no	double	low-ε	½"	argon	0.55
CATBDε¼"A	aluminum frame thermal break double-glazed low-ε ¼" argon fill	aluminum	thermal	double	low-ε	¼"	argon	0.48
CATBDε⅜"A	aluminum frame thermal break double-glazed low-ε ⅜" argon fill	aluminum	thermal	double	low-ε	⅜"	argon	0.43
CATBDε½"A	aluminum frame thermal break double-glazed low-ε ½" argon fill	aluminum	thermal	double	low-ε	½"	argon	0.42
CVTBDε¼"A	wood / vinyl frame thermal break double-glazed low-ε ¼" argon fill	wood / vinyl	thermal	double	low-ε	¼"	argon	0.39
CVTBDε⅜"A	wood / vinyl frame thermal break double-glazed low-ε ⅜" argon fill	wood / vinyl	thermal	double	low-ε	⅜"	argon	0.34
CVTBDε½"A	wood / vinyl frame thermal break double-glazed low-ε ½" argon fill	wood / vinyl	thermal	double	low-ε	½"	argon	0.33
CATBTε¼"A	aluminum frame thermal break triple-glazed low-ε ¼" argon fill	aluminum	thermal	triple	low-ε	¼"	argon	0.44
CATBTε⅜"A	aluminum frame thermal break triple-glazed low-ε ⅜" argon fill	aluminum	thermal	triple	low-ε	⅜"	argon	0.41
CATBTε½"A	aluminum frame thermal break triple-glazed low-ε ½" argon fill	aluminum	thermal	triple	low-ε	½"	argon	0.39
CVTBTε¼"A	wood / vinyl frame thermal break triple-glazed low-ε ¼" argon fill	wood / vinyl	thermal	triple	low-ε	¼"	argon	0.35
CVTBTε⅜"A	wood / vinyl frame thermal break triple-glazed low-ε ⅜" argon fill	wood / vinyl	thermal	triple	low-ε	⅜"	argon	0.32
CVTBTε½"A	wood / vinyl frame thermal break triple-glazed low-ε ½" argon fill	wood / vinyl	thermal	triple	low-ε	½"	argon	0.31

ECM ANALYSIS: APPLICATION OF SOLAR CONTROL FILM

LABOR & INDUSTRY

ENVELOPE HEAT TRANSFER CHARACTERISTICS - WINDOWS

Window Opening & Crack Dimensions						Window Counts by Type					
window inventory	dims (in) W x H	area (sf)	crack multiplier	crack depth (inch)	crack (sf)	CATBDε½"-	CATBDε½"-	CATBDε½"-	CATBDε½"-	CATBDε½"-	CATBDε½"-
type ①	DH	0.0	W•3 H•2	0	0.0						
type ⑰	fixed	1.0	W•0 H•0	0	0.0	1					
type ⑱	type ⑰ film added	-1.0	W•0 H•0	0	0.0		1				
					total area of opening (sf)	1	-1	0	0	0	0
					code	CATBDε½"-	CATBDε½"-	CATBDε½"-	CATBDε½"-	CATBDε½"-	CATBDε½"-
					U-value of product (Btu / hr / sf / °F)	0.460	0.400	0.460	0.460	0.460	0.460
					heat transfer due to conduction (Btu / hr / °F)	0.460	-0.400	0.000	0.000	0.000	0.000
					subtotal conduction heat transfer rate for openings detailed above (Btu / hr / °F)						**0.060**

Heat Transfer: slab, below grade wall, windows

	perimeter LF*	U or F2 Btu / hr / °F / sf	area SF	rate Btu / hr / °F	
slab				-	Btu / hr / °F
below grade wall				-	Btu / hr / °F
window		0.060	18,617	1,114	Btu / hr / °F
window				-	Btu / hr / °F
subtotal conduction heat transfer rate for slab, below grade wall and windows defined above				1,114	**Btu / hr / °F**
GRAND TOTAL CONDUCTION HEAT TRANSFER RATE - AFFECTED COMPONENTS				1,114	**Btu / hr / °F**

ECM ANALYSIS: APPLICATION OF SOLAR CONTROL FILM

LABOR & INDUSTRY

Heating System Calculations - OCCUPIED SEQUENCE HOURS ONLY

OA bin average Temp ˚F	heating season hrs/yr	interior balance temp ˚F	Instantaneous Heat Output in mBh			estimated generation efficiency	internal gain adjust	Heat Load (mmBtu / yr)		
			envelope gains		subtotal loads			envelope gains		subtotal loads
			infiltrat'n	conduct'n				infiltrat'n	condct'n	
52.5	219.1	55		3	3	100%	100%		0.6	1
47.5	200.7	55		8	8	100%	100%		1.7	2
42.5	234.5	55		14	14	100%	100%		3.3	3
37.5	319.3	55		19	19	100%	100%		6.2	6
32.5	250.0	55		25	25	100%	100%		6.3	6
27.5	136.6	55		31	31	100%	100%		4.2	4
22.5	96.6	55		36	36	100%	100%		3.5	3
17.5	58.6	55		42	42	100%	100%		2.4	2
12.5	19.6	55		47	47	100%	100%		0.9	1
7.5	2.0	55		53	53	100%	100%		0.1	0
2.5	0.0	55		58	58	100%	100%		0.0	0
							subtotals:	0	29	29
						pro-rated average seasonal efficiency:				

* internal gains include electric space heat & electric humidification, as well as interior lighting, plug loads and personnel

Heating System Calculations - UNOCCUPIED SEQUENCE HOURS ONLY

OA bin average Temp ˚F	heating season hrs/yr	interior balance temp ˚F	Instantaneous Heat Output in mBh			estimated generation efficiency	internal gain adjust	Heat Load (mmBtu / yr)		
			envelope gains		subtotal loads			envelope gains		subtotal loads
			infiltrat'n	conduct'n				infiltrat'n	condct'n	
52.5	401.9	50		0	0	100%	100%		0.0	0
47.5	335.3	50		3	3	100%	100%		0.9	1
42.5	436.5	50		8	8	100%	100%		3.6	4
37.5	610.7	50		14	14	100%	100%		8.5	9
32.5	493.0	50		19	19	100%	100%		9.6	10
27.5	340.4	50		25	25	100%	100%		8.5	9
22.5	204.4	50		31	31	100%	100%		6.3	6
17.5	152.4	50		36	36	100%	100%		5.5	6
12.5	63.4	50		42	42	100%	100%		2.6	3
7.5	6.0	50		47	47	100%	100%		0.3	0
2.5	0.0	50		53	53	100%	100%		0.0	0
							subtotals:	0	46	46
						pro-rated average seasonal efficiency:				

* internal gains include electric space heat & electric humidification, as well as interior lighting, plug loads and personnel

ECM ANALYSIS: APPLICATION OF SOLAR CONTROL FILM

LABOR & INDUSTRY

LABOR & INDUSTRY ZONES WITH INTERNAL SHADING — COOLING IMPACT DUE TO FILM APPLICATION

Orientation & AM data set	PM data set	Shading Coefficient (SC) existing coating etc	Shading Coefficient (SC) existing exterior & interior	Shading Coefficient (SC) proposed coating etc	Shading Coefficient (SC) proposed exterior & interior	project window area (sf)	Solar Gain 40° North Latitude — Solar Gain (Btu / sf) summer peak hour AM	summer peak hour PM	summer total AM	summer total PM	Cooling Savings Peak Load (tons)	Cooling Savings Annual Energy (ton·hr/yr)
ENE	WNW		0.36		0.17	1077	198	40	133220	27719	3.4	2756
NNW	NNE		0.36		0.17		38	102	27780	54847	0.0	0
SSE	SSW		0.36		0.17	15504	209	185	133650	58764	51.5	47434
WSW	ESE		0.36		0.17	2035	55	227	29959	180859	7.3	6822
					TOTALS / MAX:	18617					51.5	57012

LABOR & INDUSTRY ZONES WITH NO INTERNAL SHADING — COOLING IMPACT DUE TO FILM APPLICATION

Orientation & AM data set	PM data set	Shading Coefficient (SC) existing coating etc	Shading Coefficient (SC) existing exterior & interior	Shading Coefficient (SC) proposed coating etc	Shading Coefficient (SC) proposed exterior & interior	project window area (sf)	Solar Gain 40° North Latitude — Solar Gain (Btu / sf) summer peak hour AM	summer peak hour PM	summer total AM	summer total PM	Cooling Savings Peak Load (tons)	Cooling Savings Annual Energy (ton·hr/yr)
ENE	WNW	0.55			0.26	2453	198	40	133220	27719	11.8	9591
NNW	NNE	0.55			0.26		38	102	27780	54847	0.0	0
SSE	SSW	0.55			0.26	7256	209	185	133650	58764	36.8	33915
WSW	ESE	0.55			0.26	2553	55	227	29959	180859	14.1	13073
					TOTALS / MAX:	12262					36.8	56578
					TOTALS / MAX [SHADED & UNSHADED AREAS COMBINED]:	30879					88.4	113591

ASHRAE Fundamentals indicates SC values for fenestration with internal shading devices.

Table 26 below is excerpted from 1989 ASHRAE Fundamentals page 27.31:

Table 26 Shading Coefficients for Insulating Glass[a] with Indoor Shading by Venetian Blinds or Roller Shades

Type of Glass	Nominal Thickness, Each Light	Solar Trans.[b] Outer Pane	Solar Trans.[b] Inner Pane	Type of Shading: Venetian Blinds[c] Medium	Venetian Blinds[c] Light	Roller Shade: Opaque Dark	Roller Shade: Opaque White	Roller Shade: Translucent Light
Clear Out Clear In	3/32, 1/8 in.	0.87	0.87	0.62[d] (0.63)[e]	0.58[d] (0.58)[e]	0.71	0.35	0.40
Clear In	1/4 in.	0.80	0.80					
Heat-Absorbing[f] Out Clear In	1/4 in.	0.46	0.80	0.39	0.36	0.40	0.22	0.30
Reflective Coated Glass								
SC[g]= 0.20				0.19	0.18			
0.30				0.27	0.26			
0.40				0.34	0.33			

[a]Refers to factory-fabricated units with 3/16, 1/4, or 1/2-in. air space, or to prime windows plus storm windows.
[b]Refer to manufacturer's literature for exact values.
[c]For vertical blinds with opaque white or beige louvers, tightly closed, SC is approximately the same as for opaque white roller shades.
[d]From Van Dyck and Kotter (1982). For 45° open venetian blinds, 35° solar incidence, and 35° profile angle.
[e]Values for closed venetian blinds. Use these values only when operation is automated for solar gain reduction (as opposed to daylight use).
[f]Refers to bronze, or green tinted, heat-absorbing glass.
[g]SC for glass with no shading device.

Table 20 (right) is excerpted from 1989 ASHRAE Fundamentals page 27.26:

Table 20 Shading Coefficients for Single Glass and Insulating Glass[a]

Type of Glass	Nominal Thickness[b]	Solar Trans.[b]	Shading Coefficient h_o=4.0	Shading Coefficient h_o=3.0
A. Single Glass				
Clear	1/8 in.	0.86	1.00	1.00
	1/4 in.	0.78	0.94	0.95
	3/8 in.	0.72	0.90	0.92
	1/2 in.	0.67	0.87	0.88
Heat Absorbing	1/8 in.	0.64	0.83	0.85
	1/4 in.	0.46	0.69	0.73
	3/8 in.	0.33	0.60	0.64
	1/2 in.	0.24	0.53	0.58
B. Insulating Glass				
Clear Out, Clear In	1/8 in.[c]	0.71[e]	0.88	0.88
Clear Out, Clear In	1/4 in.	0.61	0.81	0.82
Heat Absorbing[d] Out, Clear In	1/4 in.	0.36	0.55	0.58

[a]Refers to factory-fabricated units with 3/16, 1/4, or 1/2-in. air space or to prime windows plus storm sash.
[b]Refer to manufacturer's literature for values.
[c]Thickness of each pane of glass, not thickness of assembled unit.
[d]Refers to gray, bronze, and green tinted heat-absorbing float glass.
[e]Combined transmittance for assembled unit.

ECM ANALYSIS: APPLICATION OF SOLAR CONTROL FILM

LABOR & INDUSTRY

Solar Intensity and Solar Heat Gain Factors for 40° North Latitude - For Calculating Window Savings Associated with a Change in Shading

Half Day Totals

	WINTER (HEATING)				SUMMER (COOLING)						WINTER (HEATING)	
Days	31	28	31	30	31	30	31	31	30	31	30	31
	JAN	FEB	MAR	APR	MAY	JUN	JULY	AUG	SEP	OCT	NOV	DEC
DIRECT NORMAL	1238	1450	1612	1692	1722	1730	1668	1599	1499	1374	1217	1132
E	452	648	832	957	1024	1038	1008	928	787	623	445	374
ENE	199	361	563	758	893	941	885	741	534	351	198	146
ESE	734	916	1035	1051	1025	999	1003	1013	980	878	721	649
HORI-ZONTAL	354	578	794	957	1083	1126	1076	946	738	540	354	282
N	61	84	114	154	215	253	223	164	119	88	63	52
NE	73	152	302	501	666	734	666	498	291	152	75	56
NNE	61	86	139	265	404	470	411	273	142	89	63	52
NNW	61	84	113	147	175	188	181	156	118	88	63	525
NW	61	84	113	147	174	186	180	156	118	88	63	52
S	813	821	694	488	358	315	352	474	672	491	798	775
SE	904	1049	1087	994	881	818	858	956	1033	1006	887	822
SSE	932	1015	968	782	601	523	584	751	925	974	914	867
SSW	561	508	403	296	247	236	248	296	396	493	551	557
SW	273	250	220	199	200	204	204	205	222	247	269	276
W	62	85	114	148	176	188	181	157	119	89	63	53
WNW	61	84	113	147	175	187	180	156	118	88	63	52
WSW	101	114	132	157	180	191	186	166	137	117	101	94

ECM ANALYSIS: APPLICATION OF SOLAR CONTROL FILM

HEALTH & WELFARE

Overall Coefficient of Heat Transmission - ASHRAE Window Product Class "C"

Tabulation of U-Values for Class "C" commercial window products		frame		glazing	emissivity	space between panes		U-Value
simulation references highlighted data		material	break		ε	depth (in)	fill	Btu/hr/sf/°F
CATBDε½"-	aluminum frame thermal break double-glazed low-ε ½" airspace	aluminum	thermal	double	low-ε	½"	air	0.46

ENVELOPE HEAT TRANSFER CHARACTERISTICS - WINDOWS

Window Opening & Crack Dimensions						Window Counts by Type					
window inventory	dims (in) W x H	area (sf)	crack multiplier	crack depth (inch)	crack (sf)	CATBDε½"-	CATBDε½"-	CATBDε½"-	CATBDε½"-	CATBDε½"-	CATBDε½"-
type ⑰	fixed	1.0	W•0 H•0	0	0.0	1					
type ⑱	type ⑰ film added	-1.0	W•0 H•0	0	0.0		1				
					total area of opening (sf)	1	-1	0	0	0	0
					code	CATBDε½"-	CATBDε½"-	CATBDε½"-	CATBDε½"-	CATBDε½"-	CATBDε½"-
					U-value of product (Btu / hr / sf / °F)	0.460	0.400	0.460	0.460	0.460	0.460
					heat transfer due to conduction (Btu / hr / ˚F)	0.460	-0.400	0.000	0.000	0.000	0.000
					subtotal conduction heat transfer rate for openings detailed above (Btu / hr / ˚F)						**0.060**

Heat Transfer: slab, below grade wall, windows

	perimeter LF*	U or F2 Btu / hr / ˚F / sf	area SF	rate Btu / hr / ˚F	
slab				-	Btu / hr / ˚F
below grade wall				-	Btu / hr / ˚F
window		0.060	6,898	413	Btu / hr / ˚F
window				-	Btu / hr / ˚F
subtotal conduction heat transfer rate for slab, below grade wall and windows defined above				413	**Btu / hr / ˚F**
GRAND TOTAL CONDUCTION HEAT TRANSFER RATE - AFFECTED COMPONENTS				413	**Btu / hr / ˚F**

ECM ANALYSIS: APPLICATION OF SOLAR CONTROL FILM

HEALTH & WELFARE

Heating System Calculations - OCCUPIED SEQUENCE HOURS ONLY

OA bin average Temp ˚F	heating season hrs/yr	interior balance temp ˚F	Instantaneous Heat Output in mBh			estimated generation efficiency	internal gain adjust	Heat Load (mmBtu / yr)		
			envelope gains		subtotal loads			envelope gains		subtotal loads
			infiltrat'n	conduct'n				infiltrat'n	condct'n	
52.5	219.1	55		1	1	100%	100%		0.2	0
47.5	200.7	55		3	3	100%	100%		0.6	1
42.5	234.5	55		5	5	100%	100%		1.2	1
37.5	319.3	55		7	7	100%	100%		2.3	2
32.5	250.0	55		9	9	100%	100%		2.3	2
27.5	136.6	55		11	11	100%	100%		1.6	2
22.5	96.6	55		13	13	100%	100%		1.3	1
17.5	58.6	55		15	15	100%	100%		0.9	1
12.5	19.6	55		18	18	100%	100%		0.3	0
7.5	2.0	55		20	20	100%	100%		0.0	0
2.5	0.0	55		22	22	100%	100%		0.0	0
						subtotals:		0	11	11
						pro-rated average seasonal efficiency:				

* internal gains include electric space heat & electric humidification, as well as interior lighting, plug loads and personnel

Heating System Calculations - UNOCCUPIED SEQUENCE HOURS ONLY

OA bin average Temp ˚F	heating season hrs/yr	interior balance temp ˚F	Instantaneous Heat Output in mBh			estimated generation efficiency	internal gain adjust	Heat Load (mmBtu / yr)		
			envelope gains		subtotal loads			envelope gains		subtotal loads
			infiltrat'n	conduct'n				infiltrat'n	condct'n	
52.5	401.9	50		0	0	100%	100%		0.0	0
47.5	335.3	50		1	1	100%	100%		0.3	0
42.5	436.5	50		3	3	100%	100%		1.4	1
37.5	610.7	50		5	5	100%	100%		3.2	3
32.5	493.0	50		7	7	100%	100%		3.6	4
27.5	340.4	50		9	9	100%	100%		3.2	3
22.5	204.4	50		11	11	100%	100%		2.3	2
17.5	152.4	50		13	13	100%	100%		2.0	2
12.5	63.4	50		15	15	100%	100%		1.0	1
7.5	6.0	50		18	18	100%	100%		0.1	0
2.5	0.0	50		20	20	100%	100%		0.0	0
						subtotals:		0	17	17
						pro-rated average seasonal efficiency:				

* internal gains include electric space heat & electric humidification, as well as interior lighting, plug loads and personnel

ECM ANALYSIS: APPLICATION OF SOLAR CONTROL FILM

HEALTH & WELFARE

HEALTH & WELFARE ZONES WITH INTERNAL SHADING — COOLING IMPACT DUE TO FILM APPLICATION

Orientation & AM data set	PM data set	Shading Coefficient (SC) existing coating etc	Shading Coefficient (SC) existing exterior & interior	Shading Coefficient (SC) proposed coating etc	Shading Coefficient (SC) proposed exterior & interior	project window area (sf)	Solar Gain 40° North Latitude — Solar Gain (Btu / sf) summer peak hour AM	summer peak hour PM	summer total AM	summer total PM	Cooling Savings Peak Load (tons)	Cooling Savings Annual Energy (ton·hr/yr)
ENE	WNW		0.36		0.17	696	198	40	133220	27719	2.2	1782
NNW	NNE		0.36		0.17	0	38	102	27780	54847	0.0	0
SSE	SSW		0.36		0.17	5621	209	185	133650	58764	18.7	17196
WSW	ESE		0.36		0.17	581	55	227	29959	180859	2.1	1948
					TOTALS / MAX:	6898					18.7	20926

HEALTH & WELFARE ZONES WITH NO INTERNAL SHADING — COOLING IMPACT DUE TO FILM APPLICATION

Orientation & AM data set	PM data set	Shading Coefficient (SC) existing coating etc	Shading Coefficient (SC) existing exterior & interior	Shading Coefficient (SC) proposed coating etc	Shading Coefficient (SC) proposed exterior & interior	project window area (sf)	Solar Gain 40° North Latitude — Solar Gain (Btu / sf) summer peak hour AM	summer peak hour PM	summer total AM	summer total PM	Cooling Savings Peak Load (tons)	Cooling Savings Annual Energy (ton·hr/yr)
ENE	WNW	0.55			0.26	375	198	40	133220	27719	1.8	1466
NNW	NNE	0.55			0.26	0	38	102	27780	54847	0.0	0
SSE	SSW	0.55			0.26	2896	209	185	133650	58764	14.7	13534
WSW	ESE	0.55			0.26	421	55	227	29959	180859	2.3	2155
					TOTALS / MAX:	3691					14.7	17155
					TOTALS / MAX [SHADED & UNSHADED AREAS COMBINED]:	10590					33.4	38081

KT-LED20HID-E26-830-D

HID REPLACEMENT LED LAMP

DESCRIPTION

20W HID Replacement LED Lamp | 3000K | >83 CRI | IP64 Rated

LAMP TYPE: HID Replacement LED
BASE TYPE: E26 (Medium)
WATTAGE: 20W
COLOR TEMPERATURE: 3000K
METAL HALIDE EQUIVALENT: 50-70W
COLOR RENDERING INDEX (CRI): >83
WARRANTY: 5 Years

PRODUCT FEATURES

- Replacement for Conventional Metal Halide Lamp
- Non-Dimmable; Do Not Dim
- 50,000+ Hour Lifetime
- Environmentally Friendly: No Mercury Used
- Instant Startup
- UL Listed
- Operating Temperature: -29ºC/-20ºF to 60ºC/140ºF
- Integral Driver, Eliminates the Need for External Driver or Ballast; Includes 4kV Surge Protection
- IP64 Rated; Integrated Heat Sink Quickly Dissipates Heat and Guides Water Intrusion Out of the Lamp

OPERATING SPECIFICATIONS

ELECTRICAL CHARACTERISTICS

Input Voltage	Power Consumption	Power Factor	Input Current
120-277Vac	20W	>0.9	0.21A @ 120V 0.09A @ 277V

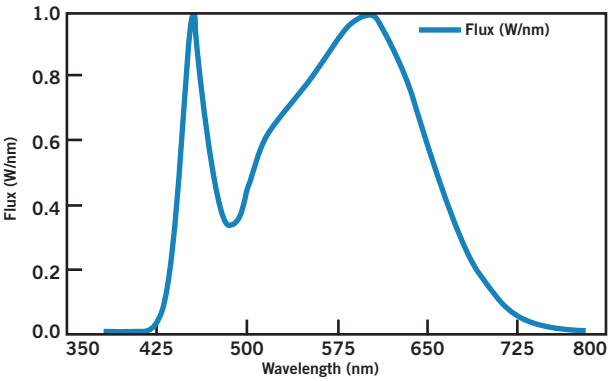
RATED LIFE

L70 (Hours)	50,000

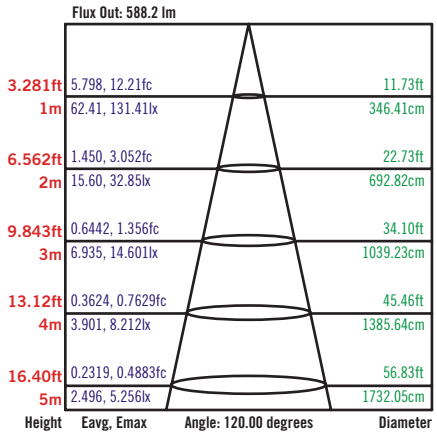
PHOTOMETRIC CHARACTERISTICS

Color Temperature (CCT)	3000K
Luminous Flux	2080 lm
Color Rendering Index (CRI)	>83
Efficacy	104 lm/W
Visible Light Area	360º

SPECTRAL DISTRIBUTION



LUX DISTANCE CURVE



Note: The curves indicate the illuminated area and the average illumination when the luminaire is at a different distance.

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Specifications subject to change. Last revised on 10.4.16

KT-LED20HID-E26-830-D

HID REPLACEMENT LED LAMP

WIRING DIAGRAM

STEP 1
Disconnect power. Disconnect and remove existing ballast, capacitor, and/or ignitor (where applicable) from fixture.

STEP 2
Rewire for line voltage to the lamp socket.

STEP 3
Install new LED replacement lamp. Ensure lamp is operating properly when power is turned on.

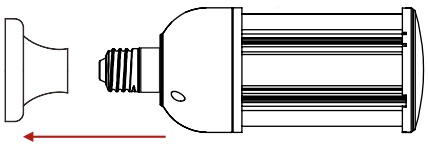


FIGURE 1

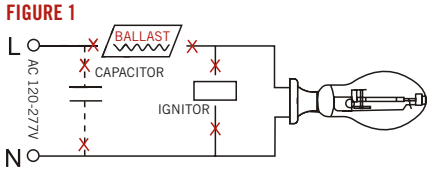
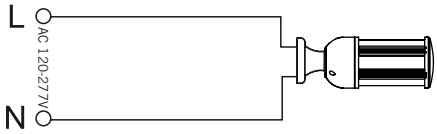
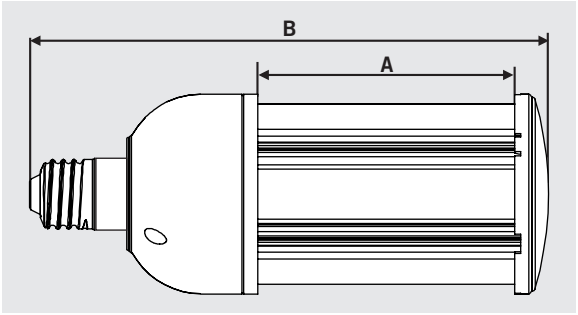


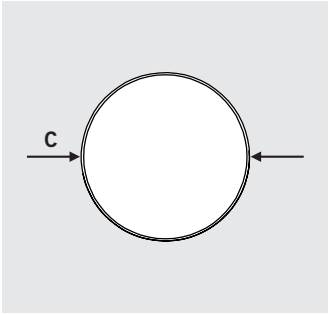
FIGURE 2

FIGURE 3



PHYSICAL CHARACTERISTICS





LAMP DIMENSIONS

A (Illuminated Length)	4.17”
B (Body Length)	7.52”
C (Diameter)	2.76”

BASE TYPE: E26 (Medium)

ORDERING INFORMATION

ORDER CODE	PACKAGING STYLE	PACK QTY.	ITEM STATUS
KT-LED20HID-E26-830-D-DP	Distributor Pack (Individual Cartons)	12	Quick Ship

CATALOG NUMBER BREAKDOWN

KT-LED20HID-E26-830-D-DP

- KT — Keystone Technologies
- LED20 — LED Lamp
- HID — Wattage
- E26 — Lamp Type
- 830 — Base Type
- D — 800 Series
- DP — Color Temp. / Direct Drive Series / Packaging Style

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Specifications subject to change. Last revised on 10.4.16

KT-LED36HID-E26-830-D

HID REPLACEMENT LED LAMP

DESCRIPTION

36W HID Replacement LED Lamp | 3000K | >83 CRI | IP64 Rated

LAMP TYPE: HID Replacement LED
BASE TYPE: E26 (Medium)
WATTAGE: 36W
COLOR TEMPERATURE: 3000K
METAL HALIDE EQUIVALENT: 150W
COLOR RENDERING INDEX (CRI): >83
WARRANTY: 5 Years

PRODUCT FEATURES

- Replacement for Conventional Metal Halide Lamp
- Non-Dimmable; Do Not Dim
- 50,000+ Hour Lifetime
- Environmentally Friendly: No Mercury Used
- Instant Startup
- UL Listed
- Operating Temperature: -29ºC/-20ºF to 60ºC/140ºF
- Integral Driver, Eliminates the Need for External Driver or Ballast; Includes 4kV Surge Protection
- IP64 Rated; Integrated Heat Sink Quickly Dissipates Heat and Guides Water Intrusion Out of the Lamp

OPERATING SPECIFICATIONS

ELECTRICAL CHARACTERISTICS

Input Voltage	Power Consumption	Power Factor	Input Current
120-277Vac	36W	>0.9	0.32A @ 120V 0.14A @ 277V

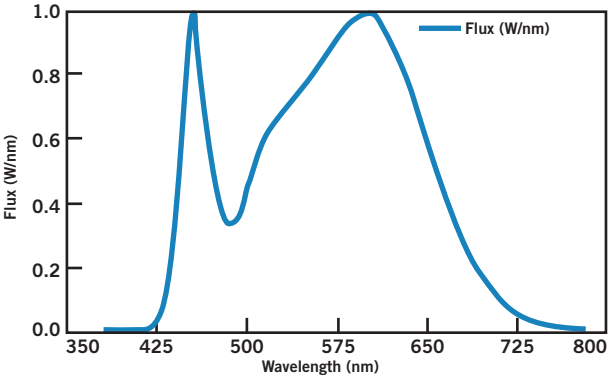
RATED LIFE

L70 (Hours)	50,000

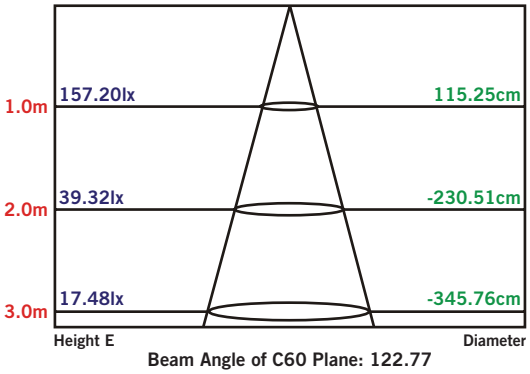
PHOTOMETRIC CHARACTERISTICS

Color Temperature (CCT)	3000K
Luminous Flux	5000 lm
Color Rendering Index (CRI)	>83
Efficacy	139 lm/W
Visible Light Area	360º

SPECTRAL DISTRIBUTION



LUX DISTANCE CURVE



Beam Angle of C60 Plane: 122.77

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KT-LED36HID-E26-830-D

HID REPLACEMENT LED LAMP

WIRING DIAGRAM

STEP 1
Disconnect power. Disconnect and remove existing ballast, capacitor, and/or ignitor (where applicable) from fixture.

STEP 2
Rewire for line voltage to the lamp socket.

STEP 3
Install new LED replacement lamp. Ensure lamp is operating properly when power is turned on.

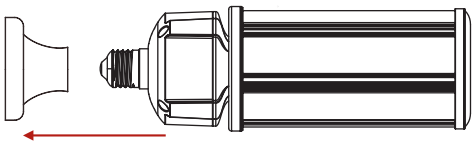


FIGURE 1

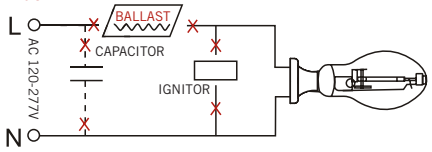


FIGURE 2

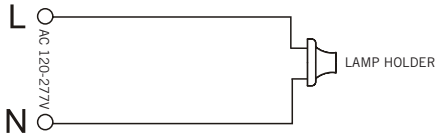
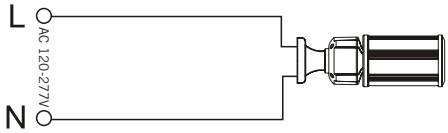
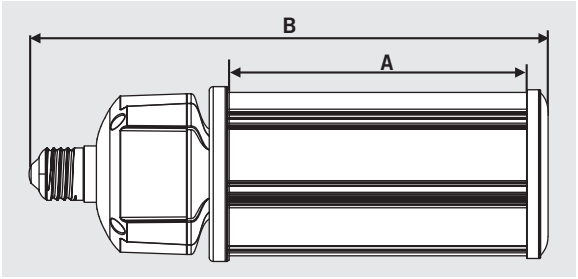
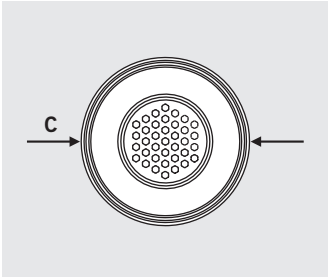


FIGURE 3



PHYSICAL CHARACTERISTICS





LAMP DIMENSIONS

A (Illuminated Length)	4.65"
B (Body Length)	8.98"
C (Diameter)	3.43"

BASE TYPE: E26 (Medium)

ORDERING INFORMATION

ORDER CODE	PACKAGING STYLE	PACK QTY.	ITEM STATUS
KT-LED36HID-E26-830-D-DP	Distributor Pack (Individual Cartons)	16	Quick Ship

CATALOG NUMBER BREAKDOWN

KT-LED36HID-E26-830-D-DP

Keystone Technologies	LED Lamp	Wattage	Lamp Type	Base Type	800 Series	Color Temp.	Direct Drive Series	Packaging Style

KT-LED45HID-E26-830-D

HID REPLACEMENT LED LAMP

DESCRIPTION

45W HID Replacement LED Lamp | 3000K | >83 CRI | IP64 Rated

LAMP TYPE: HID Replacement LED
BASE TYPE: E26 (Medium)
WATTAGE: 45W
COLOR TEMPERATURE: 3000K
METAL HALIDE EQUIVALENT: 175W
COLOR RENDERING INDEX (CRI): >83
WARRANTY: 5 Years

PRODUCT FEATURES

- Replacement for Conventional Metal Halide Lamp
- Non-Dimmable; Do Not Dim
- 50,000+ Hour Lifetime
- Environmentally Friendly: No Mercury Used
- Instant Startup
- UL Listed
- Operating Temperature: -29ºC/-20ºF to 60ºC/140ºF
- Integral Driver, Eliminates the Need for External Driver or Ballast; Includes 4kV Surge Protection
- IP64 Rated; Integrated Heat Sink Quickly Dissipates Heat and Guides Water Intrusion Out of the Lamp

OPERATING SPECIFICATIONS

ELECTRICAL CHARACTERISTICS

Input Voltage	Power Consumption	Power Factor	Input Current
120-277Vac	45W	>0.9	0.42A @ 120V 0.18A @ 277V

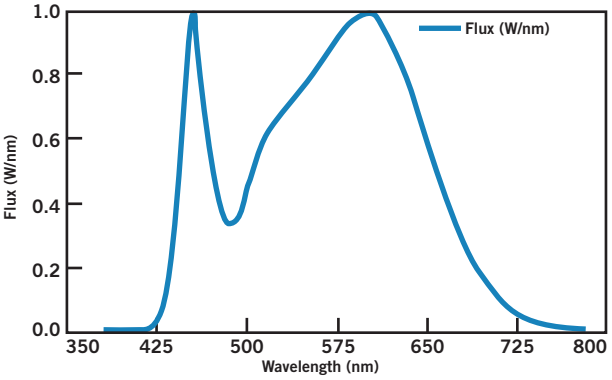
RATED LIFE

L70 (Hours)	50,000

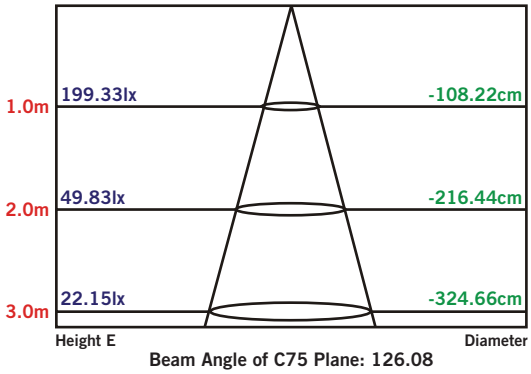
PHOTOMETRIC CHARACTERISTICS

Color Temperature (CCT)	3000K
Luminous Flux	6250 lm
Color Rendering Index (CRI)	>83
Efficacy	139 lm/W
Visible Light Area	360º

SPECTRAL DISTRIBUTION



LUX DISTANCE CURVE



Beam Angle of C75 Plane: 126.08

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KT-LED45HID-E26-830-D

HID REPLACEMENT LED LAMP

WIRING DIAGRAM

STEP 1
Disconnect power. Disconnect and remove existing ballast, capacitor, and/or ignitor (where applicable) from fixture.

STEP 2
Rewire for line voltage to the lamp socket.

STEP 3
Install new LED replacement lamp. Ensure lamp is operating properly when power is turned on.

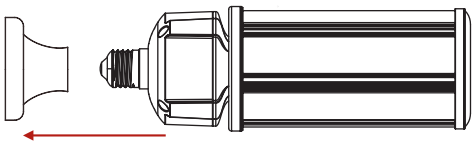


FIGURE 1

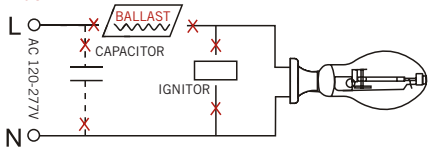


FIGURE 2

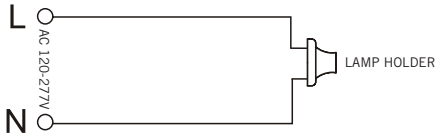
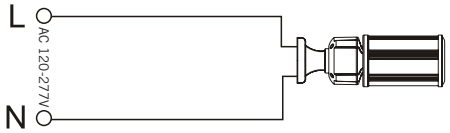
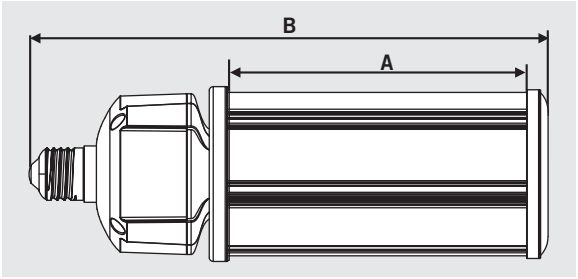
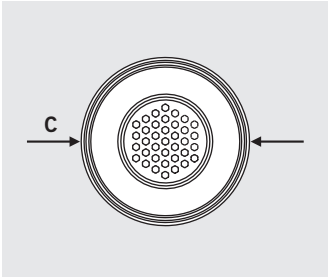


FIGURE 3



PHYSICAL CHARACTERISTICS





LAMP DIMENSIONS

A (Illuminated Length)	5.83”
B (Body Length)	10.16”
C (Diameter)	3.43”

BASE TYPE: E26 (Medium)

ORDERING INFORMATION

ORDER CODE	PACKAGING STYLE	PACK QTY.	ITEM STATUS
KT-LED45HID-E26-830-D-DP	Distributor Pack (Individual Cartons)	16	Quick Ship

CATALOG NUMBER BREAKDOWN

KT-LED45HID-E26-830-D-DP

KT	LED	45	HID	E26	830	D	DP
Keystone Technologies	LED Lamp	Wattage	Lamp Type	Base Type	800 Series	Color Temp.	Direct Drive Series	Packaging Style

KT-LED80HID-EX39-830-D

HID REPLACEMENT LED LAMP

DESCRIPTION

80W HID Replacement LED Lamp | 3000K | >83 CRI | IP64 Rated

c UL us LISTED | RoHS Compliant | 5 YEAR WARRANTY

LAMP TYPE: HID Replacement LED
BASE TYPE: EX39 (Mogul)
WATTAGE: 80W
COLOR TEMPERATURE: 3000K
METAL HALIDE EQUIVALENT: 320W
COLOR RENDERING INDEX (CRI): >83
WARRANTY: 5 Years

PRODUCT FEATURES

- Replacement for Conventional Metal Halide Lamp
- Non-Dimmable; Do Not Dim
- 50,000+ Hour Lifetime
- Environmentally Friendly: No Mercury Used
- Instant Startup
- UL Listed
- Operating Temperature: -29ºC/-20ºF to 60ºC/140ºF
- Integral Driver, Eliminates the Need for External Driver or Ballast; Includes 6kV Surge Protection
- IP64 Rated; Integrated Heat Sink Quickly Dissipates Heat and Guides Water Intrusion Out of the Lamp
- Active Cooling Technology: When Internal Thermal Sensor Reaches 84°C, Lamp Power Reduces To 80% Of Max; When Sensor Cools To 65°C Lamp Powers Back Up To 100% Rated Power
- Lamp Includes Safety Tether for Additional Security When Installing Lamp in Luminaire

OPERATING SPECIFICATIONS

ELECTRICAL CHARACTERISTICS

Input Voltage	Power Consumption	Power Factor	Input Current
120-277Vac	80W	>0.9	0.73A @ 120V 0.32A @ 277V

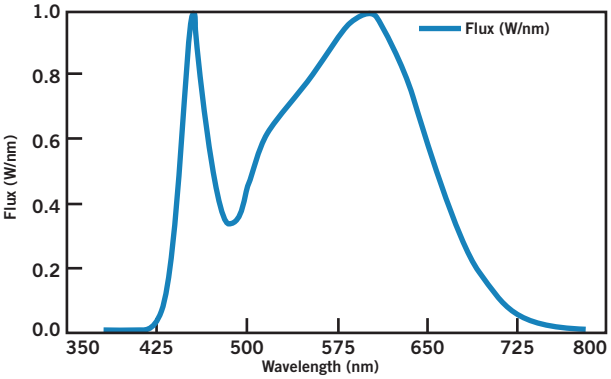
RATED LIFE

L70 (Hours)	50,000

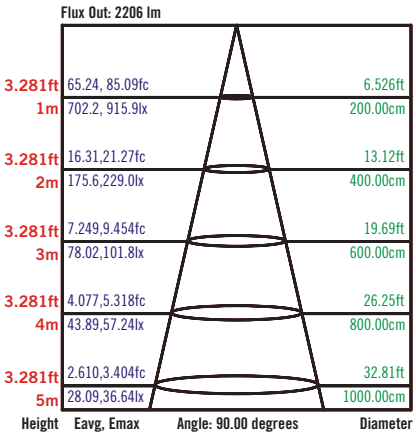
PHOTOMETRIC CHARACTERISTICS

Color Temperature (CCT)	3000K
Luminous Flux	11,100 lm
Color Rendering Index (CRI)	>83
Efficacy	139 lm/W
Visible Light Area	360º

SPECTRAL DISTRIBUTION



LUX DISTANCE CURVE



Note: The curves indicate the illuminated area and the average illumination when the luminaire is at a different distance.

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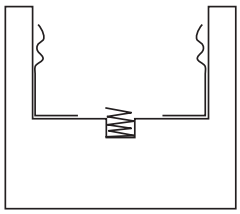
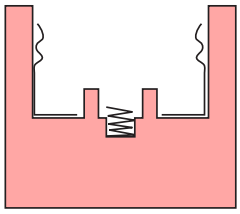
KT-LED80HID-EX39-830-D

HID REPLACEMENT LED LAMP



E39 MOGUL SOCKET



EX39 MOGUL SOCKET

EX39-based lamps will work in both E39 and EX39 sockets.

WIRING DIAGRAM

STEP 1
Disconnect power. Disconnect and remove existing ballast, capacitor, and/or ignitor (where applicable) from fixture.

STEP 2
Rewire for line voltage to the lamp socket.

STEP 3
Install new LED replacement lamp. Ensure lamp is operating properly when power is turned on.

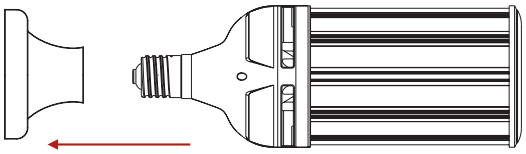


FIGURE 1

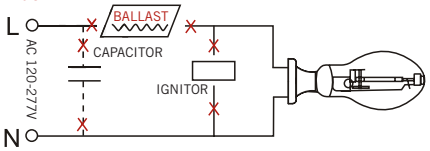


FIGURE 2

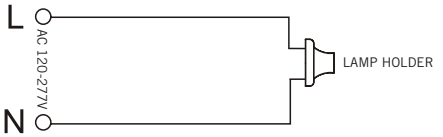
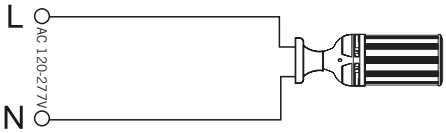
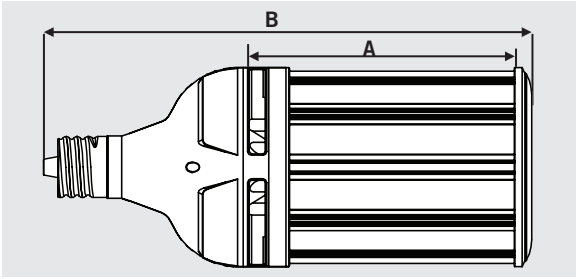
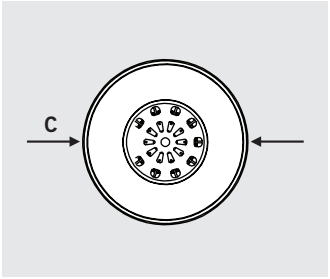


FIGURE 3



PHYSICAL CHARACTERISTICS





LAMP DIMENSIONS

A (Illuminated Length)	4.61”
B (Body Length)	11.4”
C (Diameter)	5.12”

BASE TYPE: EX39 (Mogul)

ORDERING INFORMATION

ORDER CODE	PACKAGING STYLE	PACK QTY.	ITEM STATUS
KT-LED80HID-EX39-830-D-DP	Distributor Pack (Individual Cartons)	6	Quick Ship

CATALOG NUMBER BREAKDOWN

KT-LED80HID-EX39-830-D-DP

- KT — Keystone Technologies
- LED80HID — LED Lamp
- 80 — Wattage
- HID — Lamp Type
- EX39 — Base Type
- 830 — 800 Series
- 830 — Color Temp.
- D — Direct Drive Series
- DP — Packaging Style

Keystone Technologies • 1390 Welsh Road, North Wales, PA 19454 • Phone (800) 464-2680 • Fax (888) 966-0556 • **www.keystonetech.com**

KT-LED110HID-H-EX39-840-D

HID REPLACEMENT LED LAMP

DESCRIPTION

110W HID Replacement LED Lamp | 4000K | 85 CRI | IP64 Rated

c UL us LISTED | RoHS Compliant | 5 YEAR WARRANTY

- **LAMP TYPE:** HID Replacement LED
- **BASE TYPE:** EX39 (Mogul) Rotatable
- **WATTAGE:** 110W
- **COLOR TEMPERATURE:** 4000K
- **METAL HALIDE EQUIVALENT:** 400W
- **COLOR RENDERING INDEX (CRI):** 85
- **WARRANTY:** 5 Years

PRODUCT FEATURES

- Replacement for Conventional Metal Halide Lamp
- Ideal for Shoebox and Canopy Retrofit Applications
- Non-Dimmable; Do Not Dim
- 50,000+ Hour Lifetime
- Environmentally Friendly: No Mercury Used
- Instant Startup
- UL Listed
- Optomized for Horizontal Applications with Directional Light Output from Opening LED Assembly Construction
- Operating Temperature: -40ºC/-40ºF to 45ºC/113ºF in Enclosed Fixture.*
- Integral Driver, Eliminates the Need for External Driver or Ballast; Includes 4kV Surge Protection
- IP64 Rated; Integrated Heat Sink Quickly Dissipates Heat and Guides Water Intrusion Out of the Lamp

*Lamp may enter SmartCooling mode in order to optimize lamp performance when fixture environmental ambient temperature reachs 35-45C, depending on the fixture type. During this condition, lamp power consumption and lumen output may be regulated up 20% less then standard operation.

OPERATING SPECIFICATIONS

ELECTRICAL CHARACTERISTICS

Input Voltage	Power Consumption	Power Factor	Input Current
120-277Vac	110W	>0.9	0.92A @ 120V 0.40A @ 277V

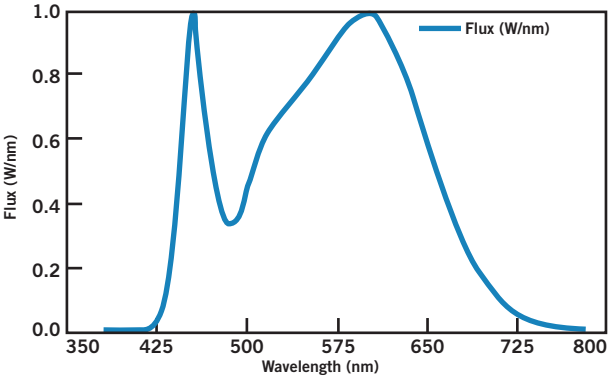
RATED LIFE

L70 (Hours)	50,000

PHOTOMETRIC CHARACTERISTICS

Color Temperature (CCT)	4000K
Luminous Flux	13700 lm
Color Rendering Index (CRI)	85
Efficacy	125 lm/W
Beam Angle	180°

SPECTRAL DISTRIBUTION



KT-LED110HID-H-EX39-840-D

HID REPLACEMENT LED LAMP

WIRING INSTRUCTIONS

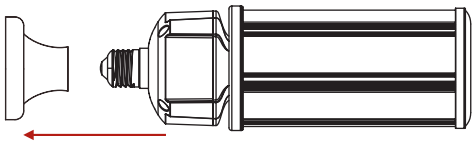
STEP 1
Disconnect power. Disconnect and remove existing ballast, capacitor, and/or ignitor (where applicable) from fixture.

STEP 2
Rewire for line voltage to the lamp socket.

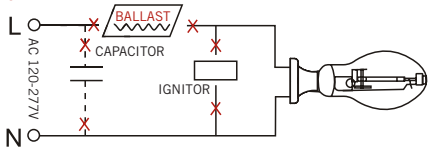
STEP 3
Install new LED replacement lamp. Ensure lamp is operating properly when power is turned on.

STEP 4
Rotate lamp base and open wings accordingly toward direction of desired lumination.

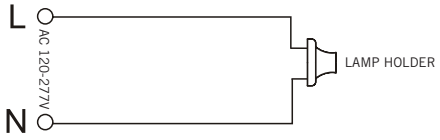
Note: The lamp will not illuminate until wings are open



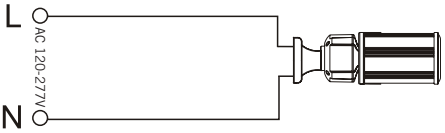
STEP 1



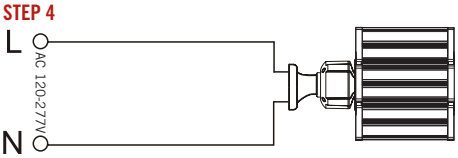
STEP 2



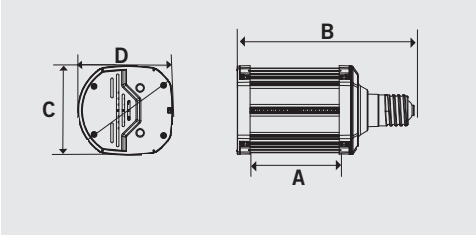
STEP 3

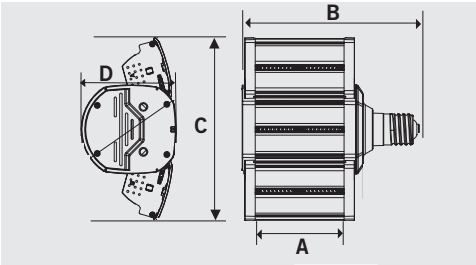


STEP 4



PHYSICAL CHARACTERISTICS





LAMP DIMENSIONS

WINGS CLOSED

A (Illuminated Length)	6.73”
B (Body Length)	11.10”
C (Width)	4.39”
D (Height)	4.70”

WINGS OPEN

A (Illuminated Length)	6.73”
B (Body Length)	11.10”
C (Width)	9.00”
D (Height)	4.70”

BASE TYPE: EX39 (Mogul) Rotatable

KT-LED110HID-H-EX39-840-D

HID REPLACEMENT LED LAMP

ORDERING INFORMATION

ORDER CODE	PACKAGING STYLE	PACK QTY.	ITEM STATUS
KT-LED110HID-H-EX39-840-D-DP	Distributor Pack (Individual Cartons)	16	Quick Ship

CATALOG NUMBER BREAKDOWN

KT-LED110HID-H-EX39-840-D-DP

- KT — Keystone Technologies
- LED — LED Lamp
- 110 — Wattage
- HID — Lamp Type
- H — Horizontal Orientation
- EX39 — Base Type
- 840 — 800 Series / Color Temp.
- D — Direct Drive Series
- DP — Packaging Style

ULTRA LED™ CL Lamp

Medium Base Retrofit for Ceiling Light Fixtures

The ULTRA LED CL Lamp screws into most existing plastic and porcelain lamp holders without any wiring required. Also installs in junction boxes for new construction applications.

Key Features & Benefits

- Lumen package:
  - 700 lumens @ 9 watts (without pull chain)
  - 1200 lumens @ 15 watts (with pull chain)
  - 2500 lumens @ 31 watts (without pull chain)
- Replacement for 65W incandescent
- CCT: 2700K & 4000K
- CRI of 82
- Reduces energy consumption up to 86%
- 50,000 hours life (L_{70})
- Suitable for damp and dry locations
- Save up to $308 over the life of the fixture and last 25X longer
- 5 year warranty
- Easy installation

Product Offering

Ordering Abbreviation	Wattage	Color Temperature	CRI
LED/700/CL	9	2700K, 4000K	82
LED/1200/CL	15	2700K, 4000K	82
LED/2500/CL	31	2700K, 4000K	82

Application Information

Applications

Indoor
- Closets
- Basements

Application Notes

1. Should not be directly exposed to water/humidity.
2. For detailed warranty information, please see www.sylvania.com/warranty.
3. Not intended for use in dimming applications.

Specifications and Certifications

SYLVANIA

Specification Data

Catalog #	Type
Project	
Comments	
Prepared by	

Specifications

Energy Data

Minimum Starting Temp: -20°F

EMI/RFI: FCC Title 47 CFR, Part 15, Class B

Sound Rating: <24dBA

Input Voltage: 120V

Power Factor: >0.90

Input Frequency: 60Hz

Input Power: 9W, 15W, 31W

Maximum Ambient Operating Temperature: 130°F

Lighting Data

Lumen Output: 700, 1200, 2500

Lumens per Watt: >77

Color

Correlated Color Temperature (CCT): 2700K, 4000K

Color Rendering Index (CRI): 82

R9: 15

Product Weight: 2.3 lbs.

Ordering Information

Item Number	Ordering Abbreviation	Fixture Diameter (in)	Nominal Wattage (W)	Lamp Base	Delivered Light Output (lm)	Color Temperature	CRI	Avg. Rated Life (hrs.)*	Pull Chain
75080	LED/700/CL/827/RP	7	9	Medium (E26)	700	2700K	82	50,000	No
75081	LED/700/CL/840/RP	7	9	Medium (E26)	700	4000K	82	50,000	No
75112	LED/1200/CL/827/RP	7	15	Medium (E26)	1200	2700K	82	50,000	Yes
75113	LED/1200/CL/840/RP	7	15	Medium (E26)	1200	4000K	82	50,000	Yes
75123	LED/2500/CL/827/RP	11	31	Medium (E26)	2500	2700K	82	50,000	No
75124	LED/2500/CL/840/RP	11	31	Medium (E26)	2500	4000K	82	50,000	No

* LED lamp life is defined as the number of hours when 50% of an average group of identical lamps reached 70% of its initial lumens.

Ordering Guide

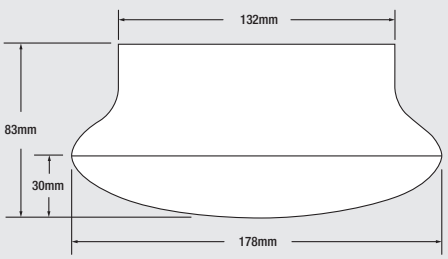
LED	/	700	/	CL	/	8	27
LED		Light Output 700lm or 1200lm		Product Name Ceiling Light		CRI >80	Color Temperature 2700K 4000K

Energy Savings

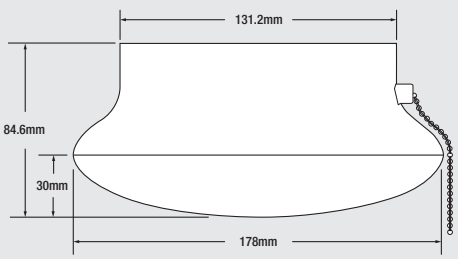
Product Description	LED Lumens	LED Life	Traditional Lamp Type	Lumens	Life	Watts Saved	Energy Savings	Life Benefit
LED/CL/700	700	50,000	Incandescent 65BR30	680	2000	56	$308.00	25x
LED/CL/1200	1200	50,000	100W Incandescent	1200	2000	85	$467.00	25x

Dimensions

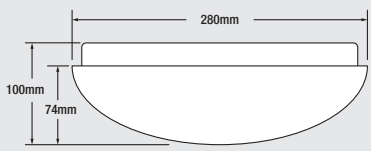
700lm CL



1200lm CL

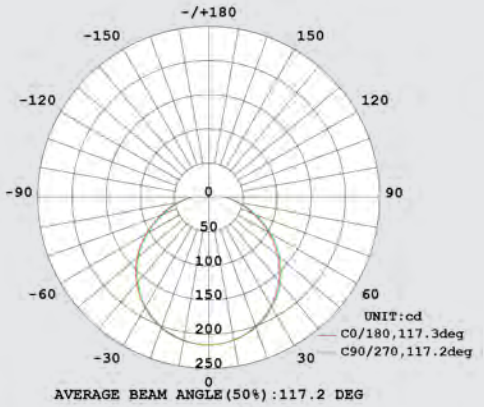


2500lm CL



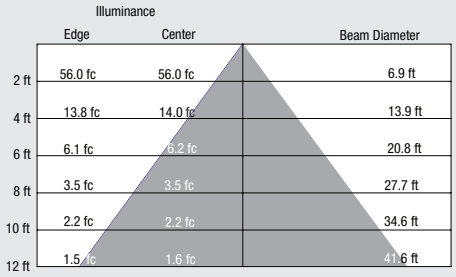
Photometric Information

700lm CL



Zonal Lumen Distribution

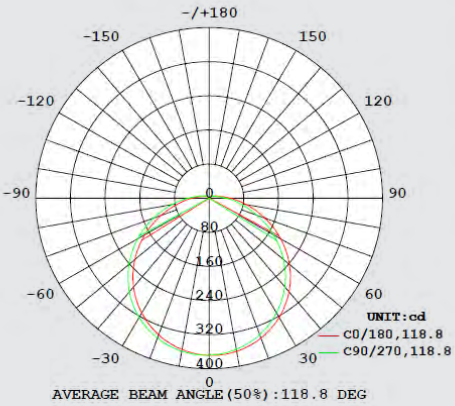
Zone	Lumens	% Fixture
0-30	174.69	23.20
0-40	287.73	38.30
0-60	518.16	68.90
0-80	672.53	89.50
60-80	154.36	20.50
70-80	63.52	8.50
80-90	37.51	5.00
90-110	30.34	4.00
90-120	35.97	4.80
90-130	39.01	5.20
90-150	41.28	5.50
90-180	41.66	5.50
110-180	11.33	1.50
0-180	751.70	100.00



Spacing to Mounting Height Ratio

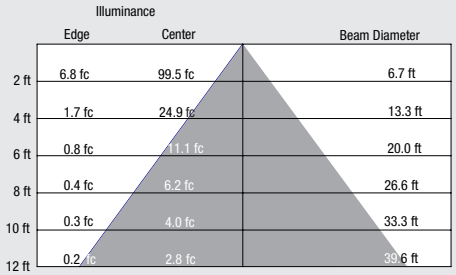
Spacing Criteria (0-180°)	1.28
Spacing Criteria (90-270°)	1.30
Spacing Criteria (Diagonal)	1.40

1200lm CL



Zonal Lumen Distribution

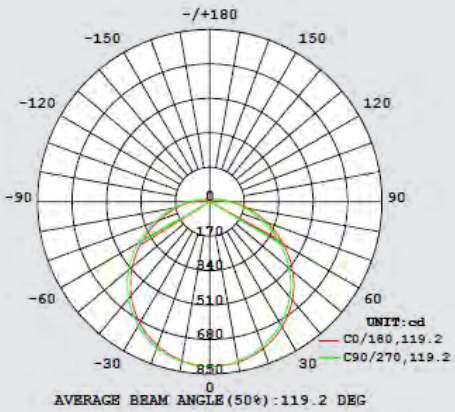
Zone	Lumens	% Fixture
0-30	310.81	23.20
0-40	511.73	38.30
0-60	921.16	68.70
0-80	1196.1	89.20
60-80	274.95	20.50
70-80	113.51	8.50
80-90	68.29	5.10
90-110	55.54	4.10
90-120	65.85	4.90
90-130	71.46	5.30
90-150	75.69	5.60
90-180	76.48	5.70
110-180	20.94	1.60
0-180	1340.88	100.00



Spacing to Mounting Height Ratio

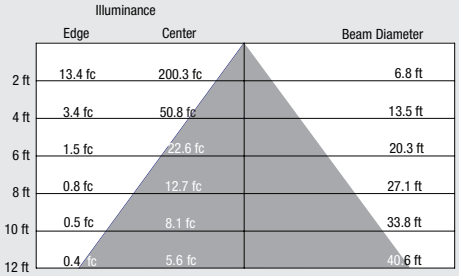
Spacing Criteria (0-180°)	1.26
Spacing Criteria (90-270°)	1.28
Spacing Criteria (Diagonal)	1.40

2500lm CL



Zonal Lumen Distribution

Zone	Lumens	% Fixture
0-30	637.5	22.50
0-40	1052.55	37.20
0-60	1904.26	67.20
0-80	2483.99	87.70
60-80	579.73	20.50
70-80	241.06	8.50
80-90	148.01	5.20
90-110	126.23	4.50
90-120	153.37	5.40
90-130	171.25	6.00
90-150	191.45	6.80
90-180	200.31	7.10
110-180	74.07	2.60
0-180	2832.31	100.00



Spacing to Mounting Height Ratio

Spacing Criteria (0-180°)	1.28
Spacing Criteria (90-270°)	1.28
Spacing Criteria (Diagonal)	1.42

LEDVANCE LLC
200 Ballardvale Street
Wilmington, MA 01887 USA
Phone 1-800-LIGHTBULB (1-800-544-4828)
www.sylvania.com

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Specifications subject to change without notice.

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ULTRA LED™ Premium Dimmable A19 Lamp

Changes from white to soothing candlelight

Key Features & Benefits

- Reduction in color temperature from 3000K to 2000K as lamp dims
- Dimmable down to 10%*
- Long life: up to 25,000 hours (L_{70})
- Power factor >.96
- UV and IR free
- Mercury and lead free
- Suitable for damp locations
- Reduction in energy consumption up to 85%
- Lasts up to 25 times longer than halogen and incandescent lamps
- No warm-up time, instant-on with full light and stable color

* Performance may vary depending on dimmer used in application. Please refer to Dimmer Compatibility List (RETRO-DIM) for a list of compatible dimmers or visit www.SYLVANIA.com/LEDRetrofit

The SYLVANIA ULTRA LED Premium Dimmable LED lamp allows control of energy usage, light output and color temperature. This lamp offers dimming characteristics similar to incandescent lamps with color temperature shifting from 3000K to 2000K as the lamp dims. The warmer color temperature at lower light levels allows you to create a comfortable, relaxing environment ideal for hospitality applications. The ULTRA LED lamp is dimmable down to 10% on compatible phase-cut dimmers and is the perfect lamp when you need to change the environment from a bright white light to warm and cozy.

Product Offering

Product Description	Wattage	Color Temperature
LEDA19	9	3000K

Application Information

Applications

- Table lamp
- Pendant lamp

Market Segments

- Healthcare
- Hospitality
- Residential
- Restaurants
- Retail

Application Notes

1. Operating temperatures -4°F and 113°F (-20°C and 45°C)
2. Suitable for outdoor use when used in a UL rated fixture where protected from the weather
3. Not for use with emergency lighting
4. Use in open fixtures

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. For FCC Part 15 user information, please see www.sylvania.com/fcc15b.

SYLVANIA

Specification Data

Catalog #	Type
Project	
Comments	
Prepared by	

Ordering Information

Item Number	Ordering Abbreviation	Wattage (W)	Base Type	Replaces	Input Voltage (VAC)	Average Rated Life (hrs.)[1]	CCT[3]	Typical Lumens (lm)[2]	CRI[4]	Power Factor	ENERGY STAR®
74479	LED9A19/DIM/O/SE/830/RP	9	Medium	60W Incan.	120	25,000	3000K	800	80	>.96	Yes

1. Hours lifetime with 70% lumen maintenance 2. Thermally stable typical lumens (±10%) 3. Thermally stable typical CCT (±10%) 4. CRI – color rendering index

Ordering Guide

LED	9	A19	/	DIM	/	0	/	SE®	/	8	30	/	RP
LED Lamps	Wattage 9	Lamp Type A19		Dimmable		Omnidirectional		Sunset Effects		CRI >80	Color Temperature 3000K		Retail Pack

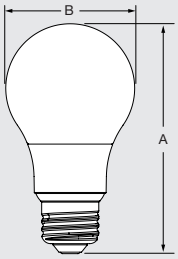
Energy Savings

Basic Product Description	LED Life (hrs.)	Similar Halogen/Incan.	Halogen/Incan. Life (hrs.)	Watts Saved	Energy Savings*	LED Life vs. Halogen Life
LED9A19	25,000	60WA19	1000	51	$140	25x

*Energy savings over life of lamp calculated at $0.11/kWh

Lamp Dimensions

	(A) MOL (inches)	(B) Diameter (inches)
LEDA19	4.21	2.36



Sample Specification

Lamp shall be SYLVANIA ULTRA LED™ Premium Dimmable lamp with 25,000 hour average rated life. Lamp shall be energy efficient and UV and IR free.

LEDVANCE LLC
200 Ballardvale Street
Wilmington, MA 01887 USA
Phone 1-800-LIGHTBULB (1-800-544-4828)
www.sylvania.com

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Specifications subject to change without notice.

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ULTRA LED™ Reflector Lamps

Key Features & Benefits

- Dimmable down to 10%*
- Available in 2700K, 3500K and 5000K color temperatures
- Long life up to 25,000 hours (L_{70})
- UV and IR free
- Mercury and lead free
- RoHS compliant
- Energy savings up to 90%

* Performance may vary depending on dimmer used in application. Please refer to Dimmer Compatibility List (RETRO-DIM) for a list of compatible dimmers or visit www.SYLVANIA.com/LEDRetrofit

Rated up to 25,000 hours at 70% lumen maintenance, the SYLVANIA ULTRA HO LED bulbous reflector lamp offer years of service and reduce energy and maintenance costs. SYLVANIA LED lamps are environmentally preferred products. They are RoHS compliant, contain no mercury, lead or other hazardous materials. They emit no UV or IR radiation that can cause fading and discoloration of fabric or artwork. The 80+ CRI ensures greater color definition and can be used in many applications, both homes and businesses. These lamps are offered in 2700K, 3500K and 5000K color temperatures.

Product Offering

Ordering Abbreviation	Wattage	Color Temperature
LEDR20	4.5, 6	2700K, 5000K
LEDBR30	8	2700K, 5000K
LEDBR30	9	2700K, 3500K, 5000K
LEDBR40	12	2700K, 5000K

Application Information

Applications

- General lighting
- Recessed downlights
- Track lighting
- Wall washers

Market Segments

- Art galleries
- Hospitality
- Museums
- Offices
- Residential
- Restaurants
- Retail

Application Notes

1. Only install in operating temperature -4°F to +104°F (-20°C to +40°C).
2. This device is not intended for use with emergency exits.
3. Not for use in totally enclosed fixtures.
4. Suitable for damp locations. Not for use where directly exposed to water.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. For FCC Part 15 user information, please see www.sylvania.com/fcc15b

Specification Data

Catalog #	Type
Project	
Comments	
Prepared by	

Ordering Information

Item Number	Ordering Abbreviation	Wattage (W)	Base Type	Replaces	Input Voltage (V)	Average Rated Life (hrs.)	CCT	Typical Lumens (lm)	CRI	Power Factor	ENERGY STAR®
74477	LED4.5R20/DIM/827/G3/RP	4.5	Medium	45WR20	120	25,000	2700K	325	80	0.9	Yes
78062	LED6R20/DIM/HO/827/G5	6	Medium	50WR20	120	25,000	2700K	525	80	.95	Yes
78061	LED6R20/DIM/HO/850/G5/RP	6	Medium	50WR20	120	25,000	5000K	550	80	.95	Yes
74475	LED8BR30/DIM/827/G3/RP	8	Medium	65WBR30	120	25,000	2700K	650	80	0.9	Yes
74476	LED8BR30/DIM/850/G3/RP	8	Medium	65WBR30	120	25,000	5000K	650	80	.95	Yes
78055	LED9BR30/DIM/HO/827/G5	9	Medium	65WBR30	120	25,000	2700K	800	80	.97	Yes
78056	LED9BR30/DIM/HO/835/G5/RP	9	Medium	65WBR30	120	25,000	3500K	800	80	.96	Yes
78679	LED9BR30/DIM/HO/850/G5/RP	9	Medium	65WBR30	120	25,000	5000K	800	80	.96	Yes
78063	LED12BR40/DIM/HO/827/G5	12	Medium	85WBR40	120	25,000	2700K	1100	80	.97	Yes
78773	LED12BR40/DIM/HO/850/G5/RP	12	Medium	85WBR40	120	25,000	5000K	1250	80	.97	Yes

Ordering Guide

LED	XX	BR30 /	DIM /	HO /	8	27
LED Lamps	Wattage: 4.5, 6, 8, 9, 12	Lamp Type: R20 BR30 BR40	Dimmable	High Output	CRI=80+	Color Temperature 2700K 3500K 5000K

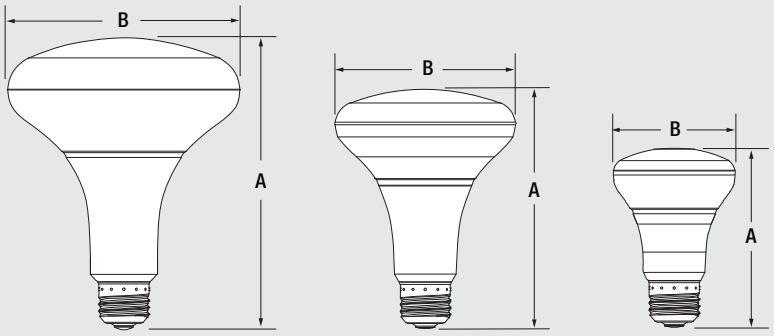
Energy Savings

Basic Product Description	LED Life (hrs.)	Similar Incandescent	Incandescent Life (hrs.)	Incandescent Lumens	Watts Saved	Energy Savings*	LED Life vs. Incandescent
LED4.5R20	25,000	45R20	2,000	330	40.5	$111.37	10x
LED6R20	25,000	50R20	2,000	420	44	$121.00	12x
LED8BR30	25,000	65BR30	2,000	700	57	$156.75	12x
LED9BR30	25,000	65BR30	2,000	700	56	$154.00	12x
LED12BR40	25,000	85BR40	2,000	1065	73	$200.75	12x

*Energy savings over life of lamp calculated at $0.11/kWh

Lamp Dimensions

	(A) MOL inches (mm)	(B) Diameter (inches) (mm)
R20	3.74 (95)	2.51 (64)
BR30	5 (127)	3.74 (95)
BR40	6.06 (154)	4.8 (122)



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SYLVANIA

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ULTRA LED™ Premium Dimmable Reflector Lamps

Changes from white to soothing candlelight

SYLVANIA ULTRA LED Premium Dimmable Reflector lamps allow control of energy usage, light output and color temperature. These lamps offer dimming characteristics similar to incandescent lamps with color temperature shifting from 3000K to 2000K as the lamp dims. The warmer color temperature at lower light levels allows you to create a comfortable, relaxing environment ideal for hospitality applications. Premium Dimmable LED lamps are dimmable down to 10% on compatible phase-cut dimmers and the perfect lamps when you need to change the environment from a bright white light to warm and cozy.

Key Features & Benefits

- Reduction in color temperature from 3000K to 2000K as lamp dims
- Dimmable down to 10%*
- Long life: up to 25,000 hours (L_{70})
- Power factor >.95
- UV and IR free
- Mercury and lead free
- Good color consistency within a 4-step MacAdam ellipse
- Suitable for damp locations
- Reduction in energy consumption up to 86%
- Lasts up to 12.5 times longer than halogen and incandescent lamps
- No warm-up time, instant-on with full light and stable color

* Performance may vary depending on dimmer used in application. Please refer to Dimmer Compatibility List (RETRO-DIM) for a list of compatible dimmers or visit www.SYLVANIA.com/LEDRetrofit

Product Offering

Product Description	Wattage	Color Temperature
LEDR20	6.5	3000K
LEDBR30	10	3000K
LEDBR40	13	3000K

Application Information

Applications

- Recessed downlighting
- Track lighting
- Wall washing

Market Segments

- Art galleries and museums
- Healthcare
- Hospitality
- Offices
- Residential
- Restaurants
- Retail

Application Notes

1. Operating temperatures -4°F and 104°F (-20°C and 40°C)
2. Suitable for outdoor use when used in a UL rated fixture where protected from the weather
3. Use in a fixture that supports a 2 lb. lamp
4. Not for use with emergency lighting
5. Use in open fixtures

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. For FCC Part 15 user information, please see www.sylvania.com/fcc15b.

Specification Data

Catalog #	Type
Project	
Comments	
Prepared by	

Ordering Information

Item Number	Ordering Abbreviation	Wattage (W)	Base Type	Replaces	Input Voltage (VAC)	Average Rated Life (hrs.)	CCT	Typical Lumens (lm)	CRI	Power Factor	ENERGY STAR®
79618	LED6.5R20DIMSE830G5RP	6.5	Medium	50W Incan.	120	25,000	3000K	525	80	.96	Yes
79619	LED10BR30DIMSE830G5RP	10	Medium	65W Incan.	120	25,000	3000K	800	80	.97	Yes
79620	LED13BR40DIMSE830G5RP	13	Medium	85W Incan.	120	25,000	3000K	1100	80	.97	Yes

Ordering Guide

LED	7	R20	/	DIM	/	SE	/	8	30	/	G5
LED Lamps	Wattage 6.5, 10, 13	Lamp Type R20, BR30, BR40		Dimmable		Sunset Effects		CRI >80	Color Temperature 3000K		5th Generation

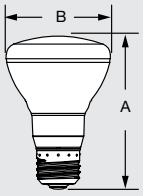
Energy Savings

Basic Product Description	LED Life (hrs.)	Similar Halogen/Incan.	Halogen/Incan. Life (hrs.)	Watts Saved	Energy Savings*	LED Life vs. Halogen Life
LED6.5R20SE	25,000	50WR20	2,000	43.5	$119.62	12.5x
LED10BR30SE	25,000	65WBR30	2,000	55	$151.25	12.5x
LED13BR40SE	25,000	85WBR40	2,000	72	$198.00	12.5x

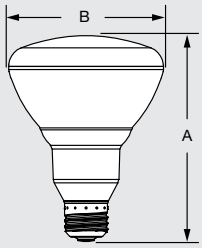
*Energy savings over life of lamp calculated at $0.11/kWh

Lamp Dimensions

	(A) MOL (inches)	(B) Diameter (inches)
LEDR20	3.67	2.34
LEDBR30	5.00	3.74
LEDBR40	5.82	4.65



7R20



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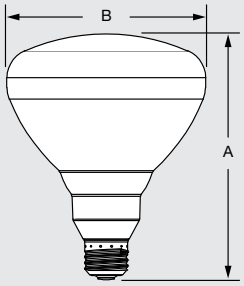

15BR40

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SYLVANIA

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ORIOS™ PAR LED Lamps

Rated up to 25,000 hours at 70% lumen maintenance, the ORIOS PAR LED lamp family offers years of service and reduced energy and maintenance costs. These lamps offer great value with energy savings up to 86% in comparison to traditional halogen lamps. The 80+ CRI ensures good color definition and can be used in many applications, both home and business. They are UL listed for use in damp locations and are RoHS compliant with no lead or mercury. They emit no UV or IR radiation that can cause fading and discoloration of fabric or artwork.

Key Features & Benefits

- Dimmable down to 10%
- Long life up to 25,000 hours (L_{70})
- Indoor and outdoor rated
- Color temperature available in 3000K
- CRI >80
- Energy savings up to 86%
- Longer life than traditional halogen lamps
- No warm-up time, instant on with full light output and stable color

* Performance may vary depending on dimmer used in application. Please refer to Dimmer Compatibility List (RETRO-DIM) for a list of compatible dimmers or visit www.SYLVANIA.com/LEDRetrofit

Product Offering

Ordering Abbreviation	Wattage	Beam Angle	Color Temperature	CRI
PAR20 LED	6, 7	30°	3000K	>80
PAR30LN LED	8, 10	30°	3000K	>80
PAR38 LED	11	30°	3000K	>80

Application Information

Applications

- General lighting
- Recessed downlights
- Track lighting
- Wall washer

Market Segments

- Offices
- Residential
- Restaurants

Application Notes

1. Operating Temperature: - 4°F to 104°F (-20°C to +40°C)
2. Use in fixtures that support a half pound lamp
3. Not for use with emergency light fixtures or exit lights
4. Use in open fixture
5. Suitable for use in UL rated fixture where protected from the weather.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. For FCC Part 15 user information, please see www.sylvania.com/fcc15b.

Specification Data

Catalog #	Type
Project	
Comments	
Prepared by	

Ordering Information

Item Number	Ordering Abbreviation	Wattage (W)	Base Type	Replaces	Input Voltage (V)	Average Rated Life (hrs.)	CCT	Typical Lumens (lm)	CBCP	CRI	Beam Angle	Power Factor	ENERGY STAR®
79261*	LED6PAR20/DIM/830/FL30G2RP	6	Med	50W	120	25,000	3000K	450	900cd	82	30°	0.85	Yes
78785	LED7PAR20/DIM/830/FL30	7	Med	35W	120	25,000	3000K	450	1100cd	82	30°	0.8	Yes
79219*	LED8PAR30LN/DIM/830/FL30G2RP	8	Med	60W	120	25,000	3000K	650	1500cd	82	30 °	0.85	Yes
78786	LED10PAR30LN/DIM/830/FL30	10	Med	50W	120	25,000	3000K	650	1500cd	82	30°	0.8	Yes
79259*	LED11PAR38/DIM/830/FL30G2RP	11	Med	65W	120	25,000	3000K	850	1950cd	82	30°	0.85	Yes
78412	LED11PAR38/DIM/830/FL30	11	Med	60W	120	25,000	3000K	800	2000cd	82	30°	0.8	Yes

***79261 replaces 78785, *79219 replaces 78786, *79259 replaces 78412**

Ordering Guide

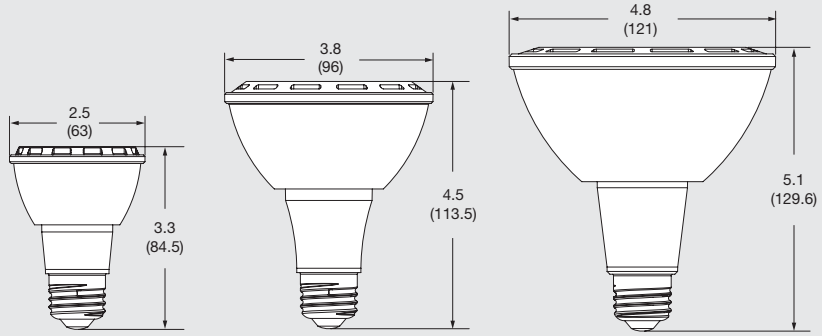
LED	11	PAR38	/	DIM	/	830	/	FL	30
LED Lamps	Wattage:	Lamp type: PAR38 PAR30LN PAR20		Dimmable		CRI=80 Color Temp. 3000K		Flood	Beam Angle

Energy Savings

Product Description	LED Life (hrs.)	Similar Halogen	Halogen Lumens	Watts Saved	Energy Savings	LED Life vs. Incandescent
LED6W PAR20	25,000	35W	360	29	$79.75	10X
LED7W PAR20	25,000	35W	360	28	$77.00	10X
LED8W PAR30LN	25,000	50W	660	42	$115.50	10X
LED 10W PAR30LN	25,000	50W	660	40	$110.00	10X
LED 11W PAR38	25,000	60W	800	49	$134.75	10X

Lamp Dimensions

	MOL (inches)	Diameter (inches)
LED PAR20	3.3	2.5
LED PAR30 LN	4.5	3.8
LED PAR38	5.1	4.8



Dimensions Inches (mm)

OSRAM

Americas Headquarters

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SYLVANIA

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SubstiTUBE® LED T5HO Lamps

Energy saving replacement for fluorescent T5HO lamps

Key Features & Benefits

- CCT: 3000K, 3500K, 4100K, 5000K
- Beam angle: 180°
- Operates on programmed rapid start T5HO electronic ballasts
- Long life: 50,000 hour life (L_{70})
- Suitable for dry and damp locations (cannot come in direct contact with water)
- Suitable for open fixtures
- 5 year limited lamp warranty (24/7 operation)
- Reduces energy consumption up to 40%
- No UV emission

SYLVANIA SubstiTUBE LED T5HO lamps are an energy saving alternative, designed to replace traditional fluorescent T5HO lamps. These LED T5HO lamps mimic the look of traditional fluorescent T5 HO lamps, contain no mercury and provide a uniform light distribution with an optimized glass optic design.

Engineered to operate on select programmed rapid start electronic T5HO ballasts, these lamps minimize labor costs.

Product Offering

Lamp Type	Color Temperature	CRI
LED T5HO	3000K, 3500K, 4100K, 5000K	80+

Application Information

Applications

- Cove lighting
- General illumination

Specifications and Certifications

c UL us LISTED · NSF · RoHS compliant · Lead-Free · Hg · DLC QPL LISTED

SYLVANIA

Specification Data

Catalog #	Type
Project	
Comments	
Prepared by	

Specifications

Energy Data

Ambient Operating Temperature: -4°F to 122°F (-20°C to 50°C)

EMI/RFI: FCC Title 47 CFR, Part 18, Non-Consumer

Max Case Temperature: 140°F (60°C)

Lighting Data

Lumen Output: Up to 3500 lumens

Lumens per Watt: Up to 125 LPW

Correlated Color Temperature (CCT): 3000K, 3500K, 4100K, 5000K

Color Rendering Index (CRI): 82

Ordering Information

Item Number	Ordering Abbreviation	Lamp Power (W)[1]	Lamp Lumens (lm)[1]	Color Temp.	CRI	Beam Angle (°)	Package Quantity	DLC (Y/N)
79746	LED25T5HO/L48/FG/830/SUB/G6	25W	3200	3000K	82	180°	10	Y
79747	LED25T5HO/L48/FG/835/SUB/G6	25W	3200	3500K	82	180°	10	Y
79748	LED25T5HO/L48/FG/841/SUB/G6	25W	3500	4100K	82	180°	10	Y
79749	LED25T5HO/L48/FG/850/SUB/G6	25W	3500	5000K	82	180°	10	Y

[1]Lamp Power and Lamp Lumens rated on QHE2x54T5HO/UNV PSN
Please contact your SYLVANIA product sales representative for additional information.

Ordering Guide

LED	25	T5	HO	/	L	48	/	FG	/	8	41	/	SUB	/	G6
LED	Wattage	Lamp Type			Length	48 Inches		Frosted Glass		CRI 82	Color Temperature 41 = 4100K 30 = 3000K 35 = 3500K 50 = 5000K		SubstiTUBE® (Compatible LED T5HO for for use with select programmed rapid start – T5HO electronic ballasts)		Generation

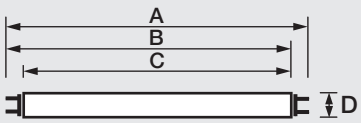
Application Information

Application Notes

1. Due to numerous ballast designs and topologies, this lamp should be tested on existing ballasts before mass quantities are installed.
2. All installation, inspection, and maintenance of lighting fixtures should be done with the power to the fixture turned off. Lamps should be installed and operated in compliance with the National Electrical Code (NEC), Underwriters Laboratories Inc. (UL) requirements, and all applicable codes and regulations.
3. Insert and align tubes properly in lamp holders. Partial insertion results in a poor or intermittent electrical contact that can result in short lamp life and arcing. Arcing at the lamp holder can result in localized overheating.
4. Operating temperature range between -4°F and 122°F (-20°C and 50°C).
5. Suitable for use in dry and damp environments.
6. Maximum mounting distance between tube and ballast is 20 feet.
7. Due to the programmed rapid start coil-heat circuitry, start times of lamps within a fixture may vary, but all reach maximum lumen output in less than one second.
8. Please read all installation instructions before attempting installation.
9. For detailed warranty information, please see www.sylvania.com.

Lamp Dimensions

	(A) Max. Overall Length (in./mm)	(B) Base Face to Opposite Pin (in./mm)	(C) Max. Base Face to Base Face(in./mm)	(D) Max. Outside Diameter (in./mm)
LED25T8	45.80/1163	Min. 45.42/1154 Max. 45.52/1156	Min. 45.16/1147 Max. 45.24/1149	0.67/17.0



Specifications & Lighting Data

Lamp	Ballast	Current (AMPS)	System Power (W)	System Lumens (lm)	System Efficacy (lm/W)	No. of Lamps
LED25T5HO	QHE2x54T5HO/UNV PSN	0.52/0.22	56	7000	125	2

Warranty

SubstiTUBE® LED T5HO lamps are covered by a 5 year limited warranty (24/7 operation).
For additional details, please visit www.sylvania.com/warranty.

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ULTRA LED™ RT5/6 HO

Recessed Downlight Kit

SYLVANIA ULTRA RT5/6 HO is a universal input voltage 5" and 6" compatible LED recessed downlight kit that creates high performing white light and is optimized for new construction and retrofit applications utilizing pin based compact fluorescent lamps. Installation is done quickly and easily in most standard six-inch frames.

The RT5/6 HO downlight is offered in 650 lumen, 700 lumen, 900 lumen and 1500 lumen options and achieves up to 88 lumens per watt.

The RT5/6 HO is designed to deliver light output comparable to traditional 1x13W, 1x18W, 1x26W and 2x26W pin based compact fluorescent luminaires.

Application Information

Application Notes

1. Operating temperature range between -4°F and +104°F (-20°C and +40°C).
2. Suitable for dry, damp or wet indoor or outdoor locations.
3. Compatible with Philips Bodine ELI-S-20 Emergency Lighting Micro Inverter.
4. Designed to install in standard 6" CFL mounting frame. For a list of compatible housings, please refer to www.sylvania.com/RT6.
5. For detailed warranty information, please see www.sylvania.com/RT6.
6. The RT5/6HO 650 and 700 lumen is compatible with 120V Phase cut dimmers and 277V Leviton Dimmer model IPX06-70Z .
7. The RT5/6 HO 900 and 1500 lumen are compatible with Leviton 0-10V dimmer model IP710-DL.
8. For installation in non-insulated ceilings: If insulation is present, it may be placed around the retrofit kit as long as a three-inch space is maintained around the kit.
9. Installation performed as a stand-alone kit (without frame) is recommended for hard ceiling. Installation of a recessed incandescent frame is recommended for tiled ceiling application for proper support of the retrofit kit.

Key Features & Benefits

- Three input voltages:
  - 120V
  - 120-277V Universal
  - 347V
- Lumen package:
  - 650 lumens @ 8 watts (line voltage dimmable)
  - 700 lumens @ 8 watts (line voltage dimmable)
  - 900 lumens @ 13 watts (0-10V Dimmable)
  - 1500 lumens @ 17 watts (0-10V Dimmable)
- Replacement for 13W, 18W, 26W and 32W CFL pin based lamps
- Fits in standard 5" and 6" CFL mounting frame
- CCT: 2700K, 3000K, 3500K & 4000K
- CRI of >80 and >90
- 35,000 and 50,000 hour life (L_{70})
- Suitable for dry, damp and wet indoor or outdoor locations (650lm Indoor only)
- UL1598 Listed and Classified for stand-alone and retrofit applications
- Reduces energy consumption up to 34%
- Lasts up to 4 times longer than compact fluorescent lamps
- No warm-up time, instant-on with full light output and stable lamp to lamp color
- Integrated white trim and metal conduit adaptor (included) for direct replacement
- Suitable for use in 8" applications using optional trim extender accessory

Product Offering

Ordering Abbreviation	Wattage	CCT
LED/RT5/6/HO/650	8	3000K, 4000K
LED/RT5/6/HO/700	8	2700K, 3000K, 3500K, 4000K
LED/RT5/6/HO/900	13	2700K, 3000K, 3500K, 4000K
LED/RT5/6/HO/1500	17	3000K, 3500K, 4000K

Specifications and Certifications

SYLVANIA

Specification Data

Catalog #	Type
Project	
Comments	
Prepared by	

Specifications

Energy Data

Minimum Starting Temp: -20°C (-4°F)

EMI/RFI: RT6/HO 1500 lumen: FCC Title 47 CFR, Part 15, Class B
RT6/HO 900 lumen: FCC Title 47 CFR, Part 15, Class A

Sound Rating: <24dBA

Input Voltage: 120-277V

Power Factor: >0.90

Input Frequency: 60Hz

THD: <20%

Maximum Ambient Operating Temperature (Non-Insulated Ceiling): 40°C (104°F)

Lighting Data

Lumen Output: 650, 700, 900 and 1500

Color

Color Rendering Index (CRI): >80 and >90

Ordering Information

Item Number	Ordering Abbreviation	Recessed Housing	Replaced CFL Wattage	Nominal Wattage (W)	Delivered Light Output (lm)	Input Voltage	LPW	Color Temperature	Avg. Rated Life (hrs)*	Packaging Configuration	Dimmable
75331	LED/RT5/6/650/930	5" and 6"	13W	8	650	120V	72	3000K	35,000	2/case	YES (Phase Cut)
75332	LED/RT5/6/650/940	5" and 6"	13W	8	650	120V	72	4000K	35,000	2/case	YES (Phase Cut)
75228	LED/RT/5/6/HO/700/827	5" and 6"	13W	8	700	120-277V	87	2700K	50,000	4/case	YES (Phase Cut)
75229	LED/RT/5/6/HO/700/830	5" and 6"	13W	8	700	120-277V	87	3000K	50,000	4/case	YES (Phase Cut)
75230	LED/RT/5/6/HO/700/835	5" and 6"	13W	8	700	120-277V	87	3500K	50,000	4/case	YES (Phase Cut)
75231	LED/RT/5/6/HO/700/840	5" and 6"	13W	8	700	120-277V	87	4000K	50,000	4/case	YES (Phase Cut)
75137	LED/RT5/6/HO/900/827	5" and 6"	18W	13	900	120-277V	69	2700K	50,000	4/case	YES (0-10V Low Voltage)
75138	LED/RT5/6/HO/900/830	5" and 6"	18W	13	900	120-277V	69	3000K	50,000	4/case	YES (0-10V Low Voltage)
75140	LED/RT5/6/HO/900/835	5" and 6"	18W	13	900	120-277V	69	3500K	50,000	4/case	YES (0-10V Low Voltage)
75139	LED/RT5/6/HO/900/840	5" and 6"	18W	13	900	120-277V	69	4000K	50,000	4/case	YES (0-10V Low Voltage)
75327	LED/RT5/6/HO/900/840/347V	5" and 6"	18W	13	900	347V	69	4000K	50,000	4/Case	NO
72528	LED/RT5/6/1500/HO/830	5" and 6"	26W & 32W	17	1500	120-277V	88	3000K	50,000	4/case	YES (0-10V Low Voltage)
72529	LED/RT5/6/1500/HO/835	5" and 6"	26W & 32W	17	1500	120-277V	88	3500K	50,000	4/case	YES (0-10V Low Voltage)
72530	LED/RT5/6/1500/HO/840	5" and 6"	26W & 32W	17	1500	120-277V	88	4000K	50,000	4/case	YES (0-10V Low Voltage)
75328	LED/RT5/6/HO/1500/840/347V	5" and 6"	26W & 32W	17	1500	347V	88	4000K	50,000	4/case	NO

*LED lamp life is defined as the number of hours when 50% of an average group of identical lamps reached 70% of its initial lumens.

Ordering Guide

LED	/	RT5/6	/	1500	/	HO	/	8	30
LED		Product Name RT5/6 5/6 = fits 5" and 6" frames		Light Output 1500lm, 900lm, 700lm, 650lm		High Output		CRI >80	Color Temperature 2700K, 3000K, 3500K, 4000K

Energy Savings

Basic Product Description	LED Lumens	LED Life	Traditional Lamp Types	Lumens	Life	Watts Saved With RT6	RT6 Energy Savings*	RT6 Life Benefit
RT5/6 HO 8W	700	50,000	13W CFL DD, DT	800	16,000	5	$27	3X
RT5/6 HO 13W	900	50,000	18W CFL DD, DT	1200	16,000	5	$27	3X
RT5/6/HO 17W	1500	50,000	26W CFL DD, DT	1800	16,000	9	$49	3X
RT5/6/HO 17W	1500	50,000	32W CFL DD, DT	2400	16,000	15	$82	3X

* Based on $0.11/kWh over 50,000 hours life.

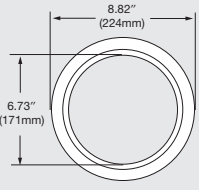
Accessories

RT5/6 Retrofit Trim	
75095	RT/5/6/TRIM/DKBZ
75097	RT/5/6/TRIM/BLK
75098	RT/5/6/TRIM/ORBZ
75099	RT/5/9/TRIM/SN
Trim Ring Extender	
75082	RT6/8/TRIMEXT
Rough In Frame	
71708	LED/RT6HO/FRAME

75097

75098

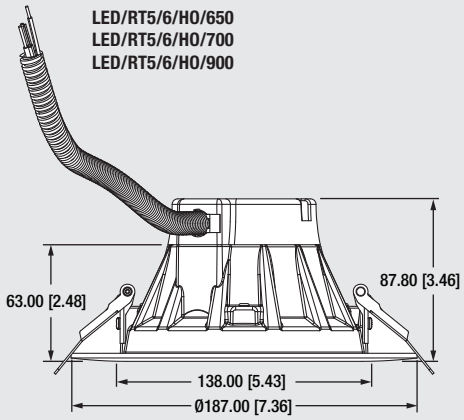
75099

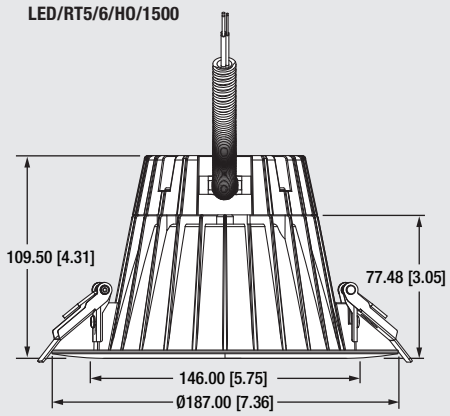


75082

71708

Assembly Diagram

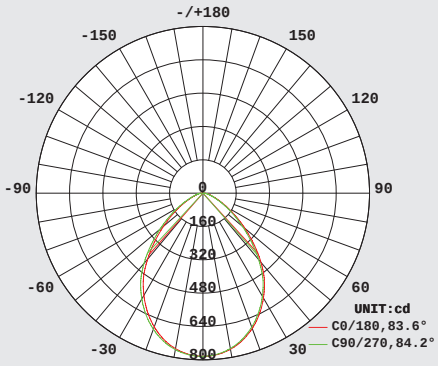




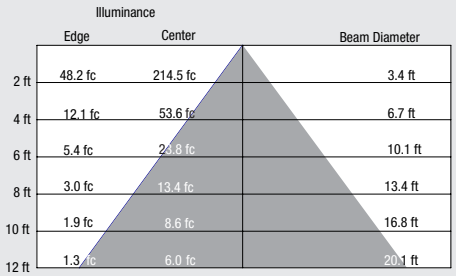
Dimensions are in mm [in]

Photometric Information

Luminous Intensity Distribution Diagram

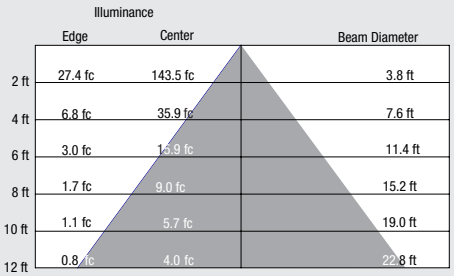


Illuminance at Distance



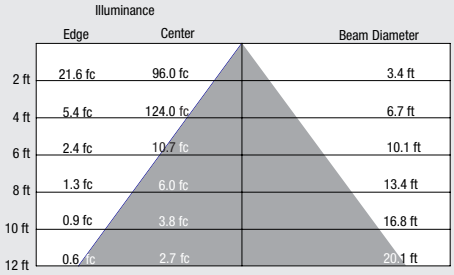
RT5/6 HO 1500 lumen

Illuminance at Distance



RT5/6 900 lumen

Illuminance at Distance



RT5/6 700 lumen

LEDVANCE LLC
200 Ballardvale Street
Wilmington, MA 01887 USA
Phone 1-800-LIGHTBULB (1-800-544-4828)
www.sylvania.com

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QUICKTRONIC® QHE LED T8

Universal Voltage Systems

Low Power LED System

LED T8 / Electronic Control Gear Guide

LED15T8 SubstiTUBE® LED T8 Lamps
1-lamp QHE 1xLEDT8/UNV-ISL-SC
2-lamp QHE 2xLEDT8/UNV-ISL-SC
3-lamp QHE 3xLEDT8/UNV-ISL-SC
4-lamp QHE 4xLEDT8/UNV-ISL-SC

Also operates
LED12T8/L36, LED08T8/L24, LED15T8/U

Key System Features

- Up to 127 LPW (lumens/watt) with SubstiTUBE LED T8
- Lowest power LED T8 Systems
- Universal voltage (120-277)
- Small Can enclosure size
- Up to 58% energy savings compared to T12 magnetic systems
- Ambient Starting Temp: -4°F to 122°F (-20°C to 50°C)
- <20% THD
- RoHS compliant
- Lead-free solder and manufacturing process

Application Information

OSRAM QUICKTRONIC QHE LED T8 are ideally suited for:

- Any applications where the lowest power T8 systems are needed for maximum energy savings
- Commercial & Retail
- Energy Management
- Energy Retrofits
- Hospitality & Institutional
- New Construction

OSRAM QUICKTRONIC High Efficiency LED T8 (QHE LED) Electronic Control Gears (ECG) offer several advantages:

1. **Optimized design for SubstiTUBE LED T8**
   - Up to 38% in energy savings compared to standard T8 Fluorescent systems
   - Maximum energy savings when compared to F34T12 magnetically ballasted systems
2. **Parallel Circuitry:** keeps remaining LED T8 lit if one or more go out.
3. **Banded Packaging**
   - Distributor-friendly for easy stocking and individual sales
   - ESCO friendly for fast installation
   - Reduced waste
   - Easy removable bands
   - No tangled wires

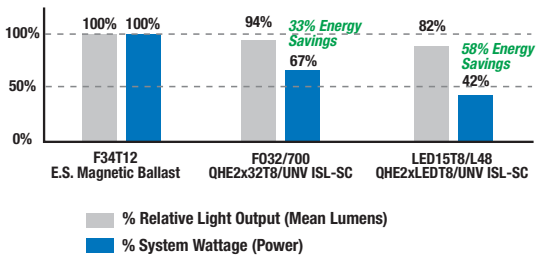
These ECGs are also RoHS compliant and feature lead-free solder and manufacturing process.

OSRAM QUICKTRONIC High Efficiency LED T8 (QHE LED) systems are covered up to 8 years by the SubstiTRONIC™ warranty, the most comprehensive LED system warranty in the industry.

System Information

OSRAM QUICKTRONIC QHE LED T8 System advantages:

- Operate from 120V through 277V
- Eliminates “wrong voltage” errors
- Highest System Efficacy



System Description	Input Power (W)	Initial System Lumens	System Efficacy LPW	Relative Initial Light Output	Energy Savings
F34T12 - E.S. Magnetic Ballast	72	4660	65	Baseline	Baseline
FO32/700 - QHE2x32T8/UNV ISL-SC	48	4370	91	94%	33%
LED15T8/L48 - QHE2xLEDT8/UNV ISL-SC	30	3800	127	82%	58%

OSRAM

High Efficiency Universal Voltage (120-277V) Low Power LED Systems

Item Number	Electronic Control Gear (ECG)	Input Current (AMPS)	SubstiTUBE LED T8	No. of LED T8	System Lumens (lm)	Input Power (W)	System Efficacy (lm/W)
75307	QHE1XLEDT8/UNV ISL-SC	0.13 / 0.06	LED15T8/L48/DIM/**G6**	1	1850	15	123
		0.13 / 0.06	LED15T8/L48/G6	1	1900	15	127
		0.11 / 0.05	LED12T8/L36/G6	1	1350	12	113
		0.08 / 0.04	LED08T8/L24/G6	1	1050	10	111
75308	QHE2XLEDT8/UNV ISL-SC	0.25 / 0.11	LED15T8/L48/DIM/**G6**	2	3700	30	123
		0.26 / 0.12	LED15T8/L48/G6	2	3800	30	127
		0.22 / 0.10	LED12T8/L36/G6	2	2900	26	114
		0.16 / 0.08	LED08T8/L24/G6	2	2100	19	111
75309	QHE3XLEDT8/UNV ISL-SC	0.37 / 0.16	LED15T8/L48/DIM/**G6**	3	5400	44	123
		0.38 / 0.17	LED15T8/L48/G6	3	5700	45	127
		0.34 / 0.15	LED12T8/L36/G6	3	4500	40	114
		0.24 / 0.11	LED08T8/L24/G6	3	3150	29	111
75310	QHE4XLEDT8/UNV ISL-SC	0.51 / 0.23	LED15T8/L48/DIM/**G6**	4	7400	60	123
		0.51 / 0.23	LED15T8/L48/G6	4	7600	60	127
		0.44 / 0.20	LED12T8/L36/G6	4	5850	52	114
		0.32 / 0.14	LED08T8/L24/G6	4	4200	38	111

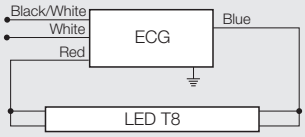
Use only with SubstiTUBE IPS LED T8.

Item No.	LED T8 Description	Length	Item No.	LED T8 Description	Length
75286	LED15T8/L48/DIM/830/SUB/G6	4ft	75128	LED12T8/L36/FG/830/SUB/G6	3ft
75287	LED15T8/L48/DIM/835/SUB/G6	4ft	75129	LED12T8/L36/FG/835/SUB/G6	3ft
75288	LED15T8/L48/DIM/841/SUB/G6	4ft	75130	LED12T8/L36/FG/841/SUB/G6	3ft
75297	LED15T8/L48/DIM/850/SUB/G6	4ft	75131	LED12T8/L36/FG/850/SUB/G6	3ft

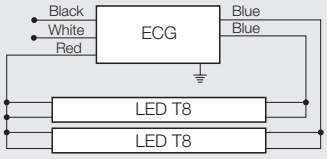
Item No.	LED T8 Description	Length	Item No.	LED T8 Description	Shape
75064	LED8T8/L24/FG/830/SUB/G6	2ft	75492	LED15T8/U/FP/830/SUB/G6	U-bend
75065	LED8T8/L24/FG/835/SUB/G6	2ft	75493	LED15T8/U/FP/835/SUB/G6	U-bend
75066	LED8T8/L24/FG/841/SUB/G6	2ft	75494	LED15T8/U/FP/841/SUB/G6	U-bend
75070	LED8T8/L24/FG/850/SUB/G6	2ft	75495	LED15T8/U/FP/850/SUB/G6	U-bend

*For additional SubstiTUBE LED T8 details, please refer to LED465.
For additonal SubstiTUBE CURVALUME IPS LED T8 details please refer to LED464.

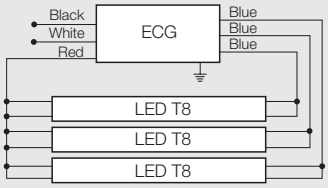
Wiring Diagrams



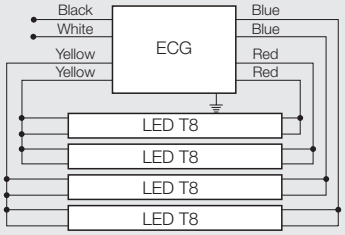
QHE LED 1 x T8



QHE LED 2 x T8



QHE LED 3 x T8



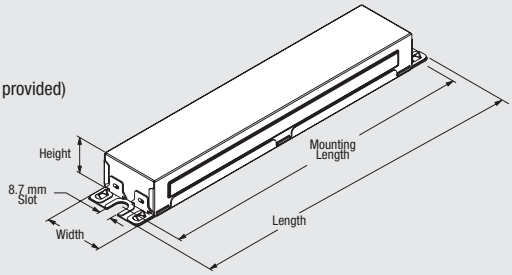
QHE LED 4 x T8

Use lamp holders with an internal shunt or ensure that lamp holders are wired in a shunt configuration.

Dimensions:
Overall: 9.5" L x 1.68" W x 1.18" H
Mounting: 8.90"

Product Weight:
14 oz each (approx.)

Wiring:
Leads only
(no connectors provided)



Ordering Guide

Item Number	**75307 QHE 1 x LEDT8 / UNV ISL - SC**	Case Size
QUICKTRONIC High Efficiency		Low Power System
Number of LED T8		Line Voltage
		SubstiTUBE LEDT8

Specification Data

Type	
Catalog #	
Project	
Comments	
Prepared by	

Performance Guide

Data based upon SubstiTUBE® LED T8 shown. QHE LED T8 Electronic Control Gear will operate LED15T8/L48, LED12T8/L36, LED08T8/L24 and LED15T8/U.

Specifications

System Output: Low Power
Circuit Type: Parallel
Ambient Operating Temperature: -4°F to 122°F (-20°C to 50°C)
Input Frequency: 50/60 Hz
Low THD: <20%
Power Factor: >90%
Voltage Range: ±10% of 120-277V rated line (108-305V)

cETLus Listed Class P, Type 1 Outdoor
70°C Max Case Temperature
FCC 47CFR Part 18 Non-Consumer
Class A Sound Rating
RoHS Compliant[1]
ANSI C62.41 Cat. A Transient Protection
Remote Mounting (Max. wire length from case to lampholder): 20 ft

1 Complies with European Union Restriction of Hazardous Substances (Directive EC 2002/95)

System Life / Warranty

QUICKTRONIC High Efficiency QHE LED products are covered up to 8 years by the SubstiTRONIC™ warranty, the most comprehensive LED system warranty in the industry. For additional warranty details, please refer to LED285.

For additional information refer to the warranty section of www.sylvania.com

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Wilmington, MA 01887 USA
Phone 1-877-636-5267
www.osram-americas.com

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SubstiTUBE® IPS LED T8

Compatible LED T8 for use with instant start and select programmed rapid start electronic T8 ballasts

Key Features & Benefits

- Optimized glass optics available in:
  – Dimmable on 0-10V 4ft/15.5W
- CCT: 3000K, 3500K, 4100K, 5000K
- Beam angle: 220°
- Compatible with instant start and select programmed rapid start electronic T8 ballasts with input voltage of 120-277V and 347V
- THD <20%, power factor >0.90
- G13 medium bi-pin base
- Long life: 60,000 hour life (L_{70})
- 5 year limited lamp warranty (24/7 operation)
- No warm-up time, instant-on with full light output and stable lamp to lamp color
- No UV emission
- Suitable for dry and damp locations (cannot come in direct contact with water)
- Maximize energy savings with occupancy sensors
- Suitable for open and enclosed fixtures

SubstiTUBE IPS LED T8 lamps are an energy saving alternative, designed to replace traditional fluorescent T8 lamps. These LED T8 lamps contain no mercury, provide instant light and a uniform light distribution.

Engineered to operate on existing instant start and select programmed rapid start electronic T8 ballasts, these lamps minimize labor and recycling costs. Because the SubstiTUBE IPS LED T8 is not affected by switching cycles, the use of occupancy or vacancy sensors can be installed with the existing instant start ballasts for optimal energy savings.

Install a new QHE instant start ballast with the SubstiTUBE IPS LED T8 lamp for optimal performance and to take advantage of the QUICK 72SUB+ system warranty. (See website for details.)

Product Offering

Length	Color Temperature	CRI
48in.	3000K, 3500K, 4100K, 5000K	82

Application Information

Applications

- Cove lighting
- Display case
- General illumination
- Parking garage
- Tunnels

Specifications and Certifications

c UL us LISTED · LEAD-FREE · Hg · RoHS compliant · DLC QPL LISTED

SYLVANIA

Specification Data

Catalog #	Type
Project	
Comments	
Prepared by	

Specifications

Energy Data

Ambient Operating Temperature: -4°F to 122°F (-20°C to 50°C)
EMI/RFI: FCC Title 47 CFR, Part 18, Non-Consumer
Max Case Temperature: LED15T8/L48 = 140°F (60°C)

Lighting Data

Lumen Output: See specification table (output is dependent on operating ballast)
Lumens per Watt: Up to 122
Correlated Color Temperature (CCT): 3000K, 3500K, 4100K, 5000K
Color Rendering Index (CRI): 82
R9: Up to 14

Ordering Information

Item Number	Ordering Abbreviation	Length	Lamp Power (W)[1]	Lamp Lumens (lm)[1]	Color Temp.	CRI	Beam Angle (°)	Package Quantity	DLC (Y/N)
75339	LED15T8/L48/DIM/830/SUB/G7	4ft	15.5	2100	3000K	82	220	25	Y
75340	LED15T8/L48/DIM/835/SUB/G7	4ft	15.5	2100	3500K	82	220	25	Y
75341	LED15T8/L48/DIM/841/SUB/G7	4ft	15.5	2200	4100K	82	220	25	Y
75342	LED15T8/L48/DIM/850/SUB/G7	4ft	15.5	2200	5000K	82	220	25	Y

1. Average Lamp Power and Average Lamp Lumens rated on QHE2x32T8/UNV ISN.

Ordering Guide

LED	15	T8	/	L	48	/	DIM	/	8	41	/	SUB	/	G7
LED	Wattage (ISN ballast)	Lamp Type		Length	48 Inches		DIM = frosted glass dimmable		CRI = 82	Color Temperature 41 = 4100K 30 = 3000K 35 = 3500K 50 = 5000K		SubstiTUBE® IPS (Compatible LED T8 for use with instant start and select programmed rapid start T8 electronic ballasts)		Generation

Application Information

Application Notes

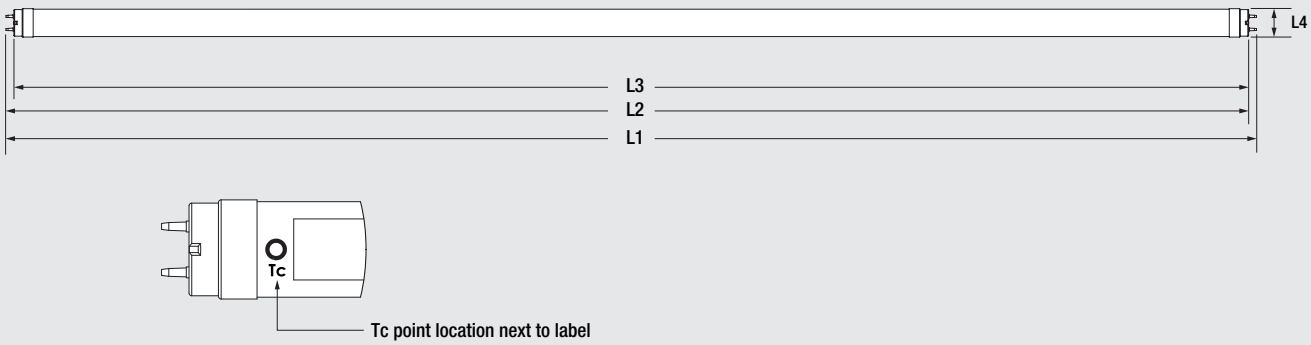
1. Due to numerous ballast designs and topologies, this lamp should be tested on existing ballasts before mass quantities are installed.
2. Not intended for use with older dedicated voltage (120V or 277V) ballasts. These ballasts have electronic components that degrade over time and may become unsuitable for the new LED T8 lamp.
3. All installation, inspection, and maintenance of lighting fixtures should be done with the power to the fixture turned off. Lamps should be installed and operated in compliance with the National Electrical Code (NEC), Underwriters Laboratories Inc. (UL) requirements, and all applicable codes and regulations.
4. Insert and align tubes properly in lamp holders. Partial insertion results in a poor or intermittent electrical contact that can result in short lamp life and arcing. Arcing at the lamp holder can result in localized overheating.
5. For instant start ballasts, use lamp holders with an internal shunt or ensure that lamp holders are wired in a shunt configuration.
6. For Programmed Rapid Start ballasts, use rapid-start lamp holders (non-shunted lamp holders).
7. De-lamp is not allowed for ISH ballasts. For approved ISN and ISL ballasts, de-lamp is allowed for only 1 lamp so long as the ballast factor remains below 1.20 (for example, 4 lamp ballast can de-lamp to 3 lamps).
8. Operating temperature range between -4°F and 122°F (-20°C and 50°C).
9. Suitable for use in dry and damp environments.
10. Maximum mounting distance between tube and ballast is 20 feet.
11. Please read all installation instructions before attempting installation.
12. For detailed warranty information, please see www.sylvania.com.

Specifications & Lighting Data

Lamp	Ballast	Current (AMPS)	System Power (W)	System Lumens (lm)	System Efficacy (lm/W)	No. of Lamps
LED15T8/L48	QHE2X32T8/UNV ISN	0.33 / 0.14	36.0	4400	122	2

Note: For complete system information refer to LED495 – SubstiTUBE System Information.

Assembly Diagram



Product Description	L1 End of Base Pin to End of Opposite Pin End	L2 Base Face to End of Opposite Base Pin	L3 Base Face to Base Face	L4 Bulb Outside Diameter
LED15T8/L48/DIM (4ft)	47.725" ± 0.055" (1212.2mm ± 1.4mm)	47.45" ± 0.05" (1205.25mm ± 1.25mm)	max 47.22" (1199.4mm)	1.02" ± 0.08" (25.9mm ± 2.0mm)

Warranty

SubstiTUBE® IPS LED T8 lamps are covered by the LED T8 Lamp Limited Warranty and the QUICK 72SUB+ System Warranty, a comprehensive system warranty. For additional details, please visit www.sylvania.com/warranty.

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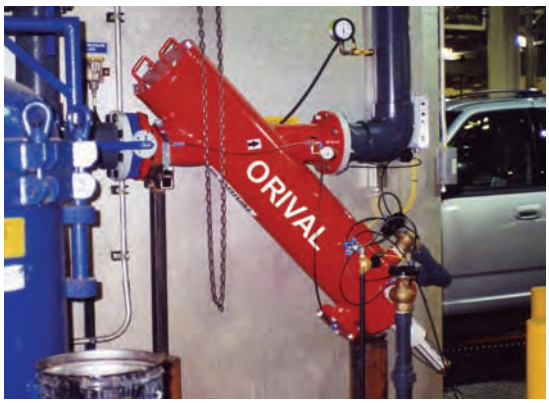

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Company Profile

Providing automatic self-cleaning filtration systems for removal of suspended solids from water is more than a job for Orival – it's a way of life. Since its establishment in 1986, Orival has supplied thousands of filtration units, for a wide variety of customers, including Fortune 500 companies and local and federal government agencies. Units are installed in over 40 countries worldwide, meeting any local standard. Single units, flange-to-flange systems, complete skid mounted packages, construction standards, alternate flange or voltage standards – all are no problem for Orival. No matter what your requirements, we can build it!

Orival's network of application specialists will provide expert solutions tailored to your specific needs. Contact us today to see how we can help you resolve your water problems. After all, solving your filtration requirements is what we do best.

Filters

Features	Standard	Optional
Power	None, line pressure powered	Electrical (See ORE/P series)
Self Cleaning Operation	Fully automatic	Semi-Automatic, Manual
Material of Construction	Carbon Steel & Stainless Steel	Titanium, Hastelloy & Others
Operating Pressure	30 psi min., 150 psi max.	12 psi min., 1000 psi max.
Operating Temperature	No min., 150°F max.	No min., 212°F max.
Screen Pattern	Wire Mesh/PVC Support	Wedgewire, Multi-layer sintered
Screen Aperture	50-3,000 mic.	5-10,000 mic.
Single Unit Flow Rate	Up to 8,100 gpm	Up to 15,000 gpm
Code	ISO 9001	ASME "U" Stamp, Others
PH Resistance	4-9	1-12
Compatible Fluid	Water	Sea water, Oily, Highly corrosive fluids
Connections	Flanged, threaded	Victaulic, Other
Installation	Any position even upside down	

Controls

Features	Standard	Optional
Power	110V/220V AC ½ Amp, 9V / 12V DC	Hydraulic
Enclosure	NEMA 4X	Explosion Proof
Backwash Activation	DP, Timer, Manual	Volumetric, Remotely
Number of Filters	1 – 10	1 – Unlimited

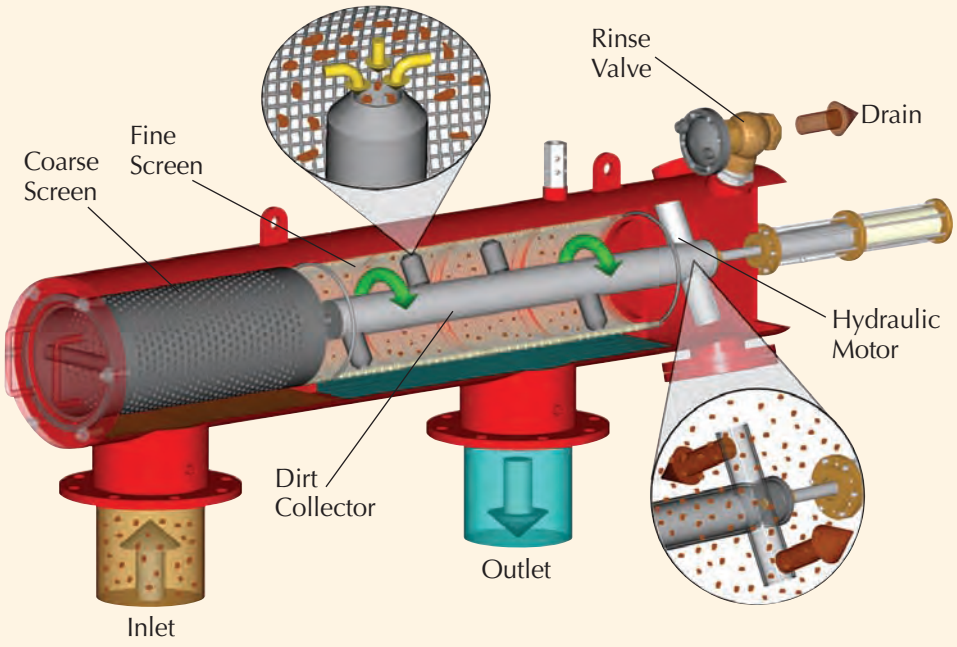
How It Works

The unit consists of two stages of filtration, a coarse pre-filter and a stainless steel fine screen.

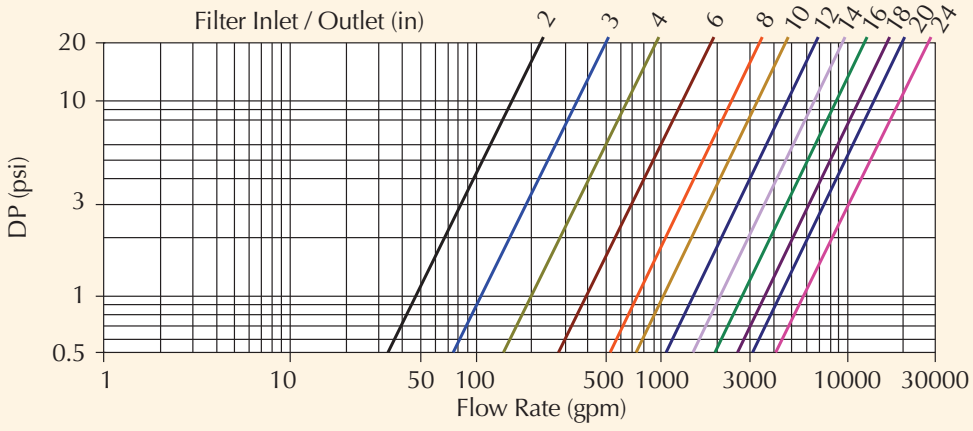
The unwanted solids accumulate on the inner surface of the fine screen, building up a filter cake, which filters out even finer particles, creating a pressure differential. Once the pressure drop reaches a preset level, a rinse cycle is activated by the factory supplied control system.

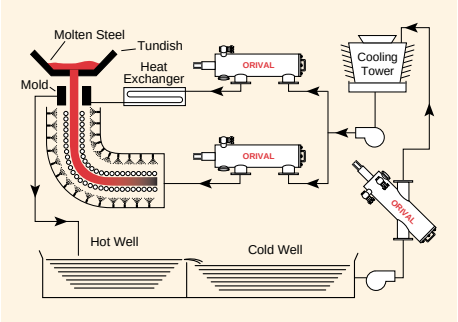
The solids are removed from the fine screen using a spot backwashing method, which aggressively sucks the dirt off the screen, similar to a vacuum cleaner, and are carried to the drain via the rinse valve. The dirt collector rotates, ensuring the entire screen is cleaned each cycle.

The process takes a matter of seconds, without interruption of system flow.

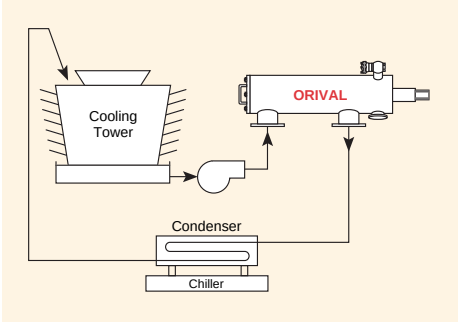


Pressure Drop vs. Flow Rate

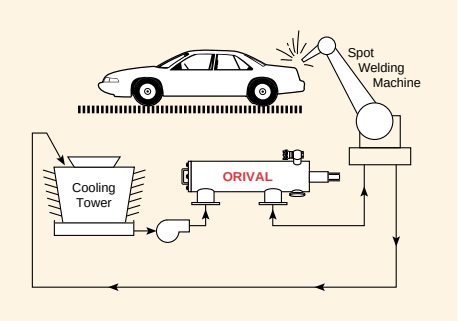




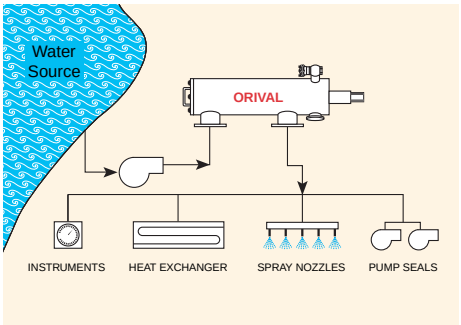
Steel / Continuous Casting



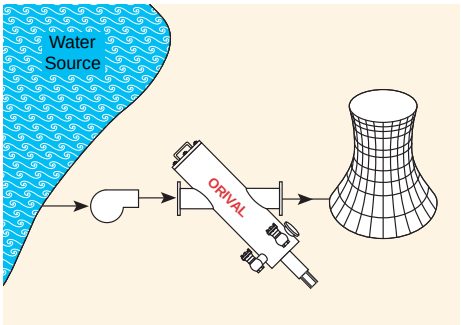
HVAC / Full Flow



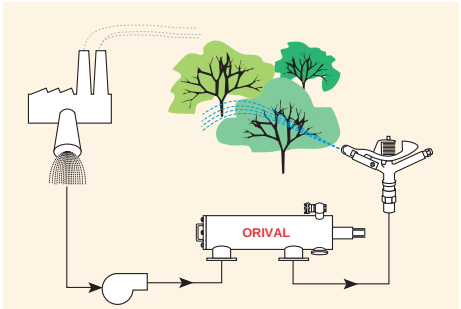
Spot Welding



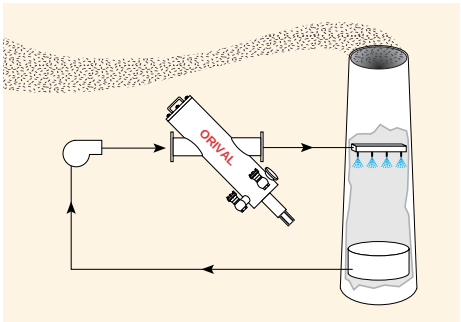
Process Cooling



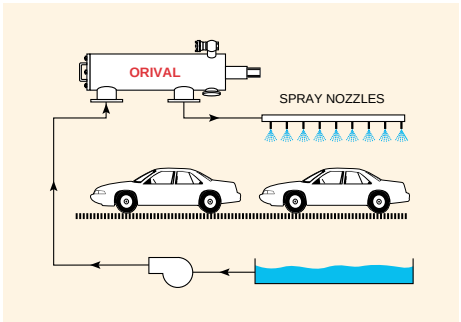
Power / Make Up



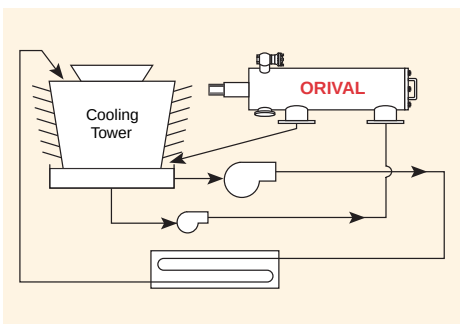
Wastewater / Irrigation



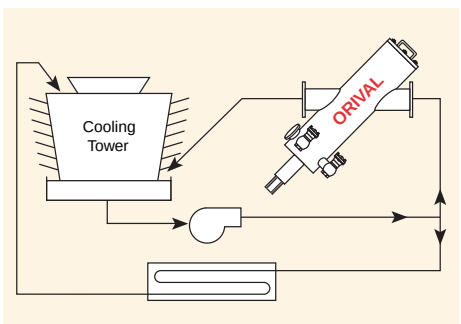
Pollution / Wet Scrubber



Automotive / Leak Test



Side Stream w/ Recirculating Pump



Side Stream w/ Existing Pump

Thoroughly Proven In:

HVAC
Chemical
Hydrocarbon
Plastics
Food
Sugar
Mining
Steel
Automotive
Paper
Pharmaceutical
Power
Sewage Treatment

Removing Solids, of any Specific Gravity:

Sand
Gravel
Algae
Pollen
Silt
Microbiological Growth
Bugs
Scale
Rust
Mussels

From Virtually any Source:

Cooling Towers
Rivers
Lakes
Wells
Ponds
Reservoirs

For any Application:

Cooling Water
Process Water
Reclaim Water
Effluent Water
Intake Water
Waste Water
Wash Water
Potable Water
Irrigation

For Protection Of:

Heat Exchangers
Spray Nozzles
Instrumentation
Pump Seals
I.E. & R.O. Units
Air Compressors
The Environment

Technical Data *(Add "-S" to model number for stainless steel construction)*

MODEL "I" Series	MODEL "P" Series	MODEL "B" Series	Flange Size (in.)	Max Flow Rate (gpm)	Open Screen Area (in^2) Woven	Open Screen Area (in^2) Sintered	Empty Weight (lb) I Series	Empty Weight (lb) P Series	Empty Weight (lb) B Series
——	OR-02-PE	——	2" NPT	110	64	96	——	95	——
OR-03-IS	OR-03-PS	——	3	175	64	96	105	105	——
OR-03-IE	OR-03-PE	OR-03-BE	3	175	237	356	205	215	225
OR-04-IS	OR-04-PS	——	4	350	120	180	135	135	——
OR-04-IE	OR-04-PE	OR-04-BE	4	350	474	713	235	225	280
OR-06-IE	OR-06-PE	OR-06-BE	6	660	474	713	290	285	335
OR-08-IS	OR-08-PS	OR-08-BS	8	1320	474	713	340	325	380
——	OR-08-PE	OR-08-BE	8	1320	713	1070	——	355	425
OR-10-IS	OR-10-PS	OR-10-BS	10	1760	632	950	565	575	865
——	OR-10-PE	OR-10-BE	10	1760	945	1420	665	645	975
OR-12-IS	OR-12-PS	OR-12-BS	12	2640	945	1420	665	645	975
OR-14-IS	OR-14-PS	OR-14-BS	14	3960	1070	1605	965	700	1040
——	OR-16-PS	OR-16-BS	16	4840	1070	1605	——	965	1305
——	OR-18-PS	——	18	6125	1070	1605	——	1025	——
——	OR-20-PS	——	20	8100	2140	3210	——	1400	——
——	OR-24-PS	——	24	12000	3210	4815	——	2100	——

Other Great Products:

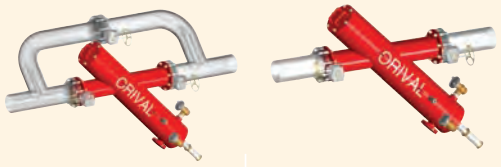
- **ORG Filters**
  2 gallons per backwash, 10 mic
- **ORE/P-Electrical Filters**
  For high loading, 10 mic
- **ORS-Suction Filters**
  For pump protection
- **SLS Series**
  5%-10% loading
- **ORM-Manual Filters**
  For low cost operations
- **Skid Mounted Filters**
  With pump, starter & connections
- **Drinking Water Plants**
  Also for rural location

Screens

	Woven on PVC Support	Multilayer Sintered	Wedgewire
Screen Patterns			
Screen Apertures	15-5000 Mic	1-5000 Mic	25-2500 Mic
Open Screen Area	40%	60%	30%
Hydraulic Collapse D.P.	300 PSI	300 PSI	450 PSI
Temp Rating	150˚F	300˚F	750˚F
Material	St/St 316L	St/St 316L	St/St 316L
Optional Material	Titanium, Hastelloy and other exotic material		
Fibrous Mat. Filtration	Poor	Poor	Excellent
Price	Low	Medium	High

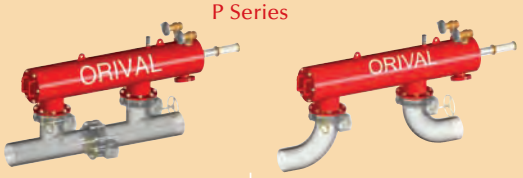
Installations & Configurations

I Series



I Series
- In-line model
- Inlet and outlet are concentric
- Commonly used in single unit installations and vertical installations

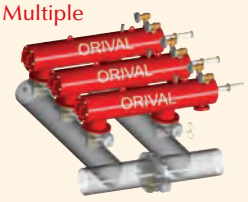
P Series



P Series
- On-line model
- Inlet and outlet are parallel
- Commonly used in single and multiple unit installations and upside down installations

B Series

Multiple



B Series
- Bypass model
- Inlet and outlet are parallel
- Commonly used in full flow applications where a constant flow of water is critical

Screen Apertures

Visible to the naked eye. →

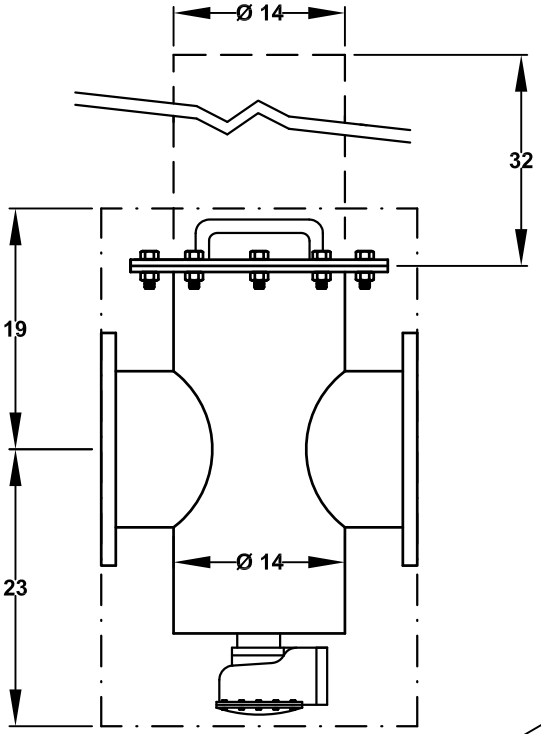
Micron	5	10	15	25	30	40	50	80	100	120	150	200	400	800	1000	1500	3000
Mesh*	3000	1500	1000	600	500	400	250	200	150	120	100	80	40	20	16	10	5
in*	.0002	.0004	.0006	.0010	.0012	.0016	.002	.003	.004	.005	.006	.008	.016	.032	.04	.06	.12
Physical Size										|	|	|	|	|	|	|	■

** Approximate and for reference only*

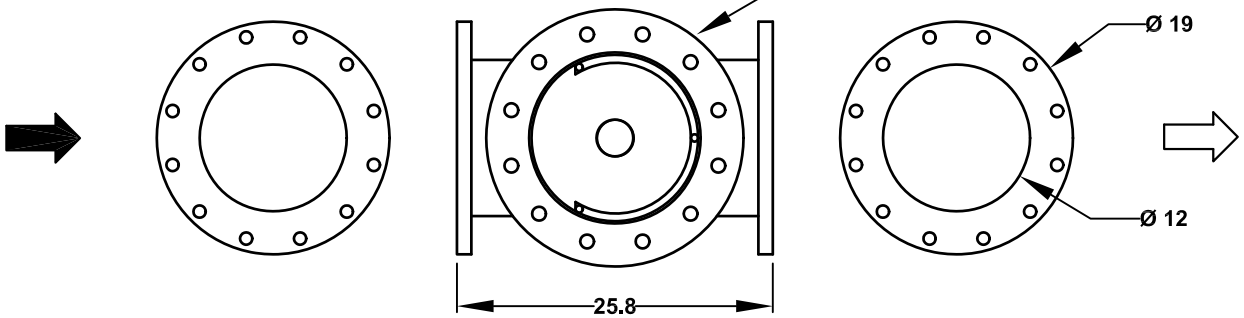
ORIVAL, INC. • 213 S. Van Brunt St., Englewood, NJ 07631 • (800) 567-9767 • (201) 568-3311 • Fax (201) 568-1916
www.orival.com • filters@orival.com

FREE SPACE REQUIRED FOR MAINTENANCE

FREE SPACE REQUIRED FOR INSTALLATION



TOP VIEW WITH Ø 21 COVER REMOVED



ALL DIMENSIONS IN INCHES UNLESS INDICATED

Orival Inc. reserves the right to modify filter dimensions without prior notice.

TECHNICAL DATA

MAXIMUM FLOW RATE:	2750 G.P.M.
AVAILABLE SCREEN SIZES:	3000, 5000 & 8000 MICRON
MAXIMUM WORKING PRESSURE:	150 PSIG
INLET/OUTLET FLANGES:	12" ANSI 150#
DRAIN VALVE CONNECTION:	3 "
DRY / SHIPPING WEIGHT:	375 / 525 POUNDS

ORC-12

AUTOMATIC SELF-CLEANING FILTER

ORIVAL, INC.
213 S. VAN BRUNT ST.
ENGLEWOOD, N.J. 07631
TEL (201) 568-3311, FAX (201) 568-1916
www.orival.com -- filters@orival.com

Kelvion

Customer: **Project:**

Item: **Date: 6/9/2017**

Kelvion Plate Heat Exchanger Specification: BYF-150

Thermal data for 1 unit(s) in parallel and 1 unit(s) in series

	hot side	cold side	
Media:	Water	Water	
Heat exchanged:	5416300		Btu/h
Mass flow:	500515	938642	lb/h
Volume flow:	1000.0	1875.0	US gpm
Temperature inlet:	55.80	43.00	°F
Temperature outlet:	45.00	48.75	°F
Pressure drop:	3.21	9.99	PSI
Working pressure inlet:	43.50	43.50	PSIg

Product properties

Density:	62.41	62.42	lb/ft³
Heat capacity:	1.00264	1.00372	Btu/lb°F
Thermal conductivity:	0.33463	0.33153	Btu/fth°F
Dyn. viscosity inlet:	2.887	3.548	lb/fth
Dyn. viscosity outlet:	3.430	3.224	lb/fth

Unit Data

Plate Type:	NA06S H			
Heat transfer area:	3134.45			ft²
Number of plates:	562			
Plate thickness:	0.40			mm
LMTD:	4.01			R
Surface margin:	15.8			%
Plate material:	AISI304			
Gasket material / Gasket type:	NBR		glueless	
Internal flow (passes x channels):	1 x 280	1 x 281		
No. of frames (par. / ser. / total):	1	1	1	
Frame material und surface:	SA516GR70	painted	3.1.1 RAL5002	

The connection types and positions are defined in the attached dimension sheet.

Design temperature:	**Min.:**	-0.00 / -0.00	**Max.:**	230.00 / 230.00	°F
Design pressure:	**Min.:**	0.00 / 0.00	**Max.:**	150.00 / 150.00	PSIg
Test pressure:	195.00 / 195.00 PSIg		**Design code:**		ASME

Kelvion Inc.

Kelvion Inc.
100 GEA Drive, York, PA, 17406, USA
Tel. 717-268-6200, 1-800-774-0474, Fax. 717-268-6162
www.Kelvion.com

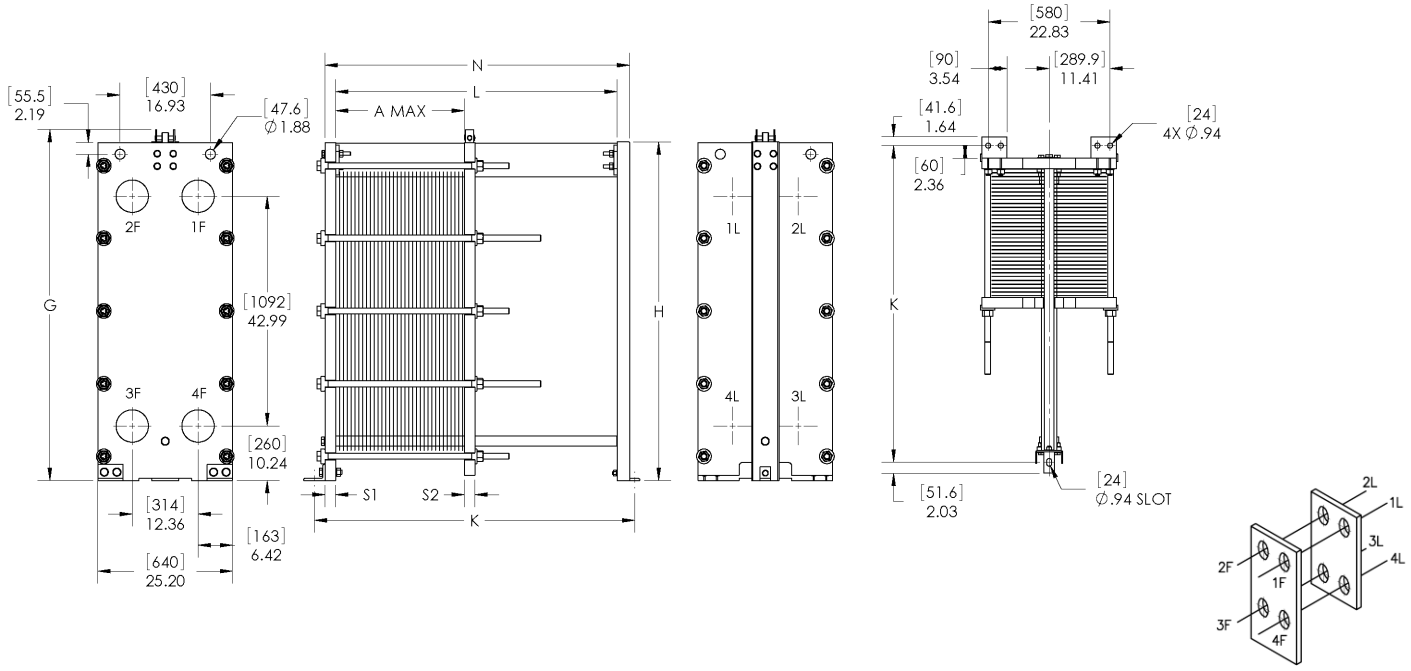
Kelvion

Customer: **Project:**

Item: **Date: 6/9/2017**

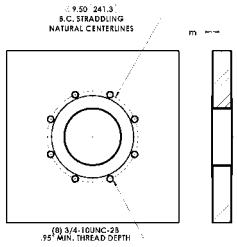
Dimension Sheet
Type: BYF-150

Dimensions of drawing in [mm] GA-060919.tif



N:	151.969 in	S_1:	0.16408 ft	a-max frame:	94.546 in	empty weight:	5432.51 lbs
K:	154.173 in	S_2:	0.16408 ft	a-max actual:	78.625 in	max. total weight:	7613.63 lbs
L:	147.244 in	H:	65.770 in	G:	68.210 in		

Pos	DN	Type	Media	In	Out	Add.	m
1F	6"	Metal Liner ANSI150 6" 1.4404 0,054	Water	x	-	-	0.078 in
2F	6"	Metal Liner ANSI150 6" 1.4404 0,054	Water	-	x	-	0.078 in
3F	6"	Metal Liner ANSI150 6" 1.4404 0,054	Water	x	-	-	0.078 in
4F	6"	Metal Liner ANSI150 6" 1.4404 0,054	Water	-	x	-	0.078 in



Metal Liner			
ANSI150			
AISI316L			
1F;2F;3F;4F			

Technical Revisions reserved. Layer thickness of painted frames according to ISO 12944-5. Frame plate surface quality according to ISO 8501-1 SA 2½. The design details are valid for PHE's manufactured by Kelvion Inc.

Kelvion Inc.

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100 GEA Drive, York, PA, 17406, USA
Tel. 717-268-6200, 1-800-774-0474, Fax. 717-268-6162
www.Kelvion.com

R.C. KILLIGREW CO.
Manufacturers Representatives

101 Chapel Hill Drive
Pittsburgh, Pa. 15238
(724) 275-7070
(724) 275-7155-Fax
(412) 260-5002 Mobile

PROJECT: Tim Roos, Harrisburg project
ENGINEER:
DUE DATE: 5-6-17
PRODUCT: **ABB** (ASEA BROWN BOVERI) 480/3/60 Variable Frequency Drive with Soft Start Starter for By-pass

All Drives are 6-Pulse Design.

We are pleased to offer our proposal for the adjustable frequency drives. Model Number ACH550 Series, with microprocessor based Pulse Width Modulation adjustable frequency AC drives. Advanced IGBT power switching for high performance control of AC motors, UL listed, 40 Character Alphanumeric display for Output Frequency Speed (RPM), Motor Current, Motor Torque, Motor Power, DC bus voltage, Elapsed Time Meter, kwh Meter, Fault Text, Warning Text, RS-485 Communication, Two Analog Inputs, Five Programmable Digital Inputs, One Programmable Analog Output, Two Programmable Form C Outputs, Protection Circuits, Adjustable Accel/Decel Ramps, Seven Preset Speeds, Five Critical Frequency Lockouts Bands, DC Line Reactor, Input Speed Signal 4-20ma, 0-10vdc, RS-485 Communication Port, Motor Overload Protection all Factory Wired, Installed and Factory Tested, Enclosures are NEMA-I, Drives will include a 24vdc Power Source @ 250ma..

Two (2) 200HP ACH550 480/3/60 NEAM I with Disconnects and Soft Start Starters in by-pass Tagged: Pumps

Warranty: 3-Year Parts and labor warranty with Factory Authorized Start-up

Terms: Net 30 Days upon Credit Approval. 1.25% Service Charge per month will be added to all invoices over 30 Days. If legal action is taken to collect payment of this invoice, you will be responsible for all legal fees. No Pa Sales Taxes Included. ONE (1) combination start-up and training trip is included in this proposal, if additional trips are require an additional cost of $400.00 per trip will be required.

Warranty does not Include Negligence or Acts of God. ABB will start up this Equipment and Provide Training at this Time.
Terms: Net 30 Days- Upon Credit Approval.
Best Regards,
Michael C. Killigrew
CC: File

TECO Westinghouse

ISSUED	PERFORMANCE DATA	ENCLOSURE
January 15, 2015	3-PHASE INDUCTION MOTOR	WP1
TYPE		CATALOG#
AMRCNH		VHP2004

NAMEPLATE INFORMATION

OUTPUT		POLE	FRAME SIZE	VOLTAGE	HZ	RATED AMBIENT	INS. CLASS	NEMA DESIGN	TIME RATING	SERVICE FACTOR
HP	KW									
200	149.2	4	445TP	230/460	60	40°C	F	B	CONT.	1.15

TYPICAL PERFORMANCE

FULL LOAD RPM	EFFICIENCY				POWER FACTOR			MAXIMUM POWER FACTOR CORRECTION
	FULL LOAD		3/4 LOAD	1/2 LOAD	F. L.	3/4 LOAD	1/2 LOAD	
	MIN. %	NOM. %	%		%		%	
1780	95.0	95.8	95.4	94.5	86.5	83.0	80.0	60.2 KVAR

CURRENTS									NEMA KVA CODE LETTER
NO LOAD				FULL LOAD			LOCKED ROTOR		
	AT 230 VOLT		AT 460 VOLT		AT 230 VOLT	AT 460 VOLT		AT 230 VOLT	AT 460 VOLT	
	-		75.50		450.0	225.0		-	1450.0	G

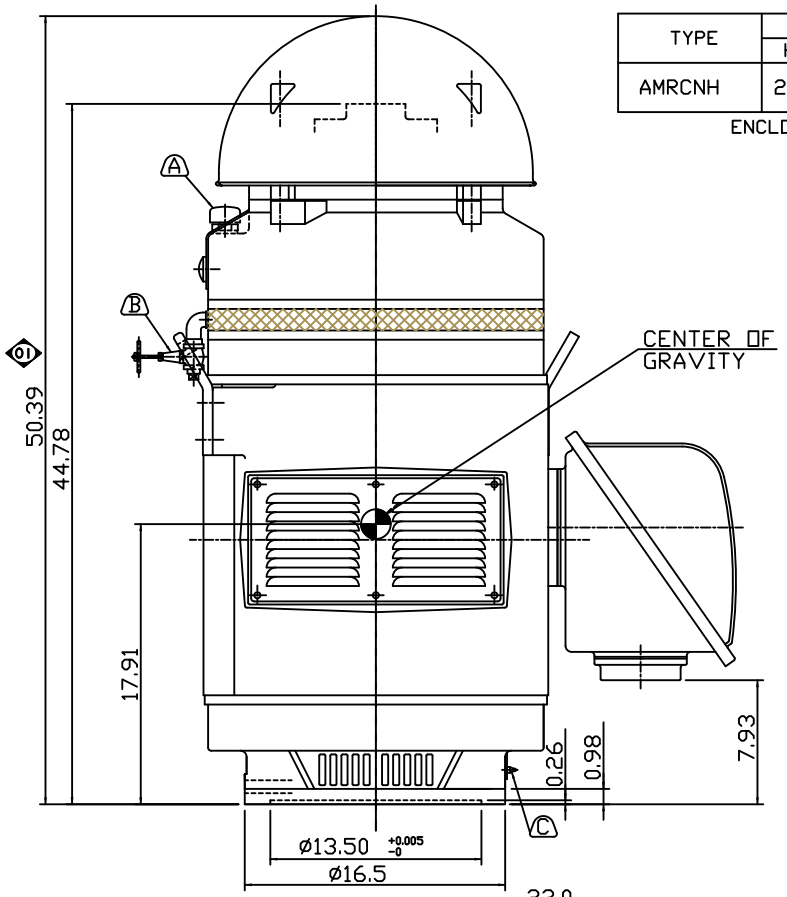
TORQUE				INERTIA			ACCEL TIME	
FULL LOAD lb-ft	LOCKED ROTOR %FLT	PULL UP %FLT	BREAK DOWN %FLT	ROTOR WR^2 $lb\text{-}ft^2$	NEMA LOAD WK^2 $lb\text{-}ft^2$	MAX ALLOWABLE WK^2 $lb\text{-}ft^2$	NEMA LOAD WK^2 Sec	MAX ALLOWABLE WK^2 Sec
587.00	125	105	205	57.00	831	1662	5.44	10.52

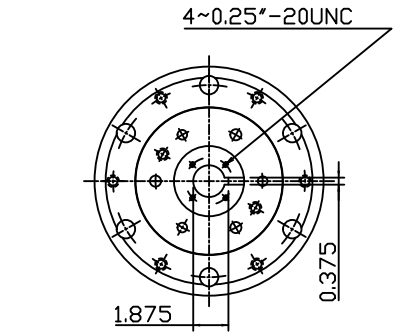
SAFE STALL TIME IN SECONDS		ALLOWABLE STARTS PER HOUR		SOUND PRESSURE LEVEL @ 3 FT dB(A)	DOWNTHRUST L10:8800 HOURS
COLD	HOT	COLD	HOT		
18	13	2	1	76.0	10700

APPROVED:	M. PRATER	DRAWING NO.	31057VHP2004	REVISION 0

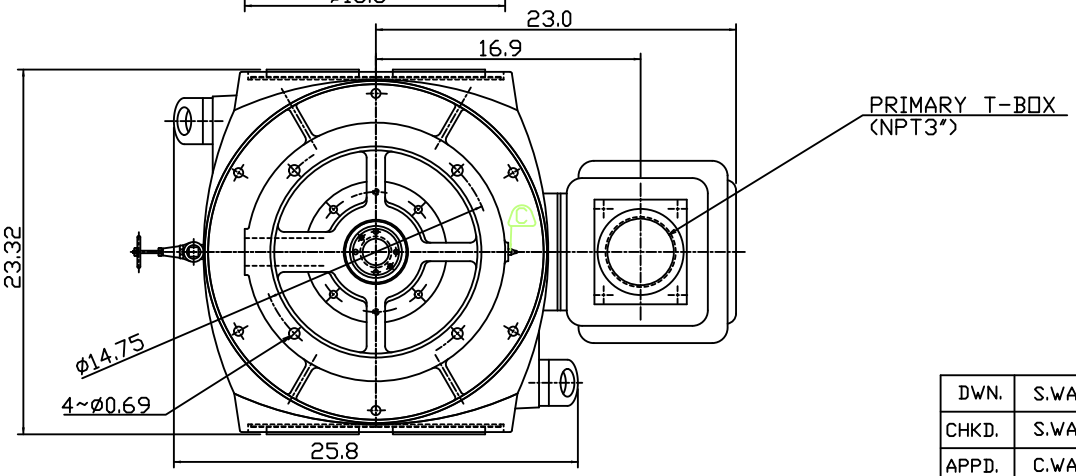
TYPE	OUTPUT		POLE	TIME RATING	VOLTAGE V	Hz	SYN.SPEED R.P.M
	HP.	kW.					
AMRCNH	200	150	4	CONT	460	60	1800

ENCLOSED VENTILATED VERTICAL HOLLOW SHAFT TYPE, SQUIRREL CAGE ROTOR
NEMA WEATHER PROTECTED TYPE I





NOTE:
1. DIMENSIONS IN INCHES.
2. FRAME NO.445TP.
3. F CLASS INSULATION. S.F. 1.15.
4. FOR DIRECT FLEXIBLE COUPLING.
5. BEARING SIZE:
   UPPER BEARING: 7324B [UNINSULATED]
   LOWER BEARING: 6316C3 [UNINSULATED]
6. LUBRICATION:
   UPPER BEARING USE OIL.
   OIL VISCOSITY: ISO VG68[300 SSU/100°F]
   OIL QUANTITY: 3.5GAL.
   LOWER BEARING USE ESSO POLYREX GREASE.
7. THRUST CAPACITY:
   MAX. ALLOWABLE CONT. DOWNTHRUST: 10,000 LBS.
   MAX. ALLOWABLE MOMENTARY UPTHRUST: 3,000LBS.
   BEARING LIFE: B10/8800 HRS.
8. ROTATION: COUNTER-CLOCKWISE(VIEWED FROM TOP).
9. WITH NON-REVERSE RATCHET MECHANISM.
10. WITH GIB KEY:0.375×0.375×2.875,1PCS
11. NOISE:BELOW 85dBA AT 1 METER DISTANCE NO LOAD.
12. NATURAL REED FREQUENCY: 41HZ.
    ABOVE CALCULATION IS CONSIDERING MOTOR AND FOR REFERENCE ONLY.
    THE WHOLE PUMPING SYSTEM ANALYSIS SHALL BE PERFORMED BY THE PUMP MANUFACTURER.
13. MOTOR APPROX. WEIGHT: 1820 LBS.



Ⓐ OIL FILLER [UPPER BEARING]
Ⓑ OIL DRAIN [UPPER BEARING]
Ⓒ GREASE INLET NIPPLE [LOWER BEARING]

DWN.	S.WANG	NOV. 10 .2008
CHKD.	S.WANG	NOV. 10 .2008
APPD.	C.WANG	NOV. 12 .2008

DATE Jan. 14, 2012
CAT. #: VHP2004

OUTLINE DIMENSIONS
3-PHASE INDUCTION MOTOR

TECO Westinghouse

DWG NO. 3B040T441 REV:01

Optivision® 25

Technical Specifications

Total Solar Energy:

Transmitted % 28.0
Reflected % 29.0
Absorbed % 44.0

Visible Light:

Transmitted % 27.0
Reflected Exterior % 27.0
Reflected Interior % 14.0
Glare Reduction % 70.0

Solar Heat Gain Coefficient 0.40
Shading Coefficient 0.47
Luminous Efficacy 0.59
Total Solar Energy Rejection % 60.0
Infrared Rejection %* 79.0

U Factor 0.99
Emissivity 0.74
Ultraviolet Rejection % ..... Exceeds 99.0

* Near IR range (780-2500nm)
Technical specification definitions can be found at www.madico.com

Read in accordance with National Fenestration Rating Council (NFRC) standards on 3mm clear glass.

Optivision 25 Performance on Installed Windows as Certified by the National Fenestration Rating Council (NFRC)

Type	Default Glazing Reference	SHGC without Film	SHGC With Film	VLT Without Film	VLT With Film	U Factor
Residential	3 mm (1/8in.) clear	0.72	0.35	0.74	0.22	1.04
Residential†	3 mm (1/8in.) clear 3 mm (1/8in.) clear	0.64	0.41	0.67	0.21	0.69
Non Residential	6 mm (1/4in.) clear	0.73	0.37	0.78	0.24	0.96
Non Residential	6 mm (1/4in.) grey	0.52	0.33	0.39	0.12	0.96
Non Residential†	6 mm (1/4in.) clear 6 mm (1/4in.) clear	0.63	0.43	0.69	0.21	0.58
Non Residential†	6 mm (1/4in.) grey 6 mm (1/4in.) clear	0.41	0.31	0.35	0.11	0.58

† *Dual pane window*

Specification Use Statement
Reported values are typical properties and should not be used as a specification. Since the user is aware of the specific conditions in which the product is to be used, it is the user's responsibility to determine whether the product is suitable for intended use. If you need verification regarding specific use or additional information, please contact Madico Window Films or your local Madico Authorized Dealer.

© 2013 Madico, Inc. L955463 9/13

Optivision® 25

Optivision 25 is designed to minimize the interior reflectivity of glass providing you with a more natural view at night.

Product Benefits

- Cuts Glare
- Increases Privacy
- Reduces Heat Gain
- Lowers Energy Costs
- Helps Shatter Resistance
- Lowers Interior Reflectivity
- Rejects over 99% of UV Rays
- Slows Fading of Furnishings, Flooring

Why Sun-Gard?
Sun-Gard window films are an elegant, practical solution for comfort, protection and natural appearance. Enjoy your view by embracing sunlight while minimizing the negative effects of the sun such as glare, harmful ultraviolet exposure and unwanted heat. Sun-Gard films are installed by professionals and backed by a manufacturer's warranty.

www.sun-gard.com

INTERNATIONAL WINDOW FILM ASSOCIATION

AIMCAL

NFRC CERTIFIED

MADICO Window Films

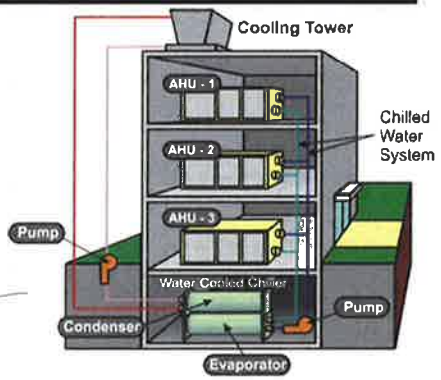
Optimization | Chilled water system optimizer
03/29/2017

This launch kit will continue to evolve as additional materials become available.

WebCTRL® Optimization Solutions
Chilled water system optimizer

What is it?

The Automated Logic® chilled water system optimizer is a sophisticated, scalable, native BACnet optimization solution for chilled water plants. The chilled water system optimizer minimizes the energy use of the entire chilled water system, up to and including air handling units and other water side chilled water consumers. By providing optimized control of the chilled water and condenser water setpoints, the chilled water system optimizer can lower energy costs while also maintaining occupant comfort levels in the building. The chilled water system optimizer solution consists of a self-adapting control algorithm packaged in an application specific Automated Logic controller.



- It minimizes energy use over the entire chilled water system without affecting occupant comfort.
- It automatically adapts to changing conditions as the system's conditions change over time
- It is patent pending control logic that overlays on top of dedicated equipment controls that are already in place
- It is scalable and works with the chilled water side alone, condenser water side alone, or both.
- It is designed to be used on plants of varying size, up to a maximum of eight chillers.

The Chilled water system optimizer Includes

- Controller
- View file - Dashboard
- Sequence of operations
- Equipment file (English or Metric)
- Optimizer driver
- Optimizer report setup instructions document
- A recommended "setpoint insert" logic, for possible use in your chiller or cooling tower manager

Optimizer_short_description.docx

Why your customers will want it

Customer Benefits and System Differentiators

- **Scalable** – Designed to be used with small to large chilled water plants.
- **Intuitive** – Monitors and displays optimization metrics via integrated dashboard.
- **Flexible** – Works with the chilled water side alone, condenser water side alone, or both.
- **Adaptable** – Adapts to changing environmental conditions and system changes over time.
- **Open** – Integrates easily with all mechanical equipment, regardless of brand.
- **Seamless** - Interfaces easily with the Automated Logic® PlantCTRL™ chiller plant solution enabling additional plant engineering efficiencies.
- **Comprehensive** – Senses air-side load via chilled water supply pump energy usage; optionally can measure air-side fan system energy usage.
- **Intelligent** – Adjusts chilled water and condenser water setpoints to achieve overall combined chiller plant and air-side energy savings.
- **Efficient** – Minimizes energy use over the entire chilled water system, including chilled water plant equipment and air-side chilled water consumers. Based on field tests, potential energy savings from 3 -15% are possible.
- **Non-disruptive** –Functions as an overlay to the existing plant control system, intelligently computing optimum chilled water and condenser water setpoints while continuously monitoring plant room and load-side energy consumption. Fail-safe logic is designed into the system so that the plant will revert to default setpoints in the event that optimized setpoints cannot be determined.
- **Affordable** - Offers lower first cost versus competitor offerings that require extensive plant analysis, system modeling, control system and mechanical system upgrades.
- **Maintainable** - Low post sales maintenance.
- **Independent** - Doesn't depend on the cloud.

Why you want to spec and sell it

Spec Compliance

- Chilled water system optimization can act as a spec-stopper.
- Can be used in conjunction with the ALC PlantCTRL™ PSM to meet overall plant control system specifications.

Positioning & Brand enhancement

- Helps to enhance ALC's position as a total energy solutions provider as well as temperature control.
- Can help establish long term customer relationships.

Trojan Horse

The chilled water optimization solution is completely brand agnostic. All communications between the system and the underlying plant control is via BACnet or MODBUS open protocol, making it compatible with the ALC PlantCTRL solution, field installed ALC plant control solutions, and even competing building automation systems.

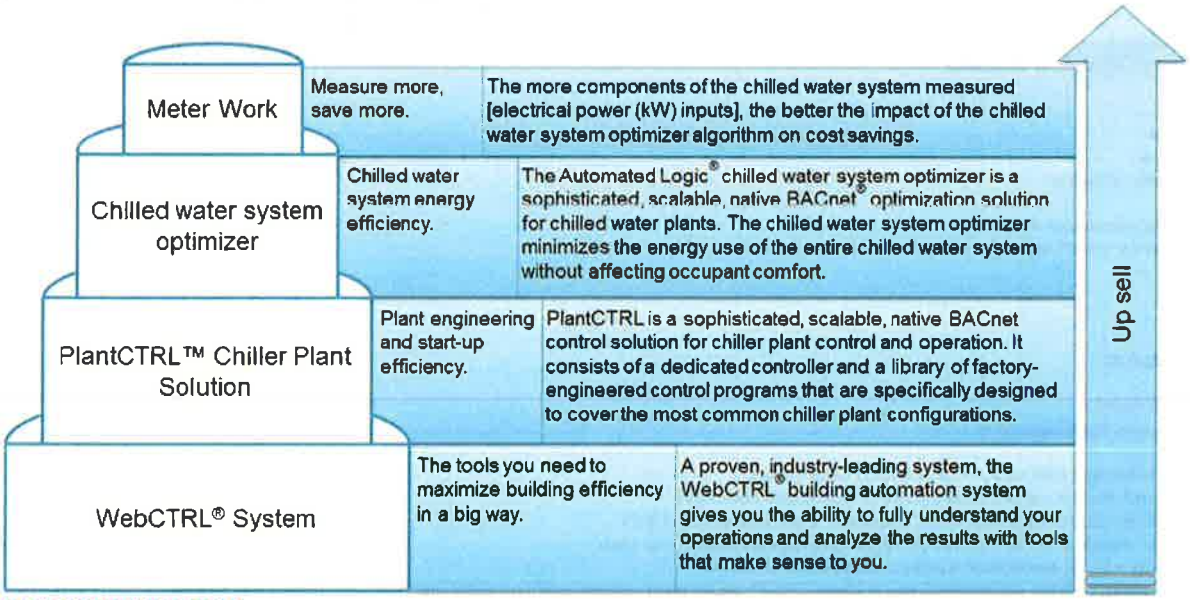
- Means of entry into competitor controlled facility.
- Can act as an overlay to a competitor controlled chiller plant control system.

Provides a mechanism for upgrades to existing facilities

- Facilitates pull-through sales opportunities.
- Providing the chilled water system optimizer may reveal opportunities for additional control related upgrades.

Additional Selling Tips

- The system is an optimization solution – it allows the existing plant system to operate more efficiently under varying conditions. Mechanical system upgrades are not mandated.
- Can be positioned as an up-sell over ALC PlantCTRL solution
- Leverage existing customer relationships
- A non-invasive, overlay solution with little to no risk in terms of plant operation
- Be cognizant of pull through sales opportunities – the system can accompany sales of additional controls and/or equipment replacement, and be used to reveal opportunities for upgrades
- You are selling energy savings, but the system should not be considered a performance contract or guaranteed savings sale
- The potential energy savings can vary greatly due to many factors such as plant size, existing equipment selection, duration of use, using patterns, and the effectiveness of the incumbent control system. Be cautious of quoting savings estimates

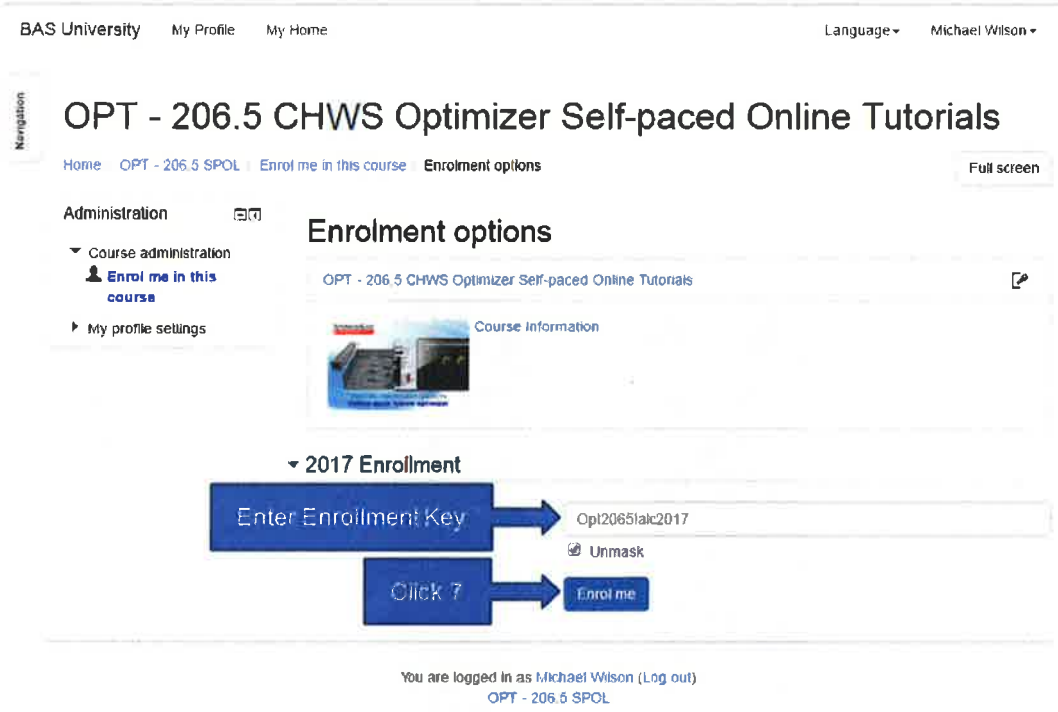


LAUNCH PROMOTION

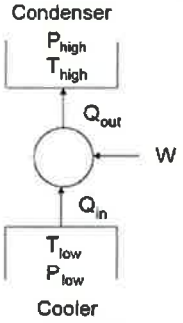
Half Price from Launch until June 30, 2017!

Reference **ENC MR20170330-16** with your order to receive the half price promotional pricing.

*Product must be ordered by **June 30, 2017** to receive discounted pricing.*

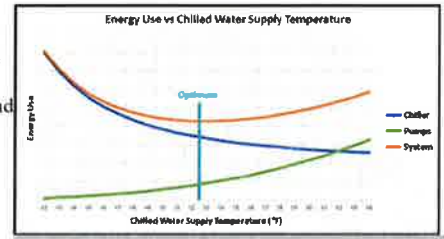


How it works overview



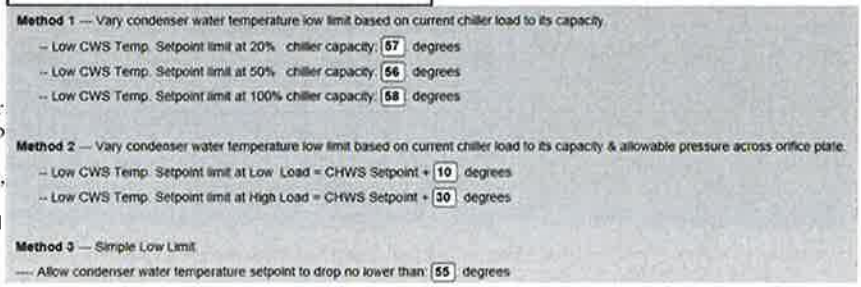
- It reduces the chiller plant energy consumption by lowering the chiller's lift without impacting occupant comfort.
- Lift is the pressure differential between the low pressure refrigerant in the cooler and the higher pressure refrigerant in the condenser.
- Lift can be reduced in either of two ways:
  1. Raising the chilled water setpoint to increase the cooler pressure
  2. Lowering the condenser water setpoint to lower the condenser pressure
  3.
- In order to provide the lowest total energy consumption, the reduced chiller energy MUST be balanced with any increase in power that occurs in the pumping systems and fans
- It improves efficiency (kW/ton) by Intelligently resetting CHWS & CWS temperatures
- And this must be done WITHOUT adversely affecting building comfort or causing equipment problems

Chilled Water Side



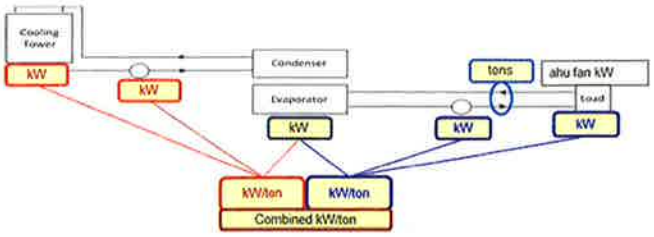
- It is an adaptive algorithm that constantly searches for the lowest kW/ton
- It seeks out the lowest kW/ton by incrementally raising and lowering the chilled water supply temperature

Condenser Water Side



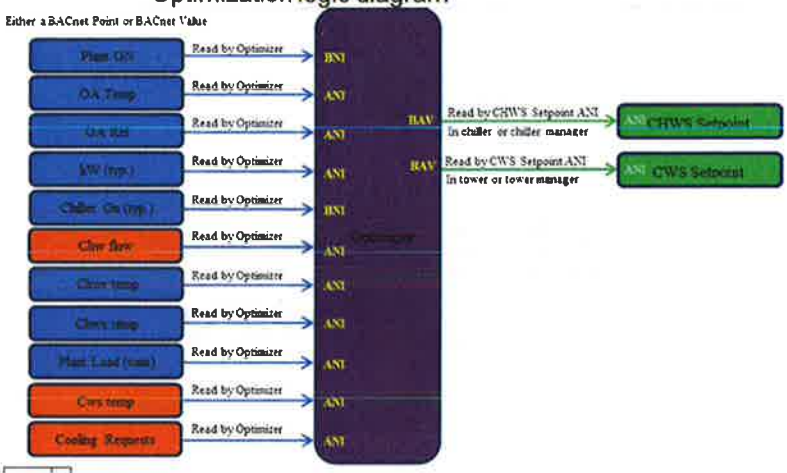
- Lower condenser water temperature reduces chiller lift. Reducing energy requires operating the towers to provide ideal condenser water temperature without excessive tower fan power consumption. Setpoint is based on OA Wet-Bulb temperature, tower approach and chiller load
- Multiple methods protect chillers from refrigerant stacking, due to excessively low condenser temperatures at higher loads or chiller surging at high condenser temperatures and low loads

- The optimizer reads and totalizes all available power inputs and reads the cooling load provided
- Then calculates the current plant usage per unit of cooling in kW /ton

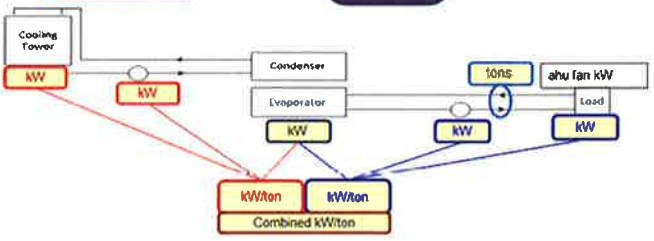


Optimization logic diagram

- It then compares the current usage to previous information
- It does so continuously, adapting to system changes
- It then optimally adjusts the chilled water and condenser water setpoints



- And then verifies if a reduction in power consumption has occurred
- It does this process continuously, adapting to system changes, which can result in reducing total plant power consumption



Optimization logic diagram

Marketing Images

Twitter_OPT-ALC2.jpg<-- This image (displayed below) is formatted for Twitter.

Twitter_OPT-ALC3.jpg<-- This image (displayed below) is formatted for Twitter.

Twitter_OPT-ALC4.jpg<-- This image (displayed below) is formatted for Twitter.

OPT-ALC_DASH.png<-- This image (displayed below), for general marketing use.

OPT-ALC2.jpg<-- This image (displayed below), for general marketing use.

SMALL DIVERSE BUSINESS SUBMISSION FORM

Submit 1 original in a sealed envelope separate from the Technical Submission and the ECM/Cost Submission

After examination of the contract documents, which are made a part hereof as if fully set forth herein, the Proposer commits to the following percentage for Small Diverse Business participation on this project. The Proposer understands the language in the RFP regarding the calculation of the percentage.

Project: GESA 2017-1 Capitol Complex

Offeror (Firm) Name

The Efficiency Network (TEN)

Commitment for Small Diverse Businesses for each ECM: (FILL IN)

ECM	Dollar Value of ECM	% SDB Commitment	Dollar Value SDB Commitment
			($ Value of ECM x % Commitment)
1	$ 2,188,371	70%	$ 1,524,712
2	$ 1,766,751	70%	$ 1,230,955
3	$ 399,764	70%	$ 278,529
4	$ 1,028,657	30%	$ 310,000
4 (Add)	Non-Core ECM		
5	$ 363,839	70%	$ 253,499
6	$ 214,429	70%	$ 149,000
TOTAL	$ 5,961,811	N/A	$ 3, 747,095

3746695

Proposer's SDB % = 100 X Total Dollar Value SDB Commitment / Total Dollar Value of ECMs

62.8 % (Figure) Sixty-two and eight tenths Percent (Written)

Note – ECM 4 (ADD) is a non-core ECM with the value of $380,346 and was removed from the calculation above per Bulletin No 5, question response 30.

PREPARED FOR

COMMONWEALTH OF PA – DEPARTMENT OF GENERAL SERVICES

MAY 10, 2018

GESA 2017-1
COMMONWEALTH OF PENNSYLVANIA
STATE CAPITOL COMPLEX
ENERGY AUDIT REPORT

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ENERGY CONSERVATION MEASURES AND COSTS

TEN is pleased to submit the following selected Energy Conservation Measures (ECMs) for the Commonwealth of Pennsylvania State Capitol Complex (the "Capitol") and Department of General Services (DGS) consideration. The following list of ECMs is composed of those proposed in the RFP stage, additional measures identified during audit activities, as well as enhancements requested by DGS during the audit period. These solutions are expected to reduce energy expense by 14%. The summary below and cashflow on the next page outline a base project that delivers significant value to the Capitol Complex through equipment upgrades and is funded primarily through energy and material savings. A relatively small capital contribution from DGS can be used to fund deeply needed mechanical upgrades that solve pressing occupant comfort and maintenance issues that have been difficult to implement under other contracting vehicles. **Other ECMs identified during audit activities that address additional deferred maintenance needs are discussed on page 5.**

We look forward to meeting with DGS to respond to any questions and complete "what if" selections with the evaluation team to select a final project based on DGS priorities.

Key features of the project include:

- LED lighting upgrade in Labor & Industry, Health & Welfare, North Office, and East Wing, including new luminaires that will greatly improve aesthetics. This ECM improves over 20,000 fixtures.
- Replace aging 2500-ton York and 1200-ton Trane chillers with three new high efficiency magnetic bearing 1200-ton chillers.
- Automatic control of major chilled water equipment with optimization software, including major controls hardware upgrade.
- Upgrade of the condenser water loop in the central plant to variable volume, including new pump motors.
- Chilled water pump motor replacement and retrofits.
- Thorough retro commissioning of controls and distribution of steam and chilled water.
- Shut-down of the centralized heating hot water loop – buildings will now rely on their own upgraded converters.
- Window film on Labor & Industry south facing windows to reduce occupant discomfort during peak summer conditions
- Replace flow-restricted chilled water coils in Health & Welfare air handling units.
- Install energy saving insulation on steam and chilled water distribution pipe.

Selected Base Project Energy Conservation Measures

ECM #	Energy Conservation Measure Description	Install Cost	Annual Energy Savings ($)	Annual O&M Savings ($)	Simple Payback	Annual kWh Savings	Annual Steam Savings (Mlbs)	Annual Water (kGal) Savings	Annual Sewer (kGal) Savings
1	Base Lighting	$ 2,233,065	$ 160,564	$ 59,965	10.1	2,460,496	-1,027	0	0
1A (ADD)	New Luminaires	$ 1,280,302	$ 13,142	$ 545	-	215,337	-127	0	0
2A	Central Plant Free Cooling	$ -	$ -	$ -	-	0	0	0	0
2B	Chiller Replacement and Plant Optimization	$ 9,123,946	$ 182,271	$ 5,808	48.5	2,296,023	0	830	138
2C	Heating Loop Decentralization	$ 1,308,620	$ 176,120	$ 221	7.4	1,319,850	3,088	32	5
2C (ADD)	Replace both Heat Exchangers in North + South Office	$ -	$ -	$ -	-	0	0	0	0
3A	Condenser Water Variable Flow	$ 671,638	$ 106,202	$ 5,730	6.0	1,290,672	0	819	136
3B	Chilled Water Pump Motor and VFD Replacement	$ 339,815	$ 997	$ -	-	13,197	0	0	0
3C	Replace Motor Bearings on CHW Pumps 1 and 3	$ 72,087	$ -	$ -	-	0	0	0	0
4A.1	Retro Commissioning	$ 1,339,503	$ 366,959	$ 1,713	3.6	677,198	12,711	245	41
4A.2	Steam/Chilled Water Piping Insulation	$ 531,549	$ 150,652	$ 937	3.5	370,325	4,921	134	22
4B	Central Plant Controls Upgrade	$ 376,023	$ -	$ -	-	0	0	0	0
4C	L&I Chilled Water Capacity Shortfall - Satellite Chiller	$ -	$ -	$ -	-	0	0	0	0
5A	Window Film - L&I	$ 172,889	$ 5,605	$ 141	30.1	55,631	48	20	3
5B	Window Film - H&W	$ -	$ -	$ -	-	0	0	0	0
6	L&I Building Window Sealing	$ -	$ -	$ -	-	0	0	0	0
7A	H&W Chilled Water Coil Replacement - AHU1&2	$ 297,500	$ 950	$ -	-	12,575	0	0	0
7B	H&W Chilled Water Coil Replacement - AHU3&4	$ 297,500	$ 950	$ -	-	12,575	0	0	0
	Installation Total	**$ 18,044,436**	**$ 1,164,411**	**$ 75,059**	**14.6**	**8,723,879**	**19,613**	**2,078**	**346**

Owner Controlled Contingency	$ 175,000
LESS Capital Avoidance (CHWP Retrofits, H&W Coils - ECMs 3B, 3C, 7A, and 7B)	$ (1,006,901)
Net Financed Amount	**$ 17,212,535**

Possible PPL Act-129 Incentives (Add to Owner Controlled Contingency)	$ 418,851
Lighting	*$ 112,356*
Non-Lighting	*$ 306,495*

Note: The table above reflects a DGS controlled contingency fund financed by the project – TEN looks forward to discussing the appropriate size of that fund with DGS. A capital contribution from DGS to reflect capital cost avoidance is assumed for certain measures highlighted in green. The cost of replacing the H&W coils is estimated – a competitive bid will be held, and any reduction in cost will be transferred to the owner controlled contingency fund. The O&M savings for lighting are based entirely on material savings from installing equipment with longer operational lifetimes, while O&M savings for all other ECMs are based on chemical treatment savings at the central chilled water plant from reduced make-up water use. As previously agreed, PPL Act-129 incentives will be paid to TEN and held as additional DGS controlled contingency funds for use under this GESA. The exact amount of these incentives will be determined after measurement and verification activities have occurred to determine the level of savings achieved.

Annual Financial Projections

The cash flow illustrates that the proposed project will pay for itself within 19 years when modeled at a 3.95% interest rate, and 1% energy and maintenance rate escalation. The columns in the cash flow represent the following:

A. Annual energy costs without improvements
B. Annual energy costs with improvements
C. Annual energy cost savings (A-B)
D. Annual O&M Savings
E. Total Annual Savings (C+D)
F. Payments for financing equipment
G. Payments for monitoring and maintenance services
H. Net annual benefit
I. Cumulative cash flow

BASE Project Cash flow (20 years including 12 months construction)

Year	Annual Energy Costs (Before) A	Annual Energy Costs (After) B	Annual Energy Savings C=A-B	O&M Savings D	Total Annual Savings E=C+D	Annual Financing Payments F	Other Payments (M&V + Capacitor) G	Net Annual Benefit H=E-F-G	Excess Cumulative Cashflow I
0	$ 8,150,202	$ 7,975,456	$ 174,746	$ -	$ 174,746	$ 174,746	$ -	$ -	$ -
1	$ 8,231,704	$ 7,055,649	$ 1,176,056	$ 75,810	$ 1,251,865	$ 1,187,316	$ 64,549	$ -	$ -
2	$ 8,314,021	$ 7,126,205	$ 1,187,816	$ 76,568	$ 1,264,384	$ 1,159,648	$ 104,736	$ -	$ -
3	$ 8,397,161	$ 7,197,467	$ 1,199,694	$ 77,333	$ 1,277,028	$ 1,170,297	$ 106,731	$ -	$ -
4	$ 8,481,133	$ 7,269,442	$ 1,211,691	$ 78,107	$ 1,289,798	$ 1,289,798	$ -	$ -	$ -
5	$ 8,565,944	$ 7,342,136	$ 1,223,808	$ 78,888	$ 1,302,696	$ 1,302,696	$ -	$ -	$ -
6	$ 8,651,604	$ 7,415,558	$ 1,236,046	$ 79,677	$ 1,315,723	$ 1,315,723	$ -	$ -	$ -
7	$ 8,738,120	$ 7,489,713	$ 1,248,407	$ 80,473	$ 1,328,880	$ 1,328,880	$ -	$ -	$ -
8	$ 8,825,501	$ 7,564,610	$ 1,260,891	$ 81,278	$ 1,342,169	$ 1,342,169	$ -	$ -	$ -
9	$ 8,913,756	$ 7,640,256	$ 1,273,500	$ 82,091	$ 1,355,590	$ 1,355,590	$ -	$ -	$ -
10	$ 9,002,893	$ 7,716,659	$ 1,286,235	$ 82,912	$ 1,369,146	$ 1,331,313	$ 37,833	$ -	$ -
11	$ 9,092,922	$ 7,793,825	$ 1,299,097	$ 83,741	$ 1,382,838	$ 1,382,838	$ -	$ -	$ -
12	$ 9,183,852	$ 7,871,764	$ 1,312,088	$ 84,578	$ 1,396,666	$ 1,396,666	$ -	$ -	$ -
13	$ 9,275,690	$ 7,950,481	$ 1,325,209	$ 85,424	$ 1,410,633	$ 1,410,633	$ -	$ -	$ -
14	$ 9,368,447	$ 8,029,986	$ 1,338,461	$ 86,278	$ 1,424,739	$ 1,424,739	$ -	$ -	$ -
15	$ 9,462,132	$ 8,110,286	$ 1,351,845	$ 87,141	$ 1,438,987	$ 1,438,987	$ -	$ -	$ -
16	$ 9,556,753	$ 8,191,389	$ 1,365,364	$ 88,013	$ 1,453,376	$ 1,453,376	$ -	$ -	$ -
17	$ 9,652,320	$ 8,273,303	$ 1,379,018	$ 88,893	$ 1,467,910	$ 1,467,910	$ -	$ -	$ -
18	$ 9,748,844	$ 8,356,036	$ 1,392,808	$ 89,782	$ 1,482,589	$ 1,455,569	$ -	$ 27,021	$ 27,021
19	$ 9,846,332	$ 8,439,596	$ 1,406,736	$ 90,679	$ 1,497,415	$ 1,340,353	$ -	$ 157,062	$ 184,083

NPV of Cashflow (column H): $88,687

Note: The cash flow table above assumes that 6 months of construction period energy savings worth $174,746 (from ECM 1 – lighting and ECM 2C – heating hot water loop decentralization) are applied toward the principal balance at the onset of the repayment period. The payments in column F of the cash flow reflect the repayment of $679,895 in capitalized interest cost based on a twelve (12) month construction period and are predicated on an initial capital contribution of $1,006,901 that reduces the financed project cost. All energy and maintenance savings are escalated at 1% per year. The M&V payments in year 2 and 3 are larger than year 1 to reflect on-going optimization and M&V activities by Optimum Energy – Optimum's year 1 M&V costs are included in the ECM installation cost. A payment in year 10 of column G reflects the estimated cost to replace capacitors on the new chillers.

Additional Project Funding (not factored into the cash flow)

- PJM Permanent Capacity Reduction Payments. (Determined by annual auction price and paid out over four years.) TEN will prepare the necessary documentation for this additional funding stream and present them to DGS for signature and submission.
- PPL Act-129 Incentive Payments. TEN will prepare the necessary documentation for this additional funding stream and will submit to PPL on DGS's behalf. As agreed by DGS, TEN will receive the incentive money from PPL and apply the funds to an owner controlled contingency fund to be used for additional project work.

Utility Baseline

TEN examined the electricity, steam, and water/sewer consumption recorded in utility bills to determine the baseline consumption and utility rates from which savings will be calculated. The energy use intensity (EUI) for the steam and electricity used by the Capitol was calculated to be 68 kBtu/sqft.

Current Baseline[1] (3-year Average)			
Utility	**Usage**	**Unit**	**Cost**
Electricity	66,552,132	kWh/yr	$5,027,747
Steam	126,187	Mlb/yr	$3,109,248
Water[2]	18,162	kGal/yr	$171,815
Sewer[2]	14,707	kGal/yr	$102,803
TOTAL			**$8,411,612**

[1] Buildings include: L&I, H&W, North and South Office, Ryan, Main Capitol, East Wing, Central Plant, Keystone, Judicial, and Finance

[2] Water and Sewer consumption for central plant only

The utility rates used to calculate savings are $0.075546 / kWh, $24.64 / Mlb for steam, $9.46/kGal of water consumption, $6.99/kGal of separately metered sewer discharge, and $7/kGal for water treatment costs in the central plant. These rates were calculated from the most recent electricity and steam utility bills for all relevant buildings in the baseline, including the central plant (see Appendix A for more detail), and from published tariff rates for water and sewer. These rates were chosen as most representative of the current operation of the Capitol Complex.

The utility baseline was adjusted for the improvements made during the 2015 Small GESA at the Judicial and Keystone buildings, which were only partially reflected in 2017 billing data. The following table shows the modified baseline on which the savings calculations are based. The adjusted electric consumption due to chilled water load reductions will be reflected in the savings calculated for ECM 2 – Chiller Replacement. The electricity reduction from lighting upgrades and steam reduction from mechanical improvements are reflected in the table below but do not affect the savings calculations in this report. The adjustment to the electricity baseline from the 2015 lighting upgrades is half the full annual lighting savings because the 2017 electricity bills already reflect partial implementation of that project.

Adjusted Baseline			
Utility	**Usage**	**Unit**	**Cost**
Electricity	65,544,896	kWh/yr	$4,951,655
Steam	118,666	Mlb/yr	$2,923,930
Water[2]	18,162	kGal/yr	$171,815
Sewer[2]	14,707	kGal/yr	$102,803
TOTAL			**$8,150,202**

Replacing the flow-restricted chilled water coils in the Health & Welfare building may increase energy use by delivering more cooling energy to the building during peak periods. TEN will take flow measurements before coil replacement to assess the level of restriction in the existing coils. A baseline adjustment will be calculated based on those measurements if it is found that the coils were capacity constrained.

Should DGS choose to install a chiller in the basement of the Labor and Industry (L&I) building (ECM 4C), a baseline adjustment would be made to reflect the peak cooling load that is currently unmet by the central plant. This is discussed further in ECM 4C.

Even in the absence of the new L&I chiller, certain improvements are being considered under the retro commissioning scope that could improve cooling capacity at L&I and would therefore warrant an increase to the baseline energy use (e.g., plate-frame heat exchanger expansion). The full baseline adjustment required to address the entire cooling capacity expansion of the chiller is approximately 440,000 kWh. The contemplated improvements under the retro commissioning scope will not address the full capacity shortfall, so the chiller baseline adjustment can be viewed as an upper bound on the needed baseline adjustment. The required baseline adjustment will be determined during measurement and verification efforts when the amount of cooling capacity expansion can be quantified.

Another baseline adjustment will be required if DGS decides to lower the chilled water supply temperature in peak months to satisfy the cooling load in L&I. The size of the adjustment will be calculated after the operational parameters of the temperature reset are known (e.g., under what conditions DGS lowers the supply temperature).

Project Monitoring and Maintenance Services

The measurement and verification of the proposed ECMs is anticipated to be conducted according to the M&V plan identified on page 52. Onsite measurements, field work and report generation will be prepared by Nikhil Singh and overseen by Greg Lok both of whom are Certified Measurement and Verification Professionals (CMVP). The proposed M&V plan includes IPMVP options A, B, C and D.

It is anticipated that DGS will incorporate the upgraded systems into their existing preventative maintenance routines. TEN's project management team will be available to facilitate warranty claims or repair work as necessary. Project training will be scheduled during the construction period.

Energy Conservation Measure Scope of Work Descriptions

The table below delineates the cost and savings for all developed ECMs. The following pages describe the scope of work and suitability of the proposed ECMs. Where possible, we have broken down pricing to facilitate a comparison with the original proposal.

The additional ECMs available for consideration are identified in dark blue below but were not included in the initially recommended project due to their long payback. It is important to note that several levers are available to incorporate these options within the project.

Potential levers to include additional ECMs include the following:

A. Utilize excess positive cash flow

B. Additional avoided capital expense

C. Additional utility rate escalation

D. Loan payments made annual-in-advance

E. Lower project interest rate

Suggested Order to add ECMs.

a. Labor & Industry Satellite Chiller

b. Window Film – Health & Welfare Building

c. Replace both Steam-to-Hot Water Heat Exchangers in North + South Office Buildings

d. Window Sealing in Labor & Industry Building

All Potential Energy Conservation Measures

ECM #	Energy Conservation Measure Description	Install Cost	Annual Energy Savings ($)	Annual O&M Savings ($)	Simple Payback	Annual kWh Savings	Annual Steam Savings (Mlbs)	Annual Water (kGal) Savings	Annual Sewer (kGal) Savings
1	Base Lighting	$ 2,233,065	$ 160,564	$ 59,965	10.1	2,460,496	-1,027	0	0
1A (ADD)	New Luminaires	$ 1,280,302	$ 13,142	$ 545	-	215,337	-127	0	0
2A	**Central Plant Free Cooling**	**$ -**	**$ -**	**$ -**	**-**	**0**	**0**	**0**	**0**
2B	Chiller Replacement and Plant Optimization	$ 9,123,946	$ 182,271	$ 5,808	48.5	2,296,023	0	830	138
2C	Heating Loop Decentralization	$ 1,308,620	$ 176,120	$ 221	7.4	1,319,850	3,088	32	5
2C (ADD)	**Replace both Heat Exchangers in North + South Office**	**$ 248,158**	**$ -**	**$ -**	**-**	**0**	**0**	**0**	**0**
3A	Condenser Water Variable Flow	$ 671,638	$ 106,202	$ 5,730	5.9	1,290,672	0	819	136
3B	Chilled Water Pump Motor and VFD Replacement	$ 339,815	$ 997	$ -	-	13,197	0	0	0
3C	Replace Motor Bearings on CHW Pumps 1 and 3	$ 72,087	$ -	$ -	-	0	0	0	0
4A.1	Retro Commissioning	$ 1,339,503	$ 366,959	$ 1,713	3.6	677,198	12,711	245	41
4A.2	Steam/Chilled Water Piping Insulation	$ 531,549	$ 150,652	$ 937	3.5	370,325	4,921	134	22
4B	Central Plant Controls Upgrade	$ 376,023	$ -	$ -	-	0	0	0	0
4C	**L&I Chilled Water Capacity Shortfall - Satellite Chiller**	**$ 1,720,134**	**$ -**	**$ -**	**-**	**0**	**0**	**0**	**0**
5A	Window Film - L&I	$ 172,889	$ 5,605	$ 141	30.1	55,631	48	20	3
5B	**Window Film - H&W**	**$ 59,134**	**$ 2,286**	**$ 57**	**25.2**	**22,692**	**20**	**8**	**1**
6	**L&I Building Window Sealing**	**$ 209,158**	**$ 1,824**	**$ -**	**114.7**	**2,833**	**65**	**0**	**0**
7A	H&W Chilled Water Coil Replacement - AHU1&2	$ 297,500	$ 950	$ -	-	12,575	0	0	0
7B	H&W Chilled Water Coil Replacement - AHU3&4	$ 297,500	$ 950	$ -	-	12,575	0	0	0
	Installation Total	**$ 20,281,020**	**$ 1,168,521**	**$ 75,116**	**16.3**	**8,749,404**	**19,698**	**2,086**	**347**

ECM 1 – LED Lighting Retrofit (BASE)

ECM 1A (ADD) – New Luminaires

These ECM options have been broken out to offer a base LED lighting upgrade consistent with the proposal (base) while providing many additional options to save energy and improve aesthetics around the Capitol.

Existing Lighting Systems

A detailed lighting walkthrough was conducted at The Pennsylvania State Capitol Complex that includes Labor & Industry, Health & Welfare, North Office Building, East Wing Building and the Capitol Complex Campus Lighting. The primary interior lighting consists of a wide range of fluorescent lighting technologies including first generation T8 linear lamps and electronic ballasts, T5 high output linear lamps and program start ballasts, as well as T5 plug-in biax twin tube lamps and program start ballasts. Incandescent and fluorescent screw-in medium based lamps and plug-in fluorescent lamps are also prevalent in all facilities. The exterior site lighting consists of multiple types of High Intensity Discharge (HID) luminaires. The existing exterior luminaires are a variety of wall pack, flood type and pole mounted acorn style luminaires with varying wattages. The campus lighting consists of a decorative "Harrisburg" post-top with an existing LED module insert.

Proposed Solution

<u>High Efficiency LED Lighting Upgrade</u>
To maximize the overall electric savings, TEN proposes to optimize both interior and exterior existing lighting systems. This will help to achieve a cost effective, highly efficient lighting system with low maintenance costs. The project scope includes the following:

Exterior lighting solutions: *Labor & Industry, Health & Welfare, Capitol Complex Campus Lighting*

- TEN will replace the existing HID perimeter on the building façade wall-packs with new high efficiency LED wall-packs. New LED wall-packs will come equipped with photocell sensors for automatic dusk to dawn operation for fixed hours of operation.
- In the loading dock area of Health & Welfare Building there are linear fluorescent vapor tight luminaires. TEN will retrofit these fixtures with TYPE "C" TLED high efficiency 13w linear LED lamp with external driver lighting system.
- The existing "Harrisburg" decorative post top fixtures currently have a 52-watt LED module installed and are reaching the end of their rated life. TEN will Replace the existing LED module kits that are located in the "Harrisburg" acorn style luminaires with a new 30-watt high efficiency LEDioc® LED post top upgrade kit.

Interior lighting solutions: *Labor & Industry, Health & Welfare, North Office Building, East Wing Building, Capitol Complex Campus Lighting*

There are three main components with various upgrade options for each site included in our lighting scope. Spaces include office areas, both open floor plan and individual offices, common spaces, and parking garage areas. Detailed scopes of work for each building are as follows:

Labor & Industry Building and Health & Welfare

- In the Labor & Industry Building the predominant lighting in most office areas consists of fluorescent 3-lamp 2x4 recessed troffers with deep cell parabolic lenses. TEN proposes to replace these luminaires with a high efficiency 2x4 LED edge lit panel luminaire. This provides a cleaner look with a solid construction flat panel design. This will eliminate all the different lens types (prismatic, parabolic, para-cube and microcell) and standardize to one lens type.

- In areas where existing linear fluorescent T8 lamps and luminaires are serviceable and in good working order, the luminaires will be retrofitted with a TYPE "C" TLED high efficiency 13w linear LED lamp with external driver.
- Supplemental lighting in common area such as corridors and elevator lobby areas consists of 8" recessed downlights. These fixtures have fluorescent plug-in lamps and electronic ballasts. TEN proposes to replace these with a new high efficiency LED recessed downlight luminaire.

North Office Building

- The lighting in the North Office Building consists primarily of 2x4 recessed troffer fixtures that are configured in long continuous rows. They are flange-mounted in a hard plaster ceiling. The glass lenses are much heavier than traditional prismatic acrylic lenses and the glass thickness reduces lumen output. TEN has proposed to replace the framed door and lens with a custom 2x4 LED edge lit panel and flange frame kit. This design option will mirror the existing white blank lenses that are in place for each of the safe-off panels where the lamps and ballasts were previously removed.
- In areas where existing linear fluorescent T8 lamps and luminaires are serviceable and in good working order, the luminaires will be retrofitted with a TYPE "C" TLED high efficiency 13w linear LED lamp with external driver. This mainly consists of areas such as the restrooms, offices, and mechanical spaces with surface mount luminaires.
- Additional supplemental lighting is a mix of incandescent and compact fluorescent medium based lamp technology. TEN proposes to retrofit these with new high efficiency LED screw-in lamps that have equivalent lumen output for all medium base applications.

East Wing Building

- The East Wing of the Main Capitol building has various options for lighting upgrades across several fixture types. The Senate and House of Representatives office areas have a brass pendant mount indirect HID metal halide luminaire. TEN proposes to replace these with an architectural LED 3-arm pendant fixture with and alabaster acrylic diffuser. This will update the space aesthetic and provide better light distribution both up and down where more lighting is needed. The color of the LEDs are of a warmer hue than that of the existing HID's blue casting and provides better color rendering, which enhances the natural colors of the wood furniture and decor.
- In the rotunda offices on the Concourse level, the primary lighting is a series of cove lighting which will be retrofitted with a TYPE "C" TLED high efficiency 13w linear LED lamp with external driver. There are brass lamps throughout the offices that have compact fluorescent screw-in lamps that are issued by

their respected departments. They will be retrofitted with new high efficiency LED screw-in lamps and matched to the color temperature of the linear LED retrofits.

- The large cylinder cans located high above the fountain and café area in the glass atriums have 1000-watt metal halide lamps and smaller cylinder cans have a 200-watt LED retrofit lamp that was previously installed. TEN proposes to replace all of the cylinders with a round decorative brushed metal finish 200-watt LED luminaire.
- The glass ceiling above the escalator area in the Concourse level has fifteen (15) HID cylinder can lights mounted on pendants. These fixtures pose a logistical problem for maintenance as they are located above the escalators. TEN is proposing to safe-off half of the existing HID cylinders and replace the remaining fixtures with a new high efficiency LED canopy luminaire in a symmetrical pattern for even light distribution.
- The rotunda stairwell that serves the 1st level to the P2 parking level has existing round brass colored wall sconces with a compact fluorescent plug in lamp. Some of the lenses are missing and light levels are dim. TEN proposes to replace the existing sconce with decorative LED wall mounted drum luminaire. The color base of the proposed fixture will accentuate the polished face in the brown marble surface of the staircase.
- The parking garage recessed fixtures are currently de-lamped to one linear T8 fluorescent lamp. These will be retrofitted with a TYPE "C" TLED high efficiency 13w linear LED lamp with external driver. LED's will be more effective in this area especially in the colder months. The large pillar globes which are not being utilized will be upgraded with bypass COB (Chip On Board) multi-volt screw in lamps and have the globes cleaned and serviced for operation.

An LED lighting upgrade brings value beyond energy savings. LED Lighting is more efficient, eco-friendly, and provide longer life than traditional lighting systems. The lamp color designed across all proposed replacement/retrofit options is 3500K.

Other elements of the proposed solution include:

A. **(Type C): Direct Wire - Separate Driver –** The Driver is located separately from the LED tube, much like a fluorescent ballast. In this manner, the lamps are lighter, the driver and LEDs operate cooler with maximum efficiency and safety. Existing ballasts are eliminated as a potential future maintenance requirement. This is our approach to all linear retrofit applications.

B. **Expected Useful Life** – LED lighting has a typical life rating of 50,000 hours or more depending on manufacture and type of lamp/luminaire. Based on 3,000 hours a year we can expect a minimum of 16 years of expected life with a minimal amount of premature failures. Warranties are usually 5 years but this varies depending on the manufacturer selected.

C. **Other Benefits** – LED lighting creates an environment with increased perceived brightness. LED will not require any re-strike time like HID luminaires- meaning if there's a power outage or fluctuation, led lighting will illuminate as soon as the power is restored. The new T8 and T5 LED Tubes utilize parallel wiring. If one lamp goes out the remaining LED lamps will remain lit.

Coordination for all site construction activities will include TEN construction team personnel along with PA DGS facilities personnel. This will include a proposed construction schedule of installation, duration of construction activities, and notifications to occupied tenant spaces where lighting construction would occur. Logistics associated with product deliveries, product material storage, disposal and recycling of existing lighting material will also be coordinated with TEN construction team personnel and PA DGS facilities personnel.

Quantity Summary of Proposed Lighting Upgrades

ECM 1 - (BASE) Retrofit

Retrofit Type	Total Fixtures	Total Unit Qty
New Interior LED Luminaires	1468	1468
New Exterior LED Luminaires	8	8
High Efficient Electronic Instant Start LED Drivers	18460	17957
TLED Linear LED Lamps 2', 3', 4' (Includes T8 & T5 TLED Lamps)		43278
Screw-in & PL LED Lamps (some fixtures have multiple lamps)	767	1088
LED COB (Chip On Board) 120/277v Screw-in Bypass Lamp	244	244
LED Conversion Kits (for decorative drum, wall sconce, chandelier, Posttop)	627	627
New Exit Signs & Retrofit Kits	118	118
No Retrofit	1009	1009
TOTAL	**22701**	
No Retrofit	1009	
Replacement/Retrofit	**21692**	

ECM 1A (ADD) New Luminaires

Retrofit Type	Total Fixtures	Total Unit Qty
New Interior LED Luminaires	13370	13370
New Exterior LED Luminaires	15	15
High Efficient Electronic Instant Start LED Drivers	7046	6543
TLED Linear LED Lamps 2', 3', 4' (Includes T8 & T5 TLED Lamps)		12012
Screw-in & PL LED Lamps (some fixtures have multiple lamps)	767	1088
LED COB (Chip On Board) 120/277v Screw-in Bypass Lamp	39	39
LED Conversion Kits (for decorative drum, wall sconce, chandelier, Posttop)	627	627
New Exit Signs & Retrofit Kits	118	118
No Retrofit & Safe Off	719	719
TOTAL	**22701**	
No Retrofit	719	
Replacement/Retrofit	**21982**	

Baseline Lighting Consumption and Proposed Savings

ECM 1 - (BASE) Retrofit

Building	Total kWh Savings	Total kW Savings	Existing Ltg kWh	Proposed Ltg kWh	Existing Ltg kW	Proposed Ltg kW	Addl. Clg. Sav. kWh	Addl. Clg. Sav. kW
Labor & Industry	926,568	257	1,602,464	744,093	513	239	68,196	19
Health & Wellfare	538,102	159	954,168	455,843	332	158	39,777	12
North Office Building	214,123	62	391,898	193,605	140	69	15,830	5
Tunnels & Parking Garage	330,530	48	753,335	447,180	129	66	24,375	4
East Office Building	419,013	136	682,091	294,030	285	120	30,952	10
Capitol Complex Campus Lighting	32,162	0	75,830	46,050	17	11	2,382	0
Total	**2,460,496**	**662**	**4,459,785**	**2,180,800**	**1416**	**662**	**181,512**	**49**

ECM 1A (ADD) New Luminaires

Building	Total kWh Savings	Total kW Savings	Existing Ltg kWh	Proposed Ltg kWh	Existing Ltg kW	Proposed Ltg kW	Addl. Clg. Sav. kWh	Addl. Clg. Sav. kW
Labor & Industry	1,031,973	287	1,602,464	646,494	513	207	76,003	21
Health & Wellfare	621,042	183	954,168	379,045	332	132	45,920	14
North Office Building	167,937	48	392,573	237,045	140	84	12,408	4
Tunnels & Parking Garage	406,629	52	753,335	376,718	129	58	30,012	4
East Office Building	416,092	135	682,091	296,734	285	121	30,735	10
Capitol Complex Campus Lighting	32,162	0	75,830	46,050	17	11	2,382	0
Total	**2,675,834**	**705**	**4,460,460**	**1,982,087**	**1416**	**613**	**197,461**	**52**

Note: Total lighting kW savings have been reduced by an approximate average diversity factor of 85% applied to interior lighting.

The lighting audit line-by-line including pre & post fixture codes, descriptions, wattage, hours and diversity can be found in the appendix. Savings are calculated as:

- kWh Savings = (existing fixture kW * burn hours) – (post fixture kW * burn hours)
- Additional energy adjustments are also applied for cooling savings and heating penalties. The lighting heating penalty was calculated as follows:

$$Heat\ Penalty = \left[\left(kW_{existing} * Eff_{fluor} * HF\right) - \left(kW_{retrofit} * Eff_{LED} * HF\right)\right] * Heating\ Hours * \frac{3{,}412}{1{,}000{,}000}$$

Where:

$kW_{existing}$	=	existing fixture power (kW)
$kW_{retrofit}$	=	post-retrofit fixture power (kW)
Eff_{fluor}	=	Fraction of fluorescent fixture power converted from light to heat in conditioned space (80%). Remaining power is converted directly to heat and rises to the plenum.
Eff_{LED}	=	Fraction of LED fixture power converted from light to heat in conditioned space (90%). Remaining power is converted directly to heat and rises to the plenum.
HF	=	Conditioned space heat fraction (45%[1]). Sum of the convective heat transfer rate from the fixture to the room air and the net radiant heat exchange rate between the fixture and the room surfaces.
Heating Hours	=	Occupied hours in heating mode for the HVAC system (1,523)
3,412	=	BTU/kWh of electricity
1,000,000	=	BTU/Mlb of steam

This calculation yields a total heating penalty of 1,154 Mlb of steam.

The following table correlates the burn hours provided in the bulletin with the hour groups used in the line-by-line audit.

[1] Chantrasrisalai, C., and D.E. Fisher. 2007. Lighting heat gain parameters: Experimental method. HVAC&R Research 13(2):283-303.https://hvac.okstate.edu/sites/default/files/pubs/papers/2007/01-Chantrasrisalai%20%26%20Fisher%2C%202007%281%29.pdf

Hour Groups	Hour Group Description	Hours
Not in Use	Areas That Are Not In Use (Assumed Based On Space Type)	0
Low Use Storage	Areas with Minimal Occupancy	200
IT Room	Telephone / Data Rooms	260
Electrical Mechanical	Electrical-High Voltage / Mechanical-Boiler Room	520
High Use Storage	24 Hour / 7 Days A Week	520
Janitor Closet	Custodial / Housekeeping	1040
Staff Restroom	Unisex Restroom / Single Occupant	1040
Conference Room	Meeting / Hearing Rooms	1560
Office	Office Areas / Administration	2080
Common Area	Corridor / Lobby Areas / Stairwells	3120
Cafeteria	Cafeteria / Staff Dining	3120
Locker Room	Locker Room Areas	3640
Gym	Staff Athletic / Fitness	3640
Exterior	Exterior Building Façade / Campus Walkway	4380
Stairwell	24 Hour / 7 Days A Week	8760
Exit Signs	24 Hour / 7 Days A Week	8760
Public Restroom	Open 24 Hour Access Public Restroom	8760
Garage	Parking Garage / P1-P2 Elevator Lobby Areas	8760

Measurement and Verification

Lighting upgrade measurement and verification is anticipated to be completed through a pre and post-retrofit measurement of fixture kW as it relates to a meaningful sampling of typical fixture types and retrofit locations and their associated burn hour groups. The operating hours utilized for this ECM have been stipulated as per the burn hour table above.

TEN anticipates using a stratified sample of 34 measurements across the campus. The sample will be stratified by fixture type and building. The fixtures included in the sample will represent more than 75% of the fixtures to be upgraded in the project (conforming to FEMP guidelines).

TEN is confident that 34 measurements will be sufficient to achieve an overall precision better than 10% at 90% confidence due to the stratified sampling methodology and a low expected coefficient of variation (C_v) within fixture groups. TEN calculated the actual C_v for the lighting fixture power measurements in the small GESA covering the PJC and Keystone, which should provide a good indication of the achievable C_v for this GESA. The sample size was 38 measurements across both buildings. Coefficients of variation for pre-retrofit measurements ranged from 0.01 to 0.15 within fixture groups, and post-retrofit C_v ranged from 0.05 to 0.15. The low C_v demonstrates that small sample sizes are sufficient to achieve tight precision.

Commissioning Plan

Training will be provided by TEN and will address warranty procedures as well as maintenance that may be required by DGS. Due to the long life of the product being installed, it may be some time before significant maintenance is required. TEN will deliver to DGS comprehensive operations and maintenance manuals including an electronic video of the training provided.

Operations and Maintenance Procedures

By implementing these retrofits, DGS will realize additional savings in the reduction of replacement materials, either through the extended warranties, reduced energy usage of proposed LED luminaires, lamps and drivers, as well as increased operating life of new equipment. PPL Utility rebate incentives will be realized but not guaranteed based on the proposed LED lighting upgrade as per the utility rebate incentive program and current available funds.

ECM 2 – Central Plant

ECM 2 has been enhanced from the original proposal of a winter free cooling system (2A) to include chiller replacement and plant optimization (2B) and the decentralization of the central heating hot water loop (2C). The original proposal for a winter free cooling system is discussed below, but TEN has found that chiller replacement and plant optimization (2B) without free cooling will lead to more efficient plant operation for a greater portion of the year (greater energy savings) and satisfies an important deferred maintenance need.

ECM 2A – Central Plant – Winter Free Cooling System

TEN's original proposal included the installation of a winter free-cooling system (water-side economizer) to reduce the need for mechanical cooling when outdoor air temperatures are low. The driving force behind this ECM was both the energy savings potential and the current energy code followed by the Commonwealth (IECC 2009), which can be interpreted to call for economization on chilled water systems of a certain size. Further investigation has shown that replacement of older chillers in the central plant with high-efficiency magnetic bearing chillers is a superior ECM that satisfies a number of goals, including:

1) Achieves significant additional energy savings over free cooling,
2) Avoids the placement of water-filled heat exchangers (which require regular maintenance) over electrical gear in the central plant,
3) Fits within the larger self-funding GESA, and
4) Satisfies an exception to IECC 2009.

The exception to IECC 2009 has been discussed with DGS and Penn State Facilities Engineering Institute (PSFEI) and is summarized here. IECC 2009 exceptions to the free cooling requirement are outlined in the code Section 503.4 Complex HVAC Systems & Equipment, Paragraph 3, "Where the cooling equipment is covered by the minimum efficiency requirements of Table 503.2.3(7) and meets or exceeds the minimum integrated part load value (IPLV) by the percentages shown in Table 503.3.1(2)."

The minimum efficiency requirements of Table 503.2.3(7) are:

TABLE 503.2.3(7)
WATER CHILLING PACKAGES, EFFICIENCY REQUIREMENTS[a]

EQUIPMENT TYPE	SIZE CATEGORY	UNITS	BEFORE *1/1/2010*		AS OF *1/1/2010*[c]				TEST PROCEDURE[b]
					PATH A		PATH B		
			FULL LOAD	IPLV	FULL LOAD	IPLV	FULL LOAD	IPLV	
Water cooled, electrically operated, centrifugal	< 150 tons	kW/ton	< 0.703	< 0.669	< 0.634	< 0.596	< 0.639	< 0.450	
	> 150 tons and < 300 tons	kW/ton	< 0.634	< 0.596					
	> 300 tons and < 600 tons	*kW/ton*	≤ 0.576	≤ 0.549	≤ 0.576	≤ 0.549	≤ 0.600	≤ 0.400	
	> 600 tons	*kW/ton*	≤ 0.576	≤ 0.549	≤ 0.570	≤ 0.539	≤ 0.590	≤ 0.400	

And the minimum integrated part load values (IPLV) by the percentages as shown in table 503.3.1(2):

TABLE 503.3.1 (2)
EQUIPMENT EFFICIENCY PERFORMANCE
EXCEPTION FOR ECONOMIZERS

CLIMATE ZONES	COOLING EQUIPMENT PERFORMANCE IMPROVEMENT (EER OR IPLV)
2B	10% Efficiency Improvement
3B	15% Efficiency Improvement
4B	20% Efficiency Improvement

The chiller plant upgrade (ECM 2B) replaces the existing York OM2500 Chiller, installed circa 1969, and the Trane 1200 TR (tons of refrigeration) Chiller installed for standby duty. These two chillers will be replaced by three (3) Smardt 1200 TR Chillers.

The York OM 2500 Chiller IPLV data was not available. Design conditions, however, were available. This chiller has a full load efficiency at project design conditions of 0.73 kW/TR, and an NPLV of 0.73 kW/TR.

The proposed Smardt 1200 TR Chiller has at 1200 TR full load and standard conditions an energy usage of 0.5458 kW/TR, and an IPLV of 0.3208 kW/TR. At design conditions, which are more stringent than standard conditions, the proposed Smardt Chiller has a full load energy usage of 0.5729 kW/TR and a NPLV of 0.3428. The Smardt rating output is below.

IPLV : 0.3208 kW/tonsR (EER 37.41 (Btu/W*h))

% Load	Capacity	Perf	kW	Chw Flow	Chw In	Chw Out	Cw Flow	Cw In	Cw Out
100	1200	0.5485	658.2	2867	54.00	44.00	3586	85.00	94.30
75	900.0	0.3934	354.0	2867	51.50	44.00	3586	75.00	81.67
50	600.0	0.2815	168.9	2867	49.00	44.00	3586	65.00	69.32
25	300.0	0.2771	83.14	2867	46.50	44.00	3586	65.00	67.16

NPLV : 0.3428 kW/tonsR (EER 35.01 (Btu/W*h))

% Load	Capacity	Perf	kW	Chw Flow	Chw In	Chw Out	Cw Flow	Cw In	Cw Out
100	1200	0.5729	687.5	1920	56.93	42.00	3600	85.00	94.26
75	900.0	0.4148	373.3	1920	53.20	42.00	3600	75.00	81.68
50	600.0	0.3028	181.7	1920	49.46	42.00	3600	65.00	69.33
25	300.0	0.2992	89.77	1920	45.72	42.00	3600	65.00	67.16

Annual energy savings calculations were conducted to compare the original free cooling ECM and the alternative chiller replacement ECM. Under free cooling, the annual energy savings are estimated to be 489,113 kWh. If the existing York OM 2500 TR and the existing Trane 1200 TR chillers are replaced with three (3) Smardt Chillers with software-controlled plant optimization, the annual energy savings is estimated to be 2,296,023 kWh.

The planned chiller replacement therefore satisfies the minimum efficiency requirements of Table 503.2.3(7) by meeting or exceeding Path A or Path B, after 1/1/2010, using either the Smardt chiller performance on both IPLV or NPLV. The replacement also meets minimum integrated part load values (IPLV) by the percentages as shown

in table 503.3.1(2). While the IPLV data was not available for the existing York OM 2500 Chiller the more stringent NPLV was used. On the NPLV basis, the energy savings improvement is over 50%.

After discussions with all stakeholders (TEN team, DGS, PSFEI), it was agreed that the chiller replacement saved significantly more energy per year, met the exception requirements in IECC 2009 and significantly extended the life of the Capitol Complex Central Chiller Plant (CWP). Therefore, development of the free cooling ECM ceased and efforts were focused on the chiller replacements.

ECM 2B – Chiller Replacement and Plant Optimization

Existing Conditions

The central chilled water plant (CWP), was built entirely below grade in the late 1960s under Soldiers Grove east of the Capitol, between 7th Avenue and Commonwealth and Avenue and Between North Drive and South Drive, on the Capitol Complex. The major energy using equipment in the CWP and associated operational parameters are discussed below.

Chillers

I. CH-1 & CH-2

a. Johnson Control, Inc. (JCI)/York 2500 TR YK Single Stage Centrifugal Chillers.

b. Full load kW/TR = 0.588 cooling 4000 GPM chilled water from 57-42°F using 7500 GPM of water from Cooling Tower at 85°F, with NPLV of 0.370 kW/TR.

c. Installed Circa 2007.

d. Variable Speed Chillers, 1829 HP, 3600 RPM, 4160-3-60.

e. Refrigerant R-134a.

f. Operational Down to 55°F Cooling Tower Water up to Full Capacity Without Condenser Water Flow Bypass.

g. Well maintained. Current issues include:

i. Condenser Sub-Cooler Liquid Level Control.

ii. Oil Cooler Temperature Control at Low Entering Condenser Water Temperatures.

h. Beneficial Service/Operation is approx. 11 years. Remaining useful life estimated at 20 years.

II. CH-3

a. York Division, Borg-Warner Corp (now JCI) OM 2500 Turbomaster Two Stage Centrifugal Chiller

b. Full Load KW/TR is approximately 0.73+ Cooling 4444 from 55.5 to 42°F using 7410 GPM Condenser Water from 85-95.1 °F, w NPLV approx. 0.73 kW/TR

c. Installed Circa 1969

d. Fixed Speed, 3000 HP Synchronous Motor, 1200 RPM, 4160-3-60, sized for heat recovery/heat pump duty

e. Compressor and system originally for R-12. Later retrofitted with R-134a

f. Compressor Speed 4400 RPM

g. Operated with Cooling tower water down to 65 °F only above 50% Capacity

h. Operating approx. 1400 Hours/Year during peak periods

i. Maintained approx. 50 years. Current Issues include

   i. Re-wound Motor

   ii. Small Refrigerant Leaks

j. Remaining useful life. While this chiller has run 50 years, and can certainly run a few more years, no one would guarantee anything except to say it is at the end of its useful life.

III. CH-4

a. Trane 1200 TR Single Stage Hermetic Centrifugal Chiller, capacity approximately 1200 TR

b. Data is limited as original Control Panels with Chiller Nameplate have been replaced.

c. Refrigerant is R-123

d. Operation is limited to a back-up role if the OM 2500 Chiller is off line., approx. 200 hours/year.

Auxiliary Support Equipment

I. Chilled Water Pumps

a. Three (3) Peerless Chilled Water Pumps, 12x14x22, Vertical, designed for 3333 GPM at 233' total dynamic head (TDH), originally as Secondary Chilled Water Pumps. 1770 RPM, 4160-3-60. Now operate as variable primary pumps.

b. SCHWP-1 & 3 have been retrofitted to 460-3-60 motors with Eaton VFDs located on south mezzanine. Both have bearing failure issues, probably as motors may not have originally been modified for variable speed service.

c. SCHWP-2 is still 4160-3-60 with a Robicon VFD. This motor/drive is slated to be replaced with 460-3-60 motor and drive in separate ECM in this project.

II. Condenser Water pumps

a. CWP-1 Bell & Gossett 18 GHXC Vertical Pump, pumping 7410 GPM 86' TDH, with 200 HP 1800 RPM 460-3-60 Induction Motor with Soft Start Starter.

b. CWP-2 & 3 Peerless 18HH Vertical Pump, pumping 7410 GPM 86' TDH with 200 HP 1800 RPM 4160-3-60 Induction Motor with Across the Line Starter.

III. Cooling Towers and Fans

a. 3 Cooling Towers, Marley (now SPX), each with 150 HP 480-3-60 Motor with VFD

Chiller Plant Control

Chillers are staged on and off, along with associated condenser water pump, as needed to keep the export/supply chilled water temp close to 42°F – a temperature which is maintained year-round. Operators know from history which chillers are "doing well" or having technical issues. Operators also know upcoming weather and Complex operations/programs that also affect the cooling load at the CWP. If operators know the load will be increasing earlier in the day, they will start more than one chiller to be able to catch the load without losing control of the chilled water supply temperature. On the other end, if on a late hot Friday afternoon before a holiday weekend, if one chiller, or two chillers cannot keep the chilled water supply temp down to 42°F – it creeps up to 44 or 45F°F, the operators will not start another chiller as thy know the employees/occupants have all left for the day/weekend, and there is no reason to cool empty spaces.

October through June, CH-1 and 2 are baseline as CH-3 and 4 are not needed. Also, CH-1 and 2 are "easier" to start with soft start from the VFD. July-September, when it is known many days 3 chillers will be needed, operators base load CH-3 and bring CH-1 and 2 on and off line as needed. This is because CH-3 is fixed speed with full voltage across the line starting, where it can only start one time cold and 2 times hot within the first hour until it becomes overheated and not available the rest of the day until it cools down. Also, CH-3 has longer pre and post lubrication cycles that add to starting and shutdown periods.

CH-1 & 2 are variable speed giving the most efficient part load operation the specific chiller can achieve. They have pre-rotation vanes, however, with the currently high minimum loads, the pre-rotation vanes are rarely employed. CH-3 and 4 are fixed speed and rely solely on pre-rotation vanes for part load operation.

Chilled water pumps are all variable speed and are run to meet a set differential pressure (D) or Delta P right outside the chiller plant. Discharge pressures are mostly run at 105 Psig and sometimes 110 Psig. In general, the pumps are matched to the number of chillers operating, keeping the chilled water temperature difference coming back from the Complex.

Currently one condenser water pump is run with one chiller, two with two and three with three. The pumps are all fixed speed.

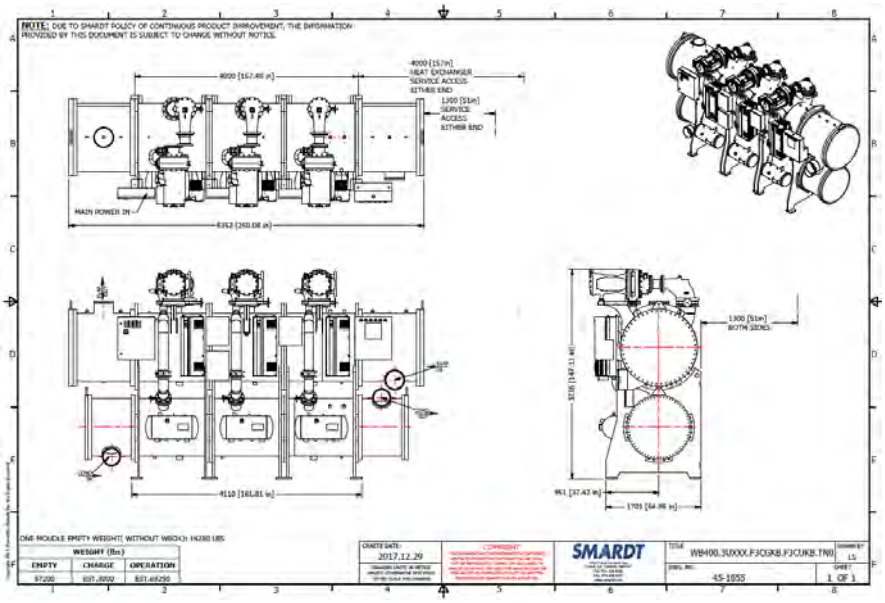
Most of the time, all the condenser water is run over all cooling tower cells, as they are all nozzle fed. The fans are turned on and off and employs variable speed to keep the water as cool as possible but no colder than 65°F. Anecdotal data notes nuisance trips of OM2500 when below 65°F. CH-4 needs the water no lower than 70-75°F to stay on line.

Proposed Solution

The proposed TEN solutions for this ECM is a combination of two changes - equipment replacement and the addition of automated optimization control. In this ECM, only the Chillers are replaced. The Optimization software is provided by Optimum Energy. Other ECMs will address other energy saving options in the chilled water system.

The chiller change for this ECM is to replace the existing CH-3 and CH-4 with three (3) 1200 TR Smardt Variable Speed Magnetic Bearing/Oil Free Segmented Chillers. The Chiller sizes and segmented options are of primary importance in this case, where rigging can only be achieved through the garage door at the East end of the CWP, next to the cooling tower. When shipped and rigged in pieces, this size and type were the only offering that could provide an efficient centrifugal chiller, redundancy, can be hoisted from 7th street to the west side of the cooling tower, lowered to the platform at East end garage door, rotated 90° to go through the door, to not exceed the existing 12 ton crane lift capacity, be rigged from the East end of the CWP to the West end, and can

fit into the available space created by the demolition of CH-3 & CH-4, with sufficient space for maintenance and tube pull space for future condenser and evaporator tube replacement.



The chillers are all variable speed, enabling easy soft starts as many times a day as necessary. These chillers are also stepped down from 4160 V to 460 V to enhance serviceability. The variable speed enables the most efficient operation at all loads. The chillers are oil free with magnetic bearings, improving the efficiency and useful life of the chiller. The chillers use R-134a. With this solution, only one refrigerant monitoring system will be employed, and plant personnel only have one refrigerant to manage. With the plant peak load decrease with the employment of other ECMs in this project, this combination of the remaining 2x2500 TR chillers and the addition of the 3x1200 TR chillers provides N+1 redundancy through the peak cooling season – even if one of the 2500 TR chillers goes down at peak conditions, the plant will still be able to satisfy the total campus load. The chillers will come with the standard 12-month factory warranty and there are a number of certified Smardt service contractors in the Harrisburg region (3 currently certified with 3 more planning to certify in the near future). The drives for the chillers will be Danfoss Turbocor VLT Drive MG35Q202.

Some of the chiller options selected for this project are listed below:

- EMI filters in the control panel
- Factory supervision of on-site chiller assembly
- Hinged covers on the marine water boxes on the evaporator and condenser
- Four-point witnessed factory performance test on each chiller
- Three-point sound test for one chiller

The chilled water system will not need to be shutdown due to construction. Work will be sequenced to maintain equipment redundancy during that particular time of year (this includes staging of all chilled water and condenser water pump motor retrofits).

This ECM also adds a top layer of control over the existing Metasys platform that will analyze the chiller plant operations and the Capitol Complex chilled water distribution to determine how much water to export, what temperature is the most efficient to deliver without sacrificing human comfort, and which combination of chillers, condenser water pumps, cooling tower cells and cooling fan speed control will achieve the lowest operating energy. **The Optimum Energy control system will pick the most efficient combination of equipment**

to be employed and will automatically control their operation. The system will also direct the variable speed chilled water pumps to be able to meet flow requirements at each building service, instead of at the exit of the CWP.

Optimum's continuing services ("OptiCx") will be provided for 3 years under this project, which includes:

- Full access to Optimum's cloud-hosted (web based) platform that provides data analytics, graphics, custom trending, and system M&V for the central plant optimization control
- Includes live technical support for all aspects of the optimization control and optimization control maintenance (adjustments to control logic or firmware updates as required to maintain optimization control at peak performance).
- Includes monthly reporting of central plant efficiency and savings accessed through the platform.
- Includes one remote optimization system training per year upon request from the site operations.
- Includes 3 years warranty of hardware replacement at no cost for device replacement (Tridium JACE 8 controller, JACE commissioning, and license fees if required). The warranty is valid only while subscription is active without lapse of subscription service. Installation labor on site of new JACE is not included. At renewal if subscription is continued for additional 3 year term, the warranty is extended, but with a hardware replacement fee of $2,500 if the device fails.

Should DGS want to renew the OptiCx service at the end of 3-years, they would have the option to contract this service directly with Optimum Energy. Pricing for the OptiCx renewal term would be similar to the cost defined for the first 3 years in the draft report, with an annual escalation of 3%. TEN does not believe that this extended service is required to realize the projected savings, and therefore these costs are not included in the project's cash flow, but TEN does recognize that the service can provide a valuable long-term operational partner for DGS.

PA Capitol Optimization - Savings Summary by Month - ECMs (2B)

	Existing CWP Plant				Upgraded and Optimized CWP Plant			
Month	Ton-Hours	Plant kWh	Plant kW/ton	Water Gallons	Ton-Hours	Plant kWh	Plant kW/ton	Water Gallons
January	383,375	337,858	0.881	810,629	383,375	169,039	0.441	736,490
February	623,279	416,089	0.668	1,265,093	623,279	273,258	0.438	1,196,696
March	755,757	499,205	0.661	1,528,611	755,757	334,672	0.443	1,452,407
April	1,198,314	789,901	0.659	2,400,437	1,198,314	633,512	0.529	2,347,057
May	1,434,299	905,775	0.632	2,853,988	1,434,299	774,205	0.540	2,815,996
June	2,192,046	1,548,621	0.706	4,411,194	2,192,046	1,405,389	0.641	4,399,717
July	2,721,555	2,194,288	0.806	5,605,663	2,721,555	1,853,545	0.681	5,509,612
August	2,513,955	2,154,261	0.857	5,239,195	2,513,955	1,662,614	0.661	5,067,649
September	1,905,305	1,333,743	0.700	3,833,988	1,905,305	1,151,767	0.605	3,793,955
October	1,263,689	816,740	0.646	2,527,285	1,263,689	663,532	0.525	2,473,107
November	847,400	539,247	0.636	1,702,213	847,400	385,030	0.454	1,632,672
December	668,903	452,216	0.676	1,360,736	668,903	292,485	0.437	1,283,970
Total	16,507,877	11,987,944	0.726	33,539,033	16,507,877	9,599,046	0.581	32,709,327

* Energy costs calculated at $0.075546/kWh blended and $9.46 per kgal of tower make-up water water, and $7 per kgal of tower make-up for chemical treatment.
* Savings is based on 100% of time operating within "LOOP MODE" for Post scenario with all equipment available for control (except for 12 days of shutdown in January)

	Savings of ECMs (2B)					
Month	Ton-Hours Saved	kWh saved	Water Saved	Electric Cost Saved	Water Cost Saved	Total Cost Saved
January	0	168,819	74,139	$12,754	$1,220	$13,974
February	0	142,831	68,397	$10,790	$1,126	$11,916
March	0	164,533	76,205	$12,430	$1,254	$13,684
April	0	156,389	53,380	$11,815	$879	$12,693
May	0	131,570	37,991	$9,940	$625	$10,565
June	0	143,232	11,477	$10,821	$189	$11,010
July	0	340,743	96,052	$25,742	$1,581	$27,323
August	0	491,648	171,546	$37,142	$2,824	$39,966
September	0	181,976	40,033	$13,748	$659	$14,407
October	0	153,208	54,179	$11,574	$892	$12,466
November	0	154,217	69,541	$11,650	$1,145	$12,795
December	0	159,732	76,767	$12,067	$1,264	$13,331
Total	0	2,388,897	829,706	$180,472	$13,657	$194,129

Note: the electricity savings given in the tables above require a small baseline adjustment to account for efforts under the 2015 Small GESA, the effects of which were not reflected in the baseline energy consumption used to calibrate the model. **The baseline adjustment reduces the ECM savings by 92,874 kWh to 2,296,023 kWh.** If the central plant baseline is re-calculated using 2018 utility bills, the baseline adjustment will no longer be necessary because the implementation of the 2015 project will be reflected in the bills. The baseline re-calculation may be justified if the pre-construction utility load from the buildings changes significantly (due to occupancy, for example).

The same total ton-hrs were used to calculate electricity consumption in the existing and upgraded plant so that savings were not double counted in other ECMs that produce a reduction in ton-hrs. The savings in ECM 2B come directly from the increase in chiller plant efficiency to serve the total load. When calculating energy savings for other ECMs that reduce ton-hrs (RCx, window film, etc), TEN utilized the upgraded chiller plant consumption ratings in both the pre and post-retrofit scenarios, which prevents double-counting.

Water savings are derived from reduced tower make-up water. The chilled water plant is becoming more efficient, and therefore heat rejection to the cooling towers will decrease. This will lower make-up water requirements to replace water lost to evaporation and blow-down. No drift or rain water make-up are assumed in this calculation. Sewer kGal savings were assumed at one-sixth of water savings (due to blowdown). Chemical treatment savings were applied at $7/kGal of water savings.

Measurement and Verification

Measurement and verification activities will be a combination of Options D, B, and C. Simulation of the entire chiller plant is calibrated to chiller logs and KW metering. In the post retrofit case, device level KW, chilled and condenser water flows, and temperature data will be metering though the Optimum Energy platform. Option C analysis will quantify electricity savings at the chilled water plant using the plant electrical meter – the Option D modeled electricity savings at the plant will be no more than 110% of the Option C calculated savings minus the modeled chilled water-based savings from other ECMs (e.g., retro commissioning, window film, etc.). Formulation of the chilled water system baseline is discussed in further detail in the Appendix.

Commissioning Plan

Commissioning of the new equipment and controls will be performed as soon as possible after component and system installations are complete. Commissioning will be performed by TEN along with it supporting contractors and vendors, beginning with all individual components, then with sub systems until the entire chilled water

distribution system and CWP are fully commissioned together. Commissioning will be documented to set baseline for future retro commissioning efforts at the CWP.

The chilled water system will not need to be shutdown due to construction. Work will be sequenced to maintain N-1 reliability during that particular time of year (this includes staging of all chilled water and condenser water pump motor retrofits, and controls upgrades).

Operations and Maintenance Procedures

ECM-2B will have positive effects on maintenance at the CWP. For the first year, new equipment is under warranty and is new. For example, the condenser tubes will not require cleaning at the beginning of the first cooling season. There will be more chillers and compressor motors to manage. However, the new compressor motors are oil free magnetic bearing design – oil monitoring, storage, management etc. will not be required. While the new compressor motors are smaller, they are easier to manage than one larger single compressor like the OM 2500.

To employ non-contact bearings and keep them employed when there is a power failure, the compressors have capacitors to provide power to the magnetic bearings in the event of a power failure. These capacitors have a roughly 10 year expected useful life. The project cash flow incorporates the expected cost to replace the capacitors in year 10 of the project.

The annual maintenance agreement should be restructured to address:

1. New mix of chiller manufactures and chiller models
2. Reducing voltage from 4160 to 460 at the new chillers
3. Elimination the need for oil management at the new chillers
4. Addition of any unique maintenance requirements of the new chiller magnetic bearing design

ECM 2C – Heating Hot Water Loop Decentralization

ECM 2C (ADD) – Replace both Heat Exchangers in North and South Office Buildings (not in base project)

The Heating hot water loop de-centralization seeks to reduce utility expenses by discontinuing the operation of a redundant and costly utility.

Existing Conditions

Three 200 HP vertical turbine heating hot water (HHW) pumps are part of the central plant's 1968 design. With ratings of 2010 gpm, two HHW pumps are required to satisfy the 4,020 gpm tube-side design of the central plant steam-to-heating water heat exchanger, the capacity of which is based on 90# steam throughput of 45,500 #/hr through the shell. Each pump's operating point of 288' of total dynamic head (TDH) was intended to circulate a 130°F hydronic heating supply between the plant's chiller condenser recovery bundles with auxiliary STHX, and the North Office, Irvis Office, East Wing, Main Capitol, Ryan, the now-demolished Transportation and Safety building, and allowances for portions of the Finance and Forum buildings. Presently one of three central plant HHW pumps operates continuously - 8,760 hours per year - to circulate a 180°F supply to North Office, Irvis Office, Ryan, East Wing and Main Capitol.

The design ratings of these pumps translate to an estimated 171 brake horsepower each. Over the course of a year, the cost incurred by the State to operate a single constant volume HHW pump is estimated at nearly $90,000. Additional energy is consumed by the chilled water system that absorbs heat from the HHW distribution piping in the tunnels and central plant.

In all cases except AHU main reheat services in East Wing, the heating water circulated from the central plant is redundant to one or more steam-to-heating water converters already in place in each of the building listed. Shell & tube exchangers in two 1960's era buildings are believed to have aged beyond the range of expected useful life: a pair of mutually redundant converters in the North Office building and a pair of mutually redundant converters in the Irvis Office building. Four converters separately serving individual loads in the East Wing are also perceived as a risk to reliability due to their construction in the 1980's. Asbestos containing material (ACM) is present in all eight cases. Converters in Ryan and Main Capitol date to the 1990's at worst and are not considered an issue.

Each of the building HHW systems served by the central plant has one or more HHW pumps to re-circulate the heating supply within the building systems. The building pumps operate in the same fashion regardless of whether the central HHW plant is in operation or not, and do not benefit from the high pressure differential generated at the central plant.

Four air handling units in the East Wing are configured with a single HHW reheat coil located just after the cooling coil. Although located in the same mechanical spaces as the four east wing converters noted above, those particular reheat coils are fed only by the central HHW distribution and are not piped to the redundant STHX.

The central plant STHX tube bundle failed in the 2016-2017 heating season. The State reports that all buildings normally served by the central HHW distribution were fully heated to comfortable levels by their internal heat generation sets for the several months the central HHW plant was offline.

Proposed Solution

Discontinuing the use of the central heating water system will produce pump power savings, chilled water system savings, and steam heating savings. Removal of the pumps, converter, and unneeded steam system pipe and fittings in the central plant frees up floor space. That floor space is extremely valuable for staging, storage and assembly of the present chiller, pump, VFD and plant control upgrades, as well as the addition of future equipment to the central plant.

Demolition of the central plant HHW generation equipment and pumps requires the reheat coils in East Wing be piped to the converters in their respective MERs. Reliability will be improved by replacement of older STHXs.

This scope includes demolition and disposal of the central HHW STHX, central HHW pumps and motors, and large elements of the central HHW system such as the air separator, manifolds, piping, cabling, conduit and so forth which are impediments to the chiller and chilled water pumping upgrades. Existing power cabling will be disconnected from the MCC and any retained breakers or switches abandoned, locked and labeled. The central HHW system steam feed, HPR, and large HHW piping will be capped in a convenient location within the plant and the remaining distributions retained as-is.

In the base project, one of the two existing HHW converters in North Office and one of the two existing HHW converters in Irvis Office will be abated, replaced and insulated. New isolation valves, relief valve, trap and connections to the existing systems are included with each. The custom flange-to-flange replacement retains existing ATC valves, controls, instrumentation and local piping intact; remaining ACM will be undisturbed. TEN has priced the additional cost to replace both converters in North and Irvis in ECM 2C (ADD).

Connection points to the four existing converters in East Wing will be abated, allowing four new converters to be installed in parallel to the existing. This scope supports, pipes and insulates the four new converters, adding isolation valves, a new steam ATC valve, a new trap, a new relief valve, and connections to the existing.

Four AHUs sharing the same mechanical rooms with the converters will be modified with new insulated piping loops between the East Wing HHW generation in each MR and their respective reheat coils. Central HHW connections will be cut and capped; valves, ATC and instrumentation will be retained as-is.

At additional cost, an adder can be offered if desired by the State to replace the four existing converters as well, yielding a pair of redundant converters in each of the four MRs.

Measurement and Verification

Electricity savings for this upgrade are derived from the reduction in continuous pumping power to recirculate the HHW supply throughout the loop. Because pumps in the buildings do not see any change in load due to the selection of plant HHW vs HHW generated locally, electricity savings are reflected in the change from present central plant pump operation to no central plant pump operation.

The central HHW pumps shall be completely removed in the accomplishment of this ECM. No new power shall be substituted for the former pumps since the existing systems will continue to operate as they now do in either mode. Pump savings shall be proven by option A as described in the Measurement and Verification section of this report.

There is significant thermal impact from distribution piping throughout the tunnels, and a significant impact in the plant as well. This arises from the regular removal of excess heat by the HVAC systems serving the basements, tunnels and mechanical spaces through which the distribution is hosted.

The buildup of heat in minimally-ventilated enclosed space balances out to a maximum temperature dictated by the combination of the insulation's resistance to heat flow, pipe internal temperature, and heat removal by ventilation in combination with conduction losses. In situations in which the tunnel space temperature is dictated by the losses from insulated high-pressure steam at internal pipe temperatures exceeding 300°F, transmission from insulated 180°F or lesser HHW piping will be extremely limited.

By comparison, transmission losses from the central HHW system are consequential throughout most of the distribution at present, due to the operation of HVAC systems designed to hold tunnels and MRs at reasonable working temperatures. Moderate space temperatures and practical convection rates translate to much lower insulation jacket temperatures than would be practical with high pressure steam piping nearby and minimal ventilation. A walk of the tunnels following our initial estimates found most sections of the tunnel moderately warm with some clearly uncomfortable (those with exposed flanges, traps, etc. as a rule) but few driven to excessive temperatures.

The temperature of the central HHW loop supply is held to roughly 180°F in all seasons. The system was sized for a 20°F differential on a design day with all loads in play, so the reductions effected throughout the years translate to an average return temperature greater than 160°F. Due to maintenance of limited OA minimums in most buildings, a high percentage of the heat removed from the tunnels, basements and MRs is transferred to the outdoors by the operation of the chilled water system acting through local air handling. Thermal savings in terms of steam and chilled water will be proven by option D as described in the Measurement and Verification section of this report. Because several sections of the tunnel and mechanical space are ventilated rather than cooled (air conditioned) we have conservatively de-rated the thermal savings to a fraction of the estimated actual values.

As waste heat is reduced, cooling load will also be reduced, with associated savings in cooling tower make-up water, cooling tower blow-down, and chemical treatment. Make-up water, sewer, and chemical treatment savings will be stipulated. Water savings for this ECM were estimated by taking the ratio of water to kWh savings in ECM 2B, and applying this ratio to the estimated cooling kWh savings in this ECM. Blowdown savings are estimated at one-sixth of water savings. Chemical treatment savings are estimated at $7/kGal of make-up water savings. The combination of these three stipulated savings estimates is only $555 per year.

TEN's project economics attribute no O&M savings to this ECM.

Commissioning Plan

Commissioning will be performed by TEN along with it supporting contractors and vendors. Commissioning will be documented and any manuals or training videos will be delivered to DGS.

Operations and Maintenance Procedures

The State will continue to operate local heating generation units in each of the affected buildings in the same manner as was accomplished when the central loop was down for repairs. The project will replace two heat exchangers in North and Irvis which have seen more than 50 years of service with new equipment, and will install new, redundant exchangers and control valves in the East Wing. Maintenance of the three 4160 V HHW pump motors in the plant will no longer be required. Maintenance will also be reduced by elimination of the three central plant HHW pumps, the heat exchanger, steam control valves and associated steam traps.

ECM 3 – Central Plant Pumping Upgrades

ECM 3 has been enhanced from the original proposal to upgrade the condenser water loop to variable volume (3A) to include the following

1. CWP-1. Existing is 460 V Motor with Soft Start changed to operation with VFD.
2. CWP-2 & 3. Existing is 4160 V Motor with Full Voltage Starting. Change CWP-2 and CWP-3 fixed speed operations to VFD.

The addition of ECM 3B comes at the request of DGS. This ECM is to replace the existing 4160 V motor and VFD on SCHWP-2 with 460 V Motor and VFD.

ECM 3A – Condenser Water Loop Upgrade to Variable Volume

Existing Conditions

CWP-1 is a vertical pump with a 460 V motor and soft start starter. The motor has class F insulation, designed with a B rise at 1.15 SF. However, it does not have insulated bearings, grounding rings nor class H insulation.

CWP-2 & 3 are Peerless 18HH Vertical Pump, pumping 7410 GPM 86' TDH with 200 HP 1800 RPM 4160-3-60 induction motor with across the line starter.

Proposed Solution

For this option, the existing motor on CWP-1 would be sent to a motor rebuild shop. There the motor will receive new bearings, be re-balanced, have a load test performed, be machined and have grounding rings installed. Then the motor will be shipped back to the CWP where it will be re-installed, reconnected to electric power, have the motor and pump complete a vibration analysis and finally have supervised startup and commissioning performed.

The only design change for VFD operation would be the electrical insulation. The H class withstands motor heating from VFD operation better than class F. It can remain viable longer at higher temperatures. However, the higher temperatures that are normally associated with VFD operation occur with prolonged operation at lower frequencies/speeds. VFD CWP operation rarely go to lower frequencies/speeds at any operating condition except when they are turned off/are starting. This is because of hydraulic flow limitations where the normal lift to top of cooling tower requires a minimum speed to be maintained. In addition, cooling tower flow limitations require a minimum flow to maintain even flow throughout. Flow below that would make the cooling tower less efficient, and the energy lowering lower cooling tower water temperature cannot be achieved. Finally, lower flow is not often seen because while the lower frequency/speed of the CWP saves CWP motor energy, it has an opposite effect on the chiller. Chiller energy will increase faster than the CWP pump motor energy decreases, due to the larger size of the chiller compressor motor relative to the CWP pump motor size. In general, CWP VFD operation is not expected to see the frequencies that cause the most heating effect that would suggest using better insulation.

This ECM will enable VFD operation and it is estimated the motor will attain most of its expected remaining useful life. If rebuilding CWP-1 is not acceptable, then the motor can be replaced with a new motor (at additional cost), designed for VFD operation from the start, just like for CWP-2 and CWP-3.

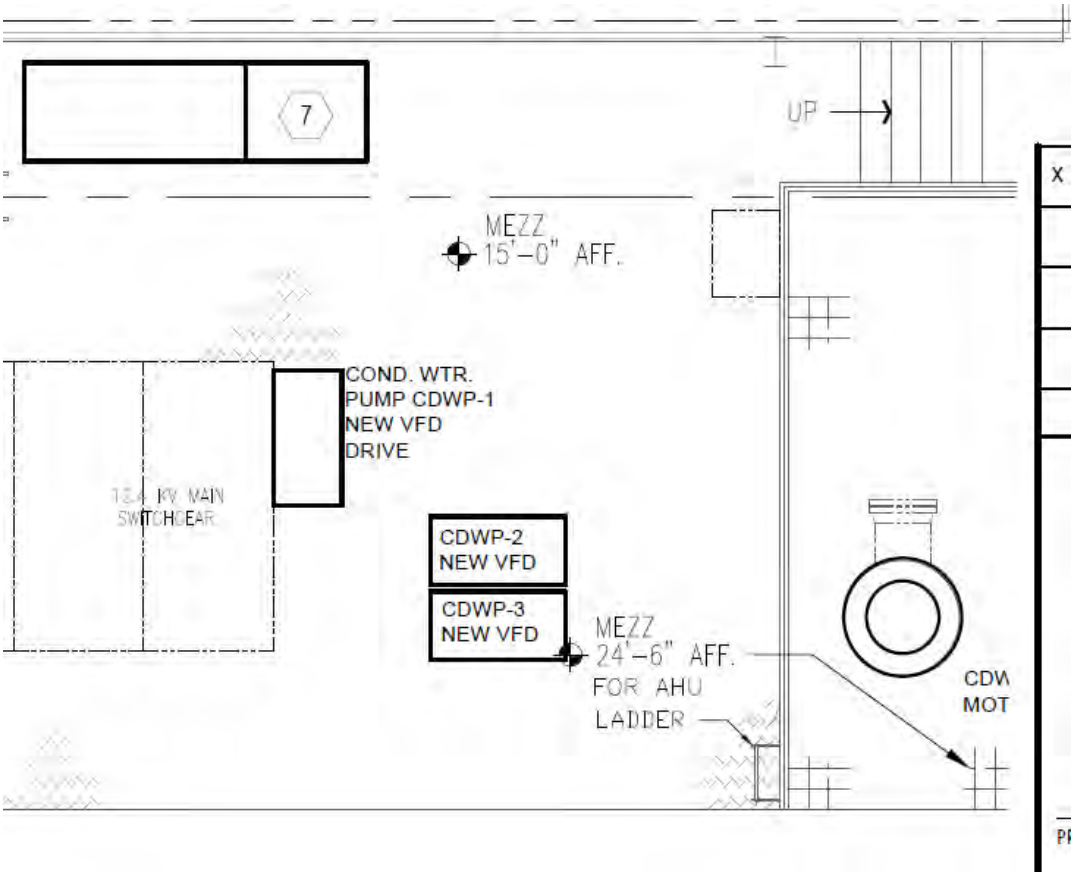
For CWP-2 and CWP-3, the pump motor will be removed, and a new motor (460-3-60) designed for VFD operation will be installed, along with the associated VFD. Like for CWP-1 above, it would be re-installed, re-connected to the electrical supply, will with the pump undergo a vibration analysis, be re-started under supervision and will be commissioned.

The VFDs to be employed would be by the same manufacture as existing 460V VFDs – ABB, sized for 200 HP motor, Model ACH550 480-3-60 with soft start bypass. These can be found as Eaton Catalog #-CPX20014AACAL@RAL3+KFRH.

For CWP-1, the VFD will replace the existing soft start starter at the end of the lineup next to the metal lockers.

For CWP-2, the VFDs will replace the 4160V Breaker used as a starter in the 5KV line up but will be located on the mezzanine across from the VFD for CWP-1.

See the following sketch:



The energy savings for the entire central plant chilled water project (including chiller replacement) follows. To calculate savings for this ECM alone, one can subtract the total savings below from that shown in ECM 2B. This results in 1,290,672 kWh and 819 kGal of water savings. Sewer kGal savings were assumed at one-sixth of water savings due to blowdown. Chemical treatment savings were applied at $7/kGal of water savings.

PA Capitol Optimization - Savings Summary by Month

	Existing CWP Plant				Upgraded and Optimized CWP Plant			
Month	Ton-Hours	Plant kWh	Plant kW/ton	Water Gallons	Ton-Hours	Plant kWh	Plant kW/ton	Water Gallons
January	383,375	337,858	0.881	810,629	383,375	123,288	0.322	715,184
February	623,279	416,089	0.668	1,265,093	623,279	200,990	0.322	1,163,052
March	755,757	499,205	0.661	1,528,611	755,757	253,767	0.336	1,414,765
April	1,198,314	789,901	0.659	2,400,437	1,198,314	527,736	0.440	2,297,834
May	1,434,299	905,775	0.632	2,853,988	1,434,299	645,142	0.450	2,755,680
June	2,192,046	1,548,621	0.706	4,411,194	2,192,046	1,260,959	0.575	4,332,065
July	2,721,555	2,194,288	0.806	5,605,663	2,721,555	1,705,977	0.627	5,440,419
August	2,513,955	2,154,261	0.857	5,239,195	2,513,955	1,522,509	0.606	5,001,908
September	1,905,305	1,333,743	0.700	3,833,988	1,905,305	1,011,809	0.531	3,728,398
October	1,263,689	816,740	0.646	2,527,285	1,263,689	548,386	0.434	2,419,379
November	847,400	539,247	0.636	1,702,213	847,400	293,740	0.347	1,590,240
December	668,903	452,216	0.676	1,360,736	668,903	214,072	0.320	1,247,462
Total	16,507,877	11,987,944	0.726	33,539,033	16,507,877	8,308,375	0.503	32,106,385

* Energy costs calculated at $0.075546/kWh blended and $9.46 per kgal of tower make-up water water, and $7 per kgal of tower make-up for chemical treatment.
* Savings is based on 100% of time operating within "LOOP MODE" for Post scenario with all equipment available for control (except for 12 days of shutdown in January)

Month	Ton-Hours Saved	kWh saved	Water Saved
January	0	214,570	95,445
February	0	215,099	102,040
March	0	245,438	113,846
April	0	262,165	102,603
May	0	260,633	98,308
June	0	287,662	79,129
July	0	488,311	165,245
August	0	631,752	237,287
September	0	321,935	105,590
October	0	268,354	107,906
November	0	245,507	111,973
December	0	238,144	113,274
Total	0	3,679,569	1,432,647

Measurement and Verification

M&V efforts for this ECM will be combined with ECM 2B – this ECM will be included in the same calibrated simulation model.

Commissioning Plan

Commissioning will take place as described above and will be performed in conjunction with the chiller replacement ECM (2B).

Operations and Maintenance Procedures

The provision for manufacturer O&M requirements and training including video recording, will be provided for this ECM as for ECM 2B.

ECM 3B – Chilled Water Pump Motor and VFD Replacement

This ECM removes and replaces one 4160 V chilled water pump motor and one 4160 V variable frequency drive with new 460 V equivalents.

Existing Conditions

The chilled water plant's variable speed chilled water pumps are powered at 4160 volts. High voltage systems require specialized service, making them costlier to operate and maintain over their 460-volt counterparts. DGS seeks to remove and replace the existing high-voltage 350 HP motor and associated variable frequency drive (VFD) powering chilled water pump #2 with a new 460 V motor and VFD. DGS has attempted to perform this ECM under a different contracting vehicle, but circumstances prevented the retrofit from taking place. This ECM will benefit from the mobilization of TEN's team in the central plant for other ECMs.

Proposed Solution

This project will replace one existing 4160-volt VFD and the corresponding 4160-volt chilled water pump motor. The equipment is rated for 350 horsepower (HP). The new 460-volt equipment will be powered through an existing stepdown transformer, so no additional transformation losses (apart from those internal to the VFD) are incurred. An estimate of the change in power consumption follows.

Central Plant CHW Pump Power Estimate	Plant Equipment					
	Flow Rate (gpm)	Pressure drop (ft w.c.)	assume efficiencies: device (%)	motor (%)	VFD (%)	power input kW
• 4160 CHW Pump with Robicon VFD	3333	***288***	***85.5%***	***93.8%***	***96.0%***	234.7
• 480V CHW Pump with New VFD	3333	***288***	***85.5%***	***95.0%***	***97.0%***	229.3
change in peak power						5.4

annual operation (hours)	8760
average qty pumps online over 8760 hours	**1.85**
average hours of operation, 1 of 3 pumps	5402
assume average speed	75%
speed impact on load	45%
annual energy savings (kWh)	13197
electric expense rate ($/kWh)	$ 0.075546
annual energy savings ($)	$ 997

Measurement and Verification

Although drawing in excess of 200 kW at peak load, savings are relatively minor for this upgrade. The improvement benefits the efficiency of the motor and VFD only and does not change the operation.

As is evident in the preceding table, expected savings are on the order of $1,000 annually. Actual savings may be greater due to the possibility the efficiency of the existing motor has degraded over the years. As described in the subsequent discussion of Measurement and Verification, savings for this ECM will be verified by option D in conjunction with the other chiller plant mechanical retrofits.

Commissioning Plan

Equipment installed under this ECM scope will be commissioned as described in the subsequent commissioning plan.

Operations and Maintenance Procedures

This ECM will remove the high-voltage restriction for future service. Due to greater market competition at conventional voltages, repair and maintenance expense over the long term should be reduced. The reliability and life span of the retrofitted pump should extend beyond those of the remaining units.

TEN's project economics attribute no O&M savings to this ECM.

ECM 3C – Replace Bearings on Central Chilled Water Pump Motors #1 and #3

Existing Conditions

The "screaming" noise emanating from the existing 460-volt chilled water pump motors (pumps #1 and #3) indicate damaged bearings. This is likely due to electrical fluting.

Proposed Solution

TEN will replace the bearings on each pump motor. The scope for this ECM will include:

1. Remove motor and ship to rebuild shop which will:
2. Replace bearings
3. Dynamically balance the rotor
4. Conduct a load test
5. Machine and install grounding rings
6. Ship back to central plant
7. Motor reinstallation with new mechanical pump shaft seals
8. Power re-connect
9. Vibration analysis
10. Start-up and commissioning

Measurement and Verification

No savings have been associated with this measure, although lower friction losses in the bearings may produce some electric savings. These cannot be quantified at this time. Thus, no measurement and verification efforts are required for this ECM.

Commissioning Plan

TEN and it subcontractors will perform start-up and commissioning when the motors are reinstalled. DGS personnel will be invited to participate.

Operations and Maintenance Procedures

Replacing the motor bearings now will reduce future maintenance needs, although no O&M savings are claimed for this ECM.

ECM 4 – Utility Distribution

This ECM seeks to restore optimum conditions throughout the campus by rectifying deterioration to equipment, operations and controls.

ECM 4A.1 – Retro Commissioning

The development of a detailed retro commissioning scope would ideally take place over 3 seasonal periods – winter, shoulder, and peak summer – to capture the variety of operating conditions experienced by the campus and expose any suboptimal controls strategies and faulty equipment. TEN's ability to finalize a retro commissioning scope was limited because the audit period largely took place during winter operating conditions. Nonetheless, TEN has identified many retro commissioning strategies in the text below that will deliver cost effective energy savings. **TEN will continue to investigate savings opportunities and finalize scope as the project moves into the construction period**.

TEN is confident that the projected savings for this ECM can be achieved, having developed a "bottom-up" engineering estimate of the savings for each strategy that is lower than a "top-down" estimate of the maximum savings that can be achieved in each building. Our top-down estimate compared the current energy-use intensity (EUI, kBTU/sq.ft.) of each building to the expected EUI for a similar high-efficiency building, a calculation which provides an upper-bound to the savings estimate. The bottom-up savings estimate given for this ECM is detailed in Appendix B.

The cost for this ECM includes pricing from controls vendors for re-programming sequences in air-handling units as well as a "fund" of money that will be dedicated to controls and equipment upgrades as those opportunities are fully scoped. At $780,000, the fund has been sized to allow significant improvements but will not cover every issue that is identified. TEN will work with DGS to prioritize improvements that deliver the most cost-effective energy savings.

Since the draft Audit Report was submitted at the end of March, TEN has continued to refine the savings estimates for the RCx ECM. The initial savings estimates in the draft report yielded preliminary findings from (1) a psychrometric air temperature reset strategy and (2) shutdown of pumps serving weathermaster units; savings from other possible measures were not quantified or included. After gathering more information, the expected savings for the psychrometric reset strategy and pumps has decreased, while TEN has continued to develop scopes and savings for other RCx measures that will increase savings.

Additional savings opportunities that have been identified since the draft report was submitted include:

- Revised economizer lockouts
- Re-calibrated PID loops
- Additional pipe, valve and fitting insulation
- Replace / rebuild / resize failing steam control valves
- ATC for return air volumes
- Humidification savings through cost‐based control

TEN is continuing to evaluate the following areas for even greater savings:

- Installation and automation of VFDs and new inverter duty motors for select fan systems
- Cool humidification in high gain areas
- Steam humidification in low gain areas

- Drive distribution interfaces to a delta T reset schedule based on OA enthalpy
- Water-side heat recovery
- Air-side heat recovery
- Water recovery
- Select zone CO2 implementation
- Automation of existing pneumatic controls
- Setback and night and weekend shutdown schedules in non-core buildings.

A Discussion of Chilled Water Distribution Issues

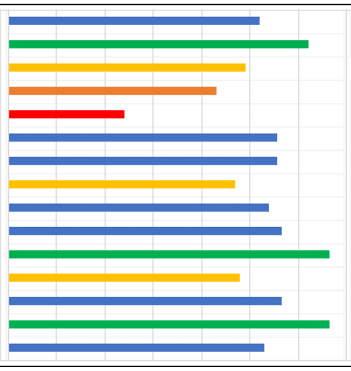
Existing Conditions

DGS and PSFEI noted that opportunity exists to optimize the water side of the chilled water system, specifically at the numerous air handling unit chilled water coils throughout the system. Chilled water flow is currently controlled to achieve a supply air temperature but is not controlled to achieve chilled water temperature drop across the cooling coils. This results in high chilled water flow rates, low chilled water delta T, wasted pump energy and reduced chiller plant efficiencies. The remote buildings in the chilled water piping system are starved for chilled water because of unnecessarily high chilled water flow.

The following table and chart compare building delta T under peak conditions per the Flood and Sterling report.

CHW Loop Performance - Flood & Sterling Balance Report

		measured flow*	CHW temp (F) EWT	CHW temp (F) LWT	CHW tons	Flood & Sterling - Measured Building ΔT	bldg gpm/ton
2	Finance	726	43.1	53.5	315	10.4	2.3
2A	Finance	43	42.6	55	22	12.4	1.9
3	PA Judicial Center	541	42.5	52.3	221	9.8	2.4
4	L&I	1315	43.8	52.4	471	8.6	2.8
5	Ed & Forum	90	43.2	48	18	4.8	5.0
6	H&W	790	42.9	54	365	11.1	2.2
7	Keystone	1140	42.1	53.2	527	11.1	2.2
8	North Office	530	43	52.4	208	9.4	2.6
10	Irvis	402	42.9	53.7	181	10.8	2.2
9	NW Riser East Add, Senate Fit Out & Main Capitol (A) / East Wing	760	42.7	54	358	11.3	2.1
11	South Riser East Add & main Capitol (B&C) / East Wing	1177	42.8	56.1	652	13.3	1.8
12	Ryan	110	43	52.6	44	9.6	2.5
	NW Riser East Add & Senate Fit Out deduct A	460	42.7	54	217	11.3	2.1
	South Riser East Add deduct (B&C)	377	42.8	56.1	209	13.3	1.8
14	Main Capitol (A) / East Wing	300	43.3	53.9	133	10.6	2.3



As can be seen in the preceding chart, the worst delta T performers are the Forum, and Labor & Industry. Forum has been excluded from this project at DGS's instruction. As discussed previously, there are physical limitations and other issues in Labor and Industry that are too costly to remediate, with simple paybacks exceeding project criteria (see Appendix C for a detailed discussion of the problems at Labor & Industry).

PA Justice Center also shows lower ΔT than expected. Building system design is part of the issue here as well, in that the Justice CHW heat exchanger is designed with a 10° temperature rise.

CHILLED WATER HEAT EXCHANGER SCHEDULE (SKID MOUNTED) SYMBOL: HE

NO.	LOCATION	SERVICE	SYSTEM MBH	HOT-SIDE DATA				COLD-SIDE DATA				OPERATING PRESSURE PSIG	UNIT WEIGHT (LBS.)	BASIS OF DESIGN		NOTES
				FLOW GPM	ENT. TEMP.	LVG. TEMP.	P.D. PSI	FLOW GPM	ENT. TEMP.	LVG. TEMP.	P.D. PSI			MANUFACTURER	TYPE	
HE-2	BASEMENT MECH C007	CHILLED WATER	13,530	2,255	55	43	7.5	2,700	42	52	10.1	30	17,500	BELL & GOSSETT	GPX-P188-333-TWTL92	1, 2

NOTES:
1. VERTICAL, PLATE AND FRAME, MOUNTED ON CHILLED WATER SKID
2. FOR OTHER ACCEPTABLE MANUFACTURERS SEE SPECIFICATIONS

Other elements of the Justice Center's performance stem from a mixture of issues, some of which can be resolved cost-effectively.

Keeping in mind the WM Group loop recommendations in 2003 assumed 15°F or better in the (then future) Justice building, the 10" loop to PJC and L&I can only support a finite flow. Justice Center AHU leaving conditions don't leave much room for slippage in the hot side supply temperature, and the exchanger's 10°F design delta clearly has a negative impact on the capacity issues faced by L&I.

Ryan Annex has a high gpm per ton rate, as does North office. Not all issues in those two buildings are yet known. In some ways the loads in those two buildings are dissimilar, requiring different solutions. But in both cases, the cost for dealing with a multiplicity of systems is much higher than the cost of rectifying a few centralized units. Legacy MetaSys / fan coil controls are among the most labor intensive to upgrade.

Potential Solutions
Upon completion of the chiller plant upgrades (ECM 2B and 3A), the plant will be in a much better position to track load for three reasons. First, speed modulation for all major plant components translates to drastically improved turndown. The plant will operate at relatively high efficiency even when gpm per ton rates exceed specifications at times when more machines are online than desired. Second, OptimumLOOP controls will manage the total campus flow and delta T balance by dynamically adjusting the leaving chilled water temperature. As system delta T is decreasing, which would otherwise result in unnecessarily high chilled water pumping, the algorithms adjust chilled water supply temperature down to reduce overall system flow, pump energy, and limit DT degradation. Finally, the control point for the chilled water pumps will be decentralized, moving from a single point right outside the plant to a network of differential pressure (DP) sensors closer to the loads at the buildings. OptimumLOOP will vary the output of the pumps in a manner directly responsive to the building needs.

TEN's team will be conducting a unit-by-unit survey of the major chilled water system components in each building in the coming shoulder/summer months when outdoor conditions are conducive to the discovery of problem areas. This survey should uncover additional solutions to improve the chilled water system in the buildings beyond the strategies outlined in this report. TEN will not make every improvement that is identified because, in some cases, savings will not be sufficient to justify costs. TEN has set aside a significant fund for retro commissioning and will work with DGS to prioritize improvements during construction. TEN assumes that if a control point is mapped in the BAS, but the end-device or communication link is broken, DGS will repair the device or link under their existing maintenance contract.

Building Retro Commissioning

Existing Conditions
Observations detailed in this section are examples of the varying conditions noted at the site.

1. The Health and Welfare building and the Labor and Industry building condition perimeter rooms by way of Weathermaster induction units, wherein return air from the space passes through the unit coil and subsequently mixes with supply air from a primary AHU.

2. Dehumidification of the primary air by the Labor & Industry AHUs is a particular problem due to chilled water supply temperatures in excess of design during the cooling season.

H&W Window Units

One of TEN's overall goals is to increase cooling capacity in L&I. ECM 4C (satellite chiller in L&I basement) is designed to solve the cooling capacity shortfall in that building. While DGS has chosen not to proceed with that ECM, TEN believes that the lighting improvements and window film in L&I, as well as retro commissioning of the chilled water system will generate savings and help improve conditions in these spaces.

3. The penthouse of the Health and Welfare building has three pumps that feed tempered supply water to a dual temperature system. Two pumps run all year round. One 30 HP pump feeds the north loop, another 30 HP pump feeds the south loop and there is one standby pump. The Weathermaster loop is a tempered 2-pipe system. TEN will perform further investigation of the pumping requirements to the Weathermaster units. No savings are associated with Weathermaster loop pumping in the economics of this final report. (As explained earlier, other RCx measures have been found that will offset removal of the pump savings originally forecast in the draft proposal.)

4. Labor and Industry has a pumping configuration for the perimeter Weathermaster induction units similar to that of Health & Welfare. Each zone pump feeds tempered supply water to a dual temperature system. Two pumps run all year round. One 30 HP pump feeds the north loop, another 30 HP pump feeds the south loop and there is one standby pump. The Weathermaster loop is a tempered 2-pipe system. TEN will perform further investigation of the pumping requirements to the Weathermaster units. No savings are associated with Weathermaster loop pumping in the economics of this final report. (As explained earlier, other rCx measures have been found that will offset removal of the pump savings originally forecast in the draft proposal.)

5. In the Labor and Industry building, the main building typically loses control of indoor temperature and humidity when outdoor temperatures rise above 76°F.

   A limited supply of chilled water from the central plant arrives at the Labor and Industry building around 44°F, however, the chilled water supply temperature at the 18th floor of the building ranges from 46°F to 48°F and beyond under more extreme conditions.

6. AHU-9 located in the basement of the Labor and Industry building has a balancing valve downstream of the control valve. This balancing valve is only creating additional pressure drop, resulting in more pump power.

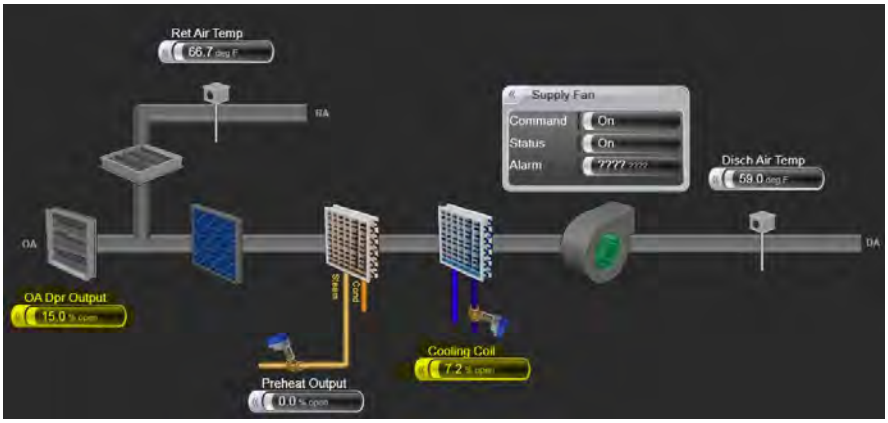
L&I AHU-9 balance valve downstream of control valve

7. EB-57 in the Labor and Industry building has a 5 HP booster pump which is operated under a dual temperature system and is operated all year round.

8. The 18th floor mechanical room of the Labor and Industry building has three 30 HP pumps, one for the south loop, one for the north loop, and one swing pump. These pumps are run as booster pumps during the summer.

9. 3rd floor west wing of the Labor and Industry building has a 5 HP booster pump that is also part of a dual temperature system and is operated all year round like the basement pump

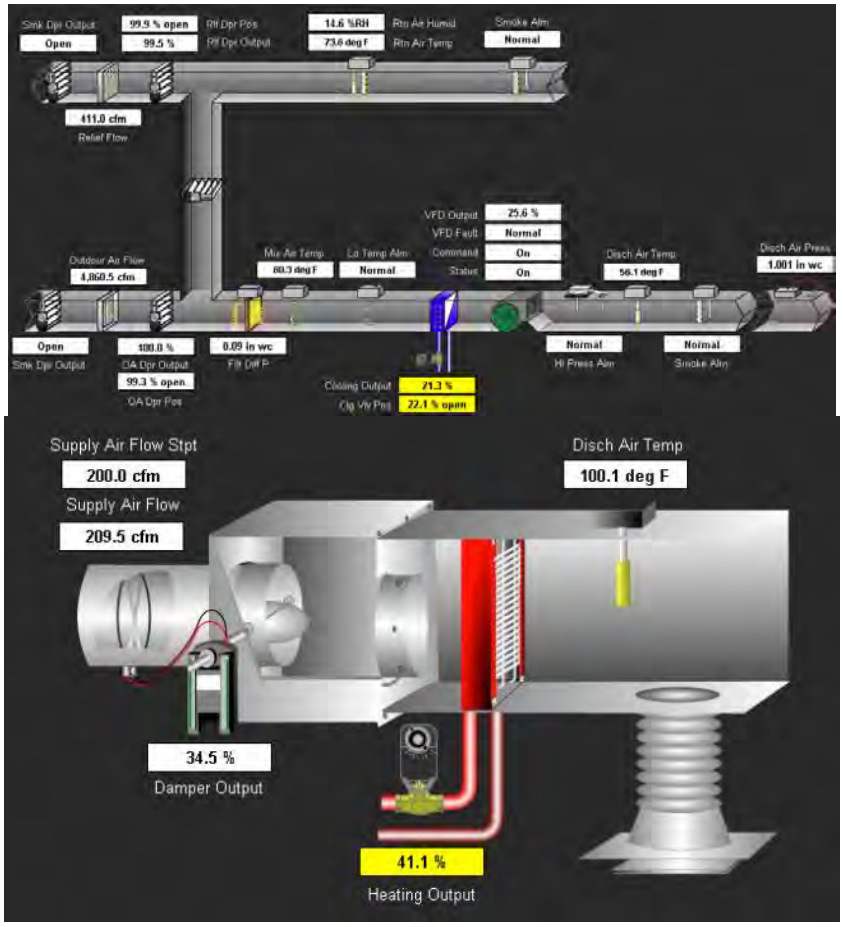
10. OA damper is only partially open and unit is using chilled water for cooling as shown below for AHU-1W of the East Wing. This is typical for the following units; East Wing: AHU-1w and AHU 3A. North Office Building: AHU-1 and AHU-2. Irvis Building: AHU-5. Ryan Building: AHU-1, AHU-4, AHU-5, and AHU-6. Judicial Building: AHU-3B, AHU-4B, AHU-5B, and AHU-8. Main Capitol: AHU-1, AHU-4, AHU-21, AHU-22, AHU-23, AHU-24, AHU-42, AHU-43, and AHU-45.



AHU-1w in the East Wing

11. In the following units mixed air is cooled in the AHU and then heated in the VAVs. Judicial Building: AHU-1B (reheat VAV PJC 1601), AHU-1D (reheat VAVs PJC 1000 and 1001), AHU-2A (reheat VAVs PJC

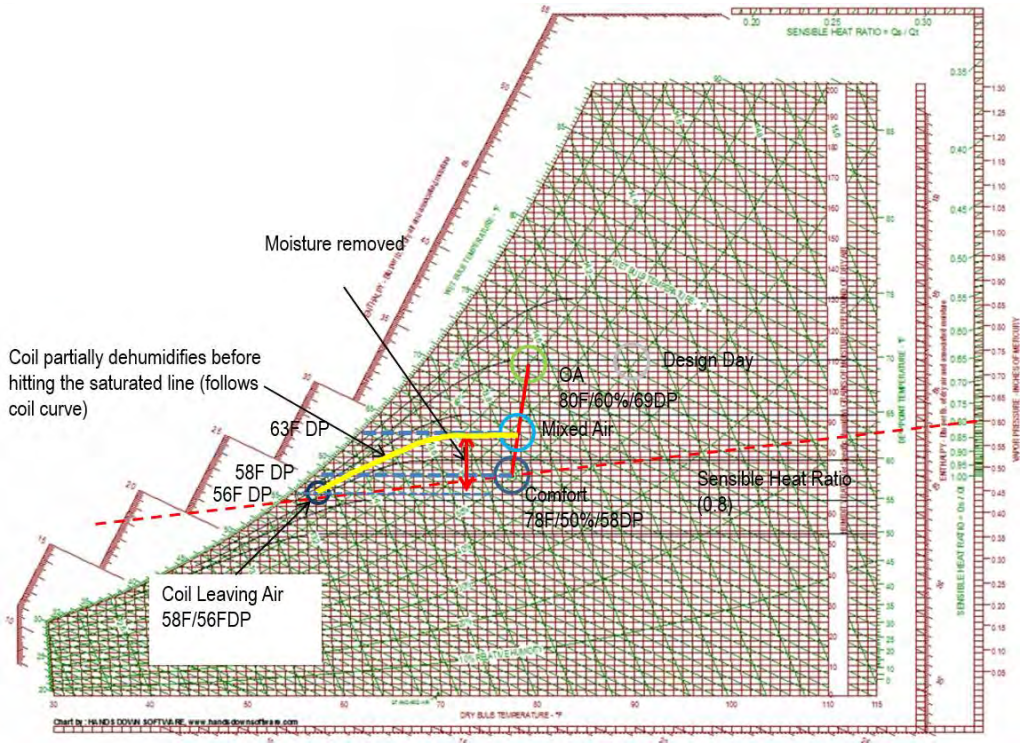
2200-A and 2103), AHU-2B (reheat VAVs PJC 2600 (2)), AHU-4A (reheat VAV PJC 4104), AHU-5A (reheat VAV PJC 5002), AHU-8 (reheat VAV PJC 8100-G and WR-8T), and AHU-9 (reheat VAV PJC 9111). The figure below shows AHU-1B and reheat VAV 1601.



AHU-1B and reheat VAV 1601 in the Judicial Building

Proposed Solution – Psychrometric Air Temperature Reset

The sequence of operation for a number of air handling systems maintains fixed discharge air temperature or a limited reset regardless of outside air temperature. When the outside air is dry enough, i.e. dew point less than 55 F, substantial energy savings opportunities exist at the air handling units. TEN proposes changes to minimize the hours during which the AHU discharge is cooled to 55 degrees (or below) by raising the setpoint whenever conditions outdoors are such that dehumidification is not needed. In this way the ECM will more fully utilize all available hours of economizer air.



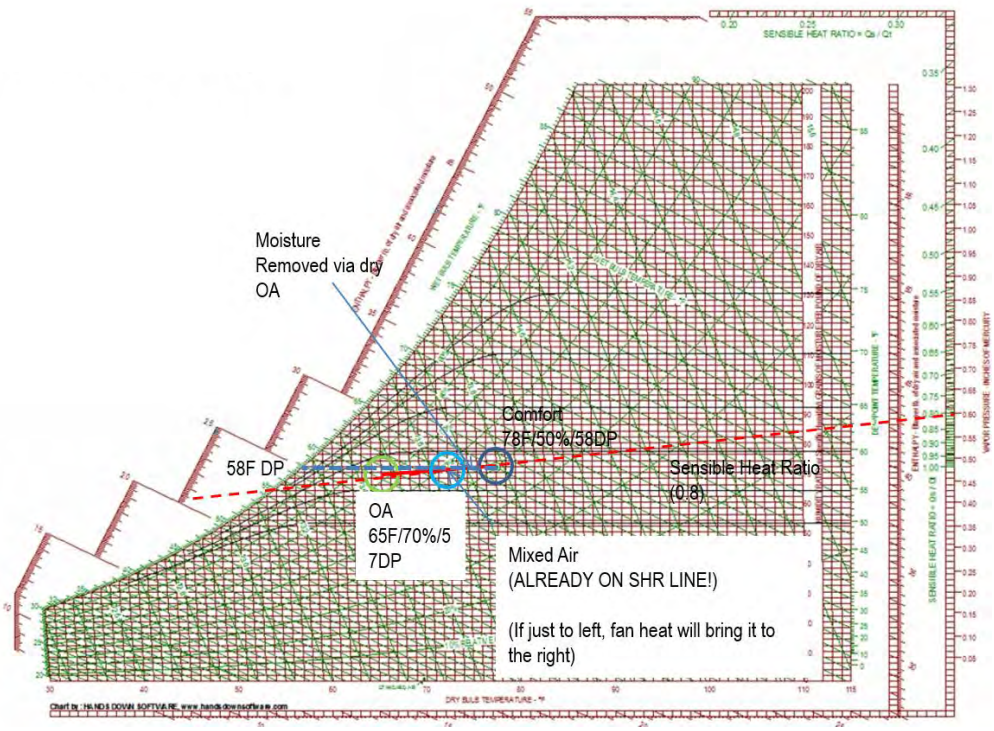
Cooling Coil Operation in Psychometric Chart for typical design day
(Illustrative Strategy – the numbers in the chart above do not reflect the final control strategy for the Capitol Complex)

Please refer to the preceding chart for this discussion.
Psychrometric optimization is an approach seeking to balance the moisture and sensible heat in the air stream to the desired parameters in the space. The key parameter for the space is the "sensible heat ratio". Design engineers often specify cooling coil leaving air temperature based on peak occupancy sensible heat ratios, which are often determined through non-empirical means. Where vintage sequencing neglects fan and motor inefficiencies - manifested as additional sensible heat in the air stream - draw-through air handling units sometimes drive the chilled water valve harder to offset the associated rise in temperature: when the temperature sensor is placed after the fan, maintaining the specified coil leaving air temperature will over-cool the airstream. With variable volume units this sometimes less an issue, but understanding the balance between fan energy, cooling energy and re-heat energy is key to optimizing the unit's operation.

The figure above shows a cooling coil operation in psychrometric chart for a typical design day operation. Hot and humid outside air is mixed with return air from space. This mixed air is then passed through a coil for cooling and dehumidification. This air is used to maintain space comfort.

The figure below shows a cooling coil operation in psychrometric chart for dry outside air operation. Cooling is only needed for sensible heat; dehumidification is not required. Typically, dehumidification is only required if outside air is more moist than 55 F dew point, otherwise outside air will absorb adequate moisture.

Our evaluation finds an overlap in coil operation for many units that leads to some degree of simultaneous heating and cooling. The cooling coil is also operating in hours when the OA already meets the supply air condition (below 55F DP), where the cooling coil can be kept closed. These slight control changes will provide energy savings. In addition to energy savings, these changes will prevent demand surges from the cooling coils, thereby extending equipment life.



Cooling Coil Operation in Psychrometric Chart for Dry Outside Air Operation
(Illustrative Strategy – the numbers in the chart above do not reflect the final control strategy for the Capitol Complex)

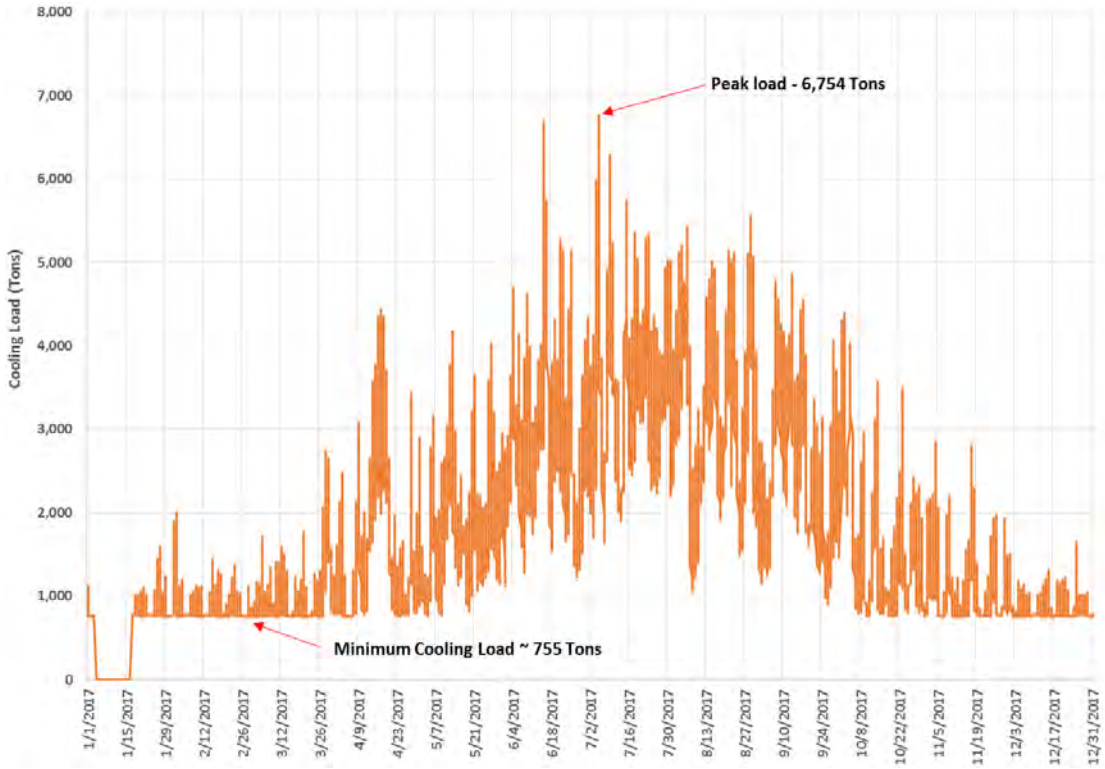
When the OA wb temperature is less than 55°F, mixed air wb temperatures vary. As OA temperatures drop, return air is increased, and perhaps heated, to achieve 55°F dry bulb. The adjustment to mixed air shall be undertaken separately above and below the 62°F temperature threshold. When the mixed air temperature (MAT) is above 62°F, the chilled water cooling coil will be used to achieve the setpoint. When MAT is 62°F or below, cooling will not be required for most units. When MAT is below 55°F, OA intake should be modulated to maintain 55F °MAT and the minimum ventilation requirement.

Three of the metrics we used to temper our field observations in evaluating a campus' chilled water consumption:

- Peak cooling load (Tons): indicates the instantaneous peak cooling power requirements of the campus.
  - **2017 Peak Load = 6,754 Tons**
- Annual cooling energy (Ton-Hrs): indicates the total annual cooling energy requirement.
  - **2017 Cooling Energy = 16,507,877 Ton-Hrs**
- Equivalent Full Load Hours (EFLH): indicates the ratio of the campus' Ton-Hrs to the peak Tons
  - **2017 EFLH= 2,444 Hrs**

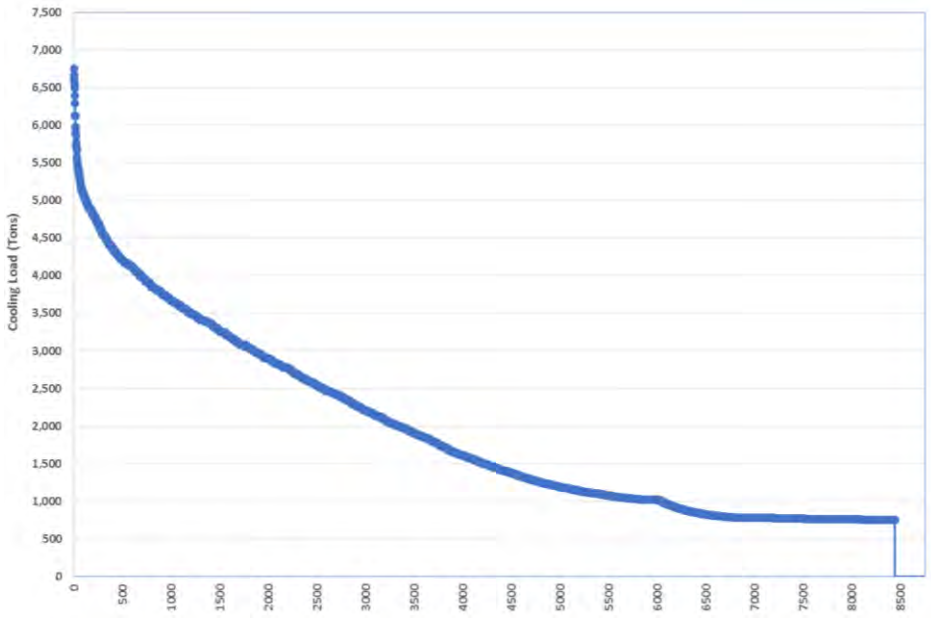
EFLH was used to design systems in 1970's. For a building complex like the State capitol, operating 12 hours a day, we believe the EFLH index should be 20% lower (based on our experience). The excess cooling ton-hrs raises a flag. This additional cooling is likely required to compensate for unnecessary heating due to leaky valves or incorrect programming of the AHU controls.

On the page to follow is an annual profile for the PA Capitol cooling system in 2017.



Annual profile for the PA Capitol cooling system in 2017

The Load Duration Curve (LDC) for the PA Capitol shown below plots the number of hours of the year that the load was above a particular tonnage.



Load Duration Curve (LDC)

From the load duration curve it can be seen that for approximately 6,500 hours out of the year the cooling load was above 750 Tons. In our experience, the shape if the LDC and the large EFLH of 2,444 Hours (considering 12 hours of daily building operation) are indicative of unnecessary simultaneous heating and cooling. Determination

of the specifics of unnecessary simultaneous heating and is undertaken through a methodical accounting of the winter and summer uses of steam / how water and chilled water for specific buildings.

This project implements and fully commissions a psychrometric-indexed reset to the discharge air control of various air handling units. For air handling units holding a fixed or minor reset, this ECM shall design, program, test, debug and document the new discharge air reset sequence.

Submaster control defined below combines the results of psychrometric analysis with the recognition that conventional, commercial ATC valves and control strategies are inefficient in regulating loop conditions at the coil. Rather than controlling to a setpoint in the middle of the deadband, submaster philosophy shifts the impact of hysteresis to the less costly side of the design point. The algorithm continues to shift the target temperature further into the optimum range on the basis of feedback from the system. Savings are realized both in terms of ton-hours and loop efficiency.

Submaster sequence is not applicable to systems having marginal capacity or which tend to be warmer than desired in summer. The targets for this upgrade are systems, and particularly control valves, having too much excess capacity under average summer conditions to track well. Submaster finitely tunes the discharge temperature where 55°F has been specified and automatically compensates for poor flow regulation and changes in ambient conditions.

Observations, trends and other data for warm weather has so far been limited. As noted earlier, submaster control is geared toward distribution loop efficiency – particularly imprecise throttling. Ton-hour savings will result where discharge temperatures historically pushed zones unnecessarily into the activation of reheat. Where PID loops are not sufficiently tuned and hunting or fighting are common, heating and cooling savings will be possible.

The psychrometric reset strategy will not be applicable to every unit – some variable volume units serving multiple space types or units which require a lower discharge air temperature may not be good candidates for this strategy. TEN will identify appropriate units during the detailed survey work in the coming months.

Sequence of Operations for Cooling Coil Control

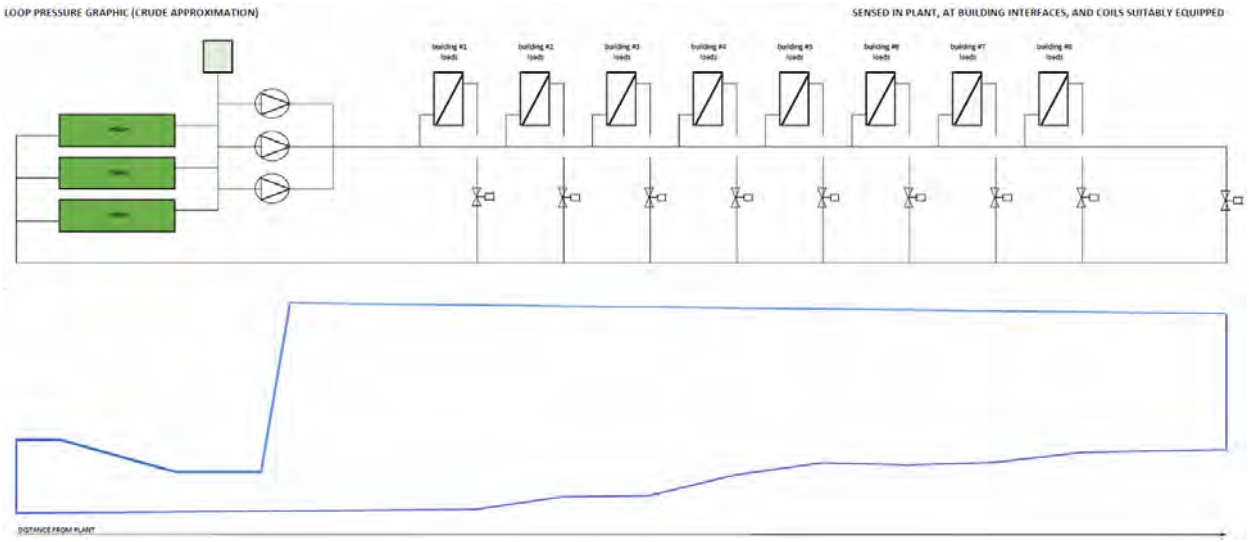
Typical AHU Cooling Coil Control

- If Dewpoint is > 55F
    - CHW Valve shall control to a Leaving air temperature of 55F.
- If Dewpoint is < 55F
    - CHW Valve shall reset the leaving air temperature based on the following in priority:
- Reheat Valve/Coil Temp Setpoint plus 1F.
- If no reheat: Space Temperature
- If not space temperature: Outside Air Temperature
- Reheat may only be used if all terminal boxes are visible on front end controller.
- Space temperature reset may only be used if no reheat and all space temperatures are available. CHW Valve shall control to maintain leaving air temperature set point which is reset to maintain Space Temperature.
- OAT Reset Value shall be interpolated between 70 and 55, linearly. May require some adjustment by operator. Latent heavy loaded interior spaces may require less reset. Values between 70 and 55F OAT, should be linearly interpolated to find the associated LAT setpoint.

Outside Air Temperature [F]	LAT Setpoint [F]
>70	55
70	55
55	62
<55	62

- TEN will initialize the sequence with range endpoints believed most practical, and will continue fine tuning the up‐front values as the work progresses and the characteristics of the best candidates become better defined. This will allow a higher degree of confidence to move toward greater reset where possible.
- Since the new sequences are deemed tools to best manage costly utility streams, we anticipate that DGS staff will invariably tweak problem areas just as they do now for conventional sequences, although we should be able to nail down a very close starting point in most cases. Operator adjustment downstream is believed to be a necessary ingredient for success in keeping with future changes in occupancy and patterns of use.
- Where Leaving water temperature is measured, the chilled water delta T should be monitored and trended. A comprehensive screen shall show all delta T's in buildings, versus building delta T. This will help the facilities identify coils that are fouling or have other mechanical deficiency. Monitoring and trending of chilled water delta T: existing BMS presently senses the temperature of CHW entering and leaving many AHU coils served by the Central CHW Loop and leaving water temperature sensors. Air handling units listed below presently sense the temperature of chilled water leaving the cooling coil:
- Ryan Annex: AHU-1 through AHU-8 excluding AHU-6
- Health & Welfare: AHU-1 through AHU-4
- Labor & Industry: AHU-8 through AHU-12
- Keystone: The majority, if not all chilled water AHUs
- East Wing: AHU-1 through AHU-15 excluding AHU-7

  Installing additional return water temperature sensors could be useful not only for measuring savings but for future diagnostics and resilient control as well. A complete listing of systems and their status with regard to cooling coil leaving water temperature sensors can be found in Appendix B. There are approximately 50 units that do not currently have sensors with design flow exceeding 7,500 CFM or outdoor air minimum flow exceeding 2,000 CFM – this is an arbitrary threshold meant to balance installation cost with the value of information gained – while 33 units fall under the threshold. The cost of adding these sensors will be fully born by the fund set aside for RCx measures, as they do not enable any additional savings by themselves. TEN will work with DGS during construction to weigh the value of installing the sensors against other potential RCx measures that are found.
- Where chilled water coil pressure drop is measured, the chilled water coil pressure drop should be monitored and trended. A comprehensive screen shall show all coil pressure drops in buildings, versus the building pressure drop. Additionally, building pump status and setpoints should be included on the screen. This will help evaluate central plant pressure setpoints, as well as mechanical deficiencies or fouling. The following graphic roughly outlines a diagnostic screen that would allow DGS to see, among other data points, flow and pressure conditions across the entire loop. TEN welcomes feedback on this design – which we expect will evolve during construction to meet the needs of the Capitol.



- The availability of water pressure sensors beyond the chilled water interfaces to the buildings is more limited. Again, TEN will work with DGS to weigh the value of installing these sensors against other potential measures. Pressure sensors may be more expensive than temperature sensors due to the plumbing/tapping required for installation.
- Sub Master Control: The LAT adjustment range described below shall be configured so as to be modifiable at the building level and at the AHU level. The range setting in one building shall not affect the range in any other building. The range adjustment sequence shall include (a) the range limit value, and (b) a remote/local toggle in each AHU graphic. When initially configured, all AHUs will reference the building (i.e., remote) LAT adjustment range. The toggle shall allow the operator to choose a different limit (i.e., local) specific to an individual AHU. Toggles may be switched between modes and back by TCT personnel as desired. Each subsequent change to the building level LAT adjustment range value will immediately update all AHU level LAT adjustment range values whose toggles are in the "remote" position at that time.
- Submaster control is provided for valves with poor Cv's and result in overflow and poor delta T. Delta T can be significantly improved with little/no impact.
- Sub Master Control: If CHW is at 100% for more than 10 minutes, increase the supply air temperature setpoint incrementally by 0.5F every 10 minutes until CHWV command signal has stayed below 95% for more than 5 minutes or the LAT setpoint has increased by a maximum total of 3F, operator adjustable.
- In the case of latent heavy loaded spaces than cannot maintain comfort with a plus 3F or fouling has caused the low delta T, the operator shall adjust the delta to a minimum total of 0F. In the case of fouling, DGS shall move the unit cooling coil toward the front of the list of coils to be cleaned under the Capital coil cleaning schedule.
- The project assumes the same standard of routine care as now exercised by DGS throughout the complex. A coil which becomes heavily fouled subsequent to the controls upgrade should be moved to the front of the maintenance list for cleaning. A fouled coil reduces cooling ton-hour consumption, and thereby reduces electric usage for chiller cold generation, condenser flow and tower heat rejection. Steam for reheat and reheat water circulation electricity expenses may also be reduced.
- Conversely, a fouled coil can also increase fan power consumption, CHW loop circulation energy and chiller inefficiency. But these latter changes are not likely to overcome the savings in expenses due to the drop in total cooling and reheat. The most important aspect of a fouled coil is the detriment to comfort, which should be the foremost concern. The degradation in plant efficiency is to be avoided,

since the cumulative effect of fouling across campus is low delta-T syndrome and high flow rates. Fouled coils quite often spur enough complaints for operators to adopt loop and chiller setpoints which can be both costly and permanent, and inevitably shorten machine life.

Further Discussion – maintaining space temperature setpoint and calculation of savings

For both the psychrometric optimization and the submaster control sequence, the ECM begins with the notion of reducing unnecessary energy use. Both subroutines adapt the control methodology to better tailor energy input to real‐time load. Sequencing under peak or design conditions is not expected to change. The ECM does not attempt to undercut the space setpoint. In a manner similar to that of replacing vortex dampers with VFDs, this optimization derives savings from more efficient turndown at part load.

- Enthalpy Savings of 4 Btu/lbm dry air – A SAT of 55°F DB & 54.5°F WB was assumed. So long as dew point temperature is 55°F or lower, most units can reset the SAT up to 62°F DB.
- Reheat Savings of 7°F – TEN assumes reheat reset from 55°F DB to 62°F DB. For spaces anticipated, this strategy seeks to reduce unnecessary cooling when dehumidification is not needed - typically shoulder months, not during peak summer conditions. This has the added benefit of eliminating reheat to bring supply air back up to required temperatures. TEN's audit of each AHU should identify where this strategy is appropriate, as well as which units are not candidates for the upgrade (e.g., spaces that require lower supply air temperature).
- Number of Hours – TEN evaluated TMY incidence for the optimization program. Hours during which savings are possible reflect TMY3 weather data below 55°F dew point during occupied periods (6:00 AM to 6:00 PM, 5 or 7 days per week depending on building), and above 55°F dry bulb temperature when air side economizers are not fully activated. This reduces the hours to 777 in buildings with weekend operation and 563 in buildings without weekend operation.
- Min CFM in the estimates refers to outdoor air ventilation minimum in cubic feet per minute.
- Psychrometric optimization is not expected to yield steam savings when deployed to units having no reheat. The calculations in the appendix account for the absence of reheat and list no savings for those particular units.

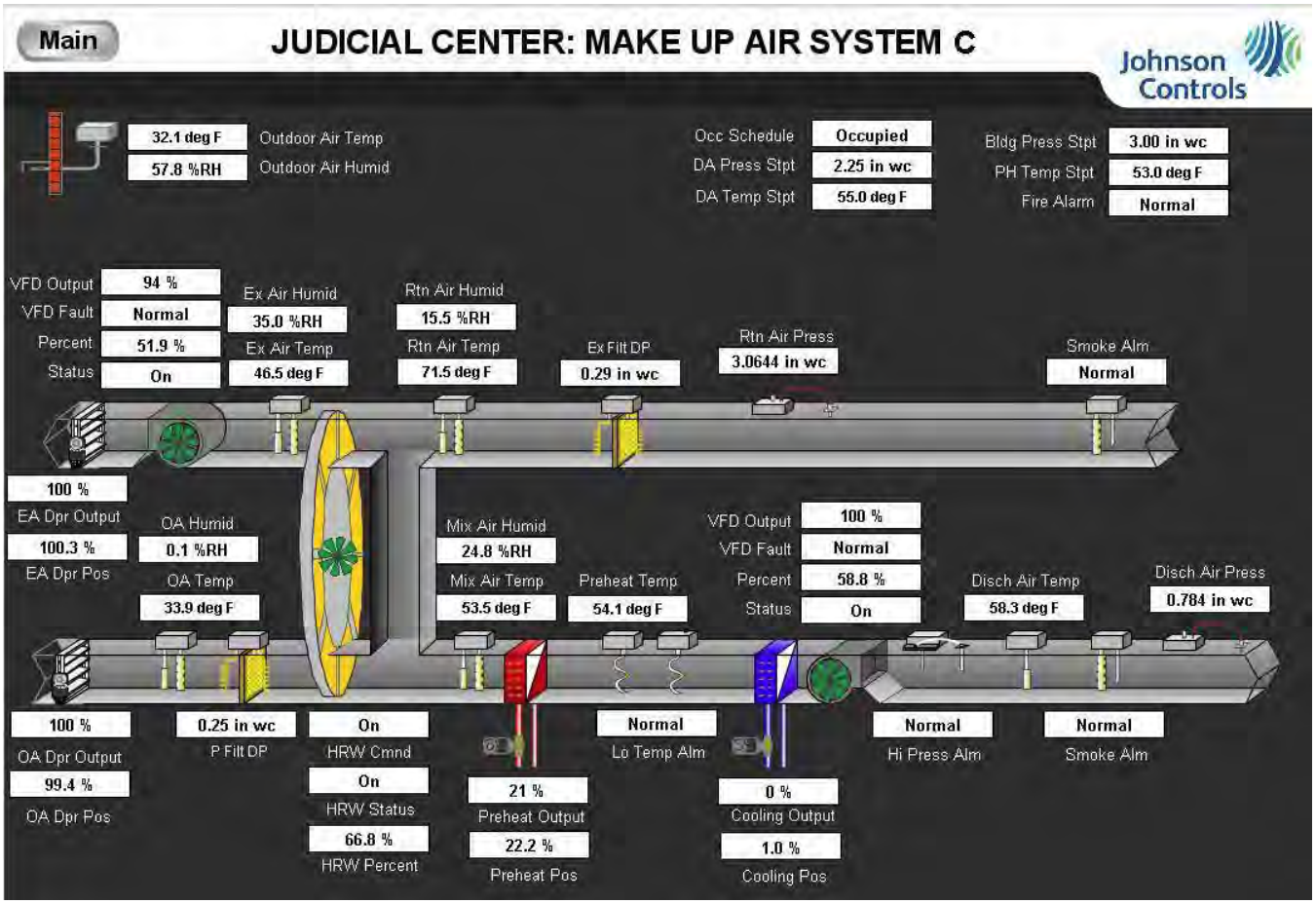
If a particular space requires lower supply air temperature due to high sensible loads, then we will limit our strategy in those spaces at those times. Additional sensors may be needed when driven by a particular space or two having non-coincident load patterns. Where the cost of additional sensors for these spaces would be not be cost effective, TEN will limit or exclude the implementation. Execution of the strategy will be limited to those units we believe to be worthwhile candidates, and the extent of the reset adjusted to the level we believe practical. As with current sequencing, endpoints for reset ranges will remain adjustable by DGS personnel. ***The psychrometric reset will not be universal to all AHUs – TEN will refine the strategy for each unit after conducting the more detailed survey during the upcoming cooling season.***

Traditional RCx Upgrades

Analysis of systems and controls finds the Capitol Complex systems and controls to be in generally good condition and operated with common sense and practicality. Unusual conditions which exist as a derivative of anomalous design or vintage upgrades have, in some cases, imposed limitations on the extent to which optimization has been practical in the past. Coupled with day-to-day manpower demands and inadequate equipment life budgeting common to most operations of this magnitude, it is unsurprising that numerous opportunities for reducing waste or improving utilization have been identified.

For example, Judicial building primary ventilation systems MUA-B and MUA-C transfer heat (and moisture) between the exhaust and the fresh air minimum. These same make-up air units temper the primary ventilation supply to numerous downstream air handling units, which in turn condition the mixture of primary and return air to the needs of associated zones. Apart from the heat recovery aspect, the use of primary air systems to temper the fresh air minimum is not unlike the design now operating in the Keystone building. Keystone's control system polls the valves of the downstream AHUs to tune the primary air discharge setpoint.

Ideally, the Judicial make up air units will maximize heat recovery benefits while avoiding any unnecessary cooling/heating which must be subsequently negated downstream. Thus, the sequencing of coils in the primary and zone AHUs should always be additive and never in opposition. As can be seen in the next figure and in the appended BMS graphics, the open heating coil control valve to the MUA opposes the cooling requirement of the downstream AHUs.



No benefit is derived from the elevation in discharge temperature by the heating coil shown here if the same can be accomplished downstream as needed. In general, it would be best that the MUA adds no utility-based heat to the primary air so long as downstream units have sufficient capacity to satisfy respective zones.

To the extent that the system remains within practical operating parameters, sequencing will be modified to preclude MUA control valves from operating in opposition to downstream AHU valves.

In general, our audit finds:

- Temperature sensing in many instances is suspect.
- Residual coil effect evident on many units heated by steam.
- CO2 inputs do not appear to be in use by ventilation sequences.
- Some fan VFDs may have been set to 100% for circulation purposes.
- Deterioration of steam control valves appears to be a recurring problem.
- Outdoor air temperature readings are sometimes inconsistent.

A sampling of screen grabs from the Metasys and webCTRL BMS systems is appended to this report. The sample provided represents a substantial subset of the savings potential from routine RCx improvements:

1. Eroded steam valve control surfaces.

   Existing Conditions
   Even in low pressure steam systems, control surfaces may erode quickly at high velocities. Though intended for steam service, seats in valves oversized for their applications or otherwise forced to throttle excessively may be wire-drawn beyond the bounds of usefulness long before anticipated lifespan.

   Proposed Solution
   This ECM identifies valves rendered inadequate for precise throttling by seat erosion. The scope will repair, rebuild or replace the failing valve as practical. Capacity reduction may be considered for valves slated for replacement.

   A number of steam control valves appear to be passing steam to preheat or heating coils at times when the BMS is not driving the valve closed. AHU steam control valves which are suspected of passing unwanted steam will be evaluated for repair or replacement. In those instances in which steam is passing a closed valve and heating the fresh air or mixed air beyond setpoint, savings will result from positive shutoff when closed and the ability to more closely modulate flow at low demands than is present with the present damaged seats.

2. Air-side economizer inactive or not sufficiently engaged.

   Existing Conditions
   The damaging potential of frigid air carries an inherent incentive for blanketing damper- and coil-controls in safety factor. Economizer sequencing in older control systems often undergoes repeated field modification and from-the-hip adjustment to minimize risk and sidestep expensive surprises. Sensor drift and related calibration issues help drive the debate when weighing optimum efficiency against avoided downside.

   Proposed Solution
   This ECM restores air-side economizer where presently impaired by sensor issues or temporary "fixes" permanently residing in the system setpoints and sequencing. The ECM will also generate a scope of sensors needing calibration or replacement.

3. Excessive pre-heat setpoints.

Existing Conditions
Frigid air inspires caution with regard to control settings. Such is the case with preheat settings in a greater sense than the economizer. The conventional low pressure steam heating system delivers 50 times the energy of an equal mass of heating water. The difficulty of turning down steam flow with precision by way of a comparatively large valve in part underlies the face-and-bypass concept.

Proposed Solution
This ECM modifies control of preheat coil control valves, along with that of face & bypass preheat arrangements. The ECM will also generate a scope of sensors needing calibration or replacement.

4. Overlap or insufficient dead-band between setpoints of opposing coils.

Existing Conditions
Our evaluation finds numerous occasions in which air is first heated then subsequently cooled due to conflict in setpoints. Simultaneous heating and cooling is costly and should be avoided unless absolutely necessary (i.e., where active de-humidification is indispensable).

Proposed Solution
This ECM reviews and revises setpoints for each unit currently engaged in simultaneous heating and cooling.

5. Index rates for some coil control valves appear to be unduly quick and should be slowed.

Existing Conditions
Proportional+Integral+Derivative control offers slow response rates in the margin to either side of setpoint but much faster response when needed. Slow response is desired for routine daily load progression and occupant migration. Fast response should be reserved for the deviation seen in meeting rooms and on morning start, or often results in overshoot.

Proposed Solution
This ECM tunes response times to minimize overshoot for a wider dead-band effect. The work shall proceed hand-in-hand with a review of steam pressure- and heating water supply- resets.

6. Above freezing, economizer sequencing on face & bypass preheats may cause unnecessarily high mixed air temperatures and erode valve seats.

Existing Conditions
When mild ambient outside conditions coincide with high internal heat gain rates, economizers at Finance are impaired by a number of conditions, including face dampers fully open to preheat coils with leaking valves and/or residual heat.

Proposed Solution
The existence of freeze protection circulators and coil bypasses together represent a great deal of latitude in optimization. The imposition of OA reset schedules on the preheat become possible. And with the circulator in operation, bypass face dampers may be held closed to improve economizer.

7. Insufficient or uncoordinated control of return air stream impairs economizer effectiveness.

Existing Conditions
As noted earlier, Finance building AHUs do not regulate return air volumes directly. Missing or damaged return air dampers limit the effectiveness of the air-side economizer. In situations such those found in upper Finance fan rooms, insufficient economizer places unnecessary load upon the chilled water plant throughout the heating season.

Proposed Solution
This ECM evaluates options for BMS governance of return air flow rates. The retro-commissioning scope evaluates return dampers for several units on which dampers are altogether lacking. Control of the new dampers will be motorized and actuated electronically through the existing BMS.

8. Maintenance of excessive winter setpoints is extremely expensive.

Existing Conditions
The conditioning of ventilation air is among the most expensive tasks routinely executed by the HVAC system. At current utility rates, humidification is also extremely expensive. Depending on the source, humidification also carries a heating and/or cooling impact.

Proposed Solution
This ECM seeks to restore uniform limits to the maintenance of temperature and humidity in office environments. Accuracy, particularly in the case of capillary elements and humidity sensors will be considered for re-calibration and/or replacement. Demand control ventilation, existing DCV strategy sensors, and the deployment of additional sensors in opportune instances will also be evaluated.

Measurement and Verification
As described in the subsequent discussion of Measurement and Verification, savings for this ECM will be verified by option D (calibrated simulation models). TEN will use trends and screenshots captured from the BAS system to calibrate the model. Parameters such as valve position, damper position, supply and return temperatures, and fan speed will be used to calibrate the model. Temperature bins will be used to group hours by similar operating conditions. Where data acquisition is interrupted or not possible, engineering estimates informed by historical usage or nearby similar units will be used.

As waste heat is reduced, cooling load will also be reduced, with associated savings in cooling tower make-up water, cooling tower blow-down, and chemical treatment. Make-up water, sewer, and chemical treatment savings will be calculated as part of the Option D verification discussed above based on the cooling savings achieved. Water savings for this ECM were estimated by taking the ratio of water to kWh savings in ECM 2B, and applying this ratio to the estimated cooling kWh savings in this ECM. Sewer kGal savings are estimated at one-sixth of water savings. Chemical treatment savings are estimated at $7/kGal of make-up water savings. The combination of these three savings estimates is $4,313 per year.

Commissioning Plan
Commissioning will be completed by The Efficiency Network, working with equipment vendors and subcontractors and in coordination with and the cooperation of DGS.

Operations and Maintenance Procedures
New HVAC end devices installed as new equipment will be sequenced by the BMS. Changes to BMS sequencing and new BMS equipment shall be submitted both in hardcopy and electronically in the final documentation. Training for new equipment and modified sequencing shall be provided to DGS staff and management.

The retro commissioning scope reduces motor operations, waste heat production, steam load and chilled water plant cooling and pumping loads. Reduced pump run time should extend motor life.

TEN's project economics attribute no O&M savings to this ECM other than the reduction in chemical treatment expense for makeup to the cooling tower.

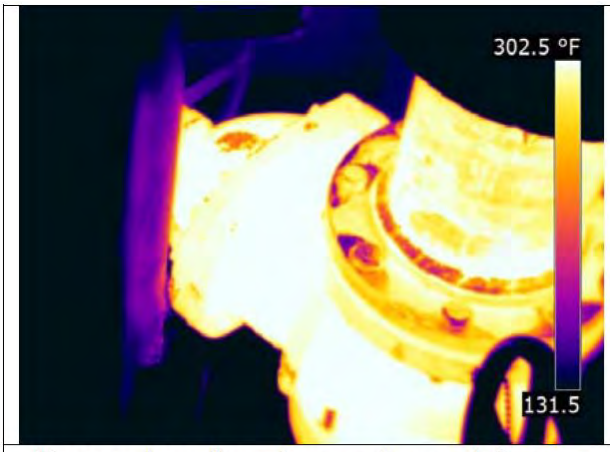
ECM 4A.2 – Steam/Chilled Water Piping Insulation

Existing Conditions

Much of the steam and chilled water distribution piping found in building mechanical rooms, tunnels, and the central plant was insulated when originally installed many decades ago. Most of that insulation is in good condition, but surveys found a number of areas with missing or degraded insulation – a thermal camera found surface temperatures as high as 300˚F on some uninsulated steam pipe. Not only does this waste heat energy, but it causes the chilled water system to consume more energy as those pipes are in the same tunnels.

Proposed Solution – Missing or Damaged Insulation

A survey of steam and chilled water piping and fittings found opportunities to reduce unwanted heat transfer from the heating and cooling distributions through added insulation. The improvements will also reduce excessive variation from safe working limits in close proximity to those systems. Appendix B provides more detail on the quantities/lengths and location of insulation to be installed.



Energy loss from bare valve and flanges

Un-insulated valve and flanges

Measurement and Verification

As described in the subsequent discussion of Measurement and Verification, savings for this ECM will be verified under Options D and A. Calibrated simulations will be performed to calculate total heat loss savings, using data from the surveys that have identified surface temperatures, lengths of uninsulated or poorly insulation pipes and fittings, pipe diameters, and ambient air conditions. Heat transfer coefficients for the new insulation will be obtained from specification sheets. Assumptions will be made regarding mass flow rates where actual flow rates are not available. M&V in subsequent years will verify that the insulation is still in place and that savings are still being realized. TEN's project economics attribute no O&M savings to this ECM.

As waste heat is reduced, cooling load will also be reduced, with associated savings in cooling tower make-up water, cooling tower blow-down, and chemical treatment. Make-up water, sewer, and chemical treatment savings will be calculated as part of the Option D verification discussed above based on the cooling savings achieved. Water savings for this ECM were estimated by taking the ratio of water to kWh savings in ECM 2B, and applying this ratio to the estimated cooling kWh savings in this ECM. Sewer kGal savings are estimated at one-sixth of water savings. Chemical treatment savings are estimated at $7/kGal of make-up water savings. The combination of these three savings estimates is $2,359 per year.

Commissioning Plan

Commissioning will be completed by The Efficiency Network, working with equipment vendors and subcontractors and in coordination with and the cooperation of DGS.

Operations and Maintenance Procedures

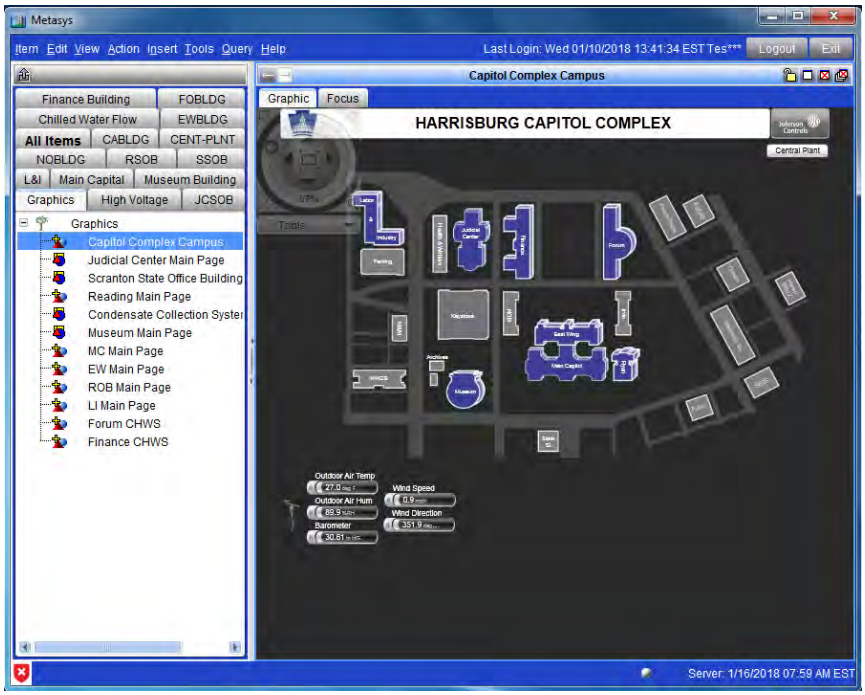
No additional O&M will be required for this ECM.

ECM 4B – Metasys BMS Upgrade (Chilled Water Plant)

Existing Conditions

The central plant has various vintages of Metasys devices. Some may need to be replaced if no longer supported. The various vintages require different connectivity, making the system difficult to maintain.

A controls upgrade will improve the speed and reliability of communications and control and will enable the control system to have improved versatility as well.



Metasys Screenshot

Proposed Solution

Upgrading the control system for the plant provides state of the art algorithms to monitor, alarm, sequence and optimize plant operations. This scope does not include replacement of failed end devices.

This ECM will furnish and install an upgrade of existing Metasys network controllers to accommodate the new sequencing for the plant, including:

1. Provide programming and logic verification for the following:
    a. Define all hardware objects, software objects, control objects, trends, totalizations, and schedules that were existing in the NCM.
    b. Convert GPL/JCBasic to LCT/SCT.
    c. Define user view to mimic the PMI Network Map.
2. Perform the following conversions on NCM-7 and NCM-20 and NCM-29. Arrange the point list to provide chiller operation through (1) main controller to avoid disruption of the entire plant when doing maintenance on a single controller.
    a. Chiller 1 NCE.

b. Chiller 2 NCE.
c. Chiller 3 NCE.
d. Chiller 4 NCE.
e. Chilled Water System NCE.
f. Condenser Water System NCE.
g. Cooling Tower NCE.
h. Bearing Cooling System NCE.
i. Three (3) Additional DX replacements with NCE controllers.

3. Demo and remove panels no longer in use; pull wiring out of panel, terminate, and tag junction box as out of use.
4. Source BACnet MSTP from the main control panel to each chiller for BACnet integration.
5. Validate system points.
6. Provide revised and new engineered control drawings.
7. Review engineering and programming sequence with Controls Supervisor prior to implementation.
8. Provide training of new system, including overview of engineered drawings and programming.

This proposal assumes the State will furnish and install Ethernet (CAT5) cable/network and IP address for any NCE where not presently existing. The system has 11 NCE panels. Eleven (11) IP addresses are required. Remaining Controllers to be FEC's and IOM's. We assume any necessary switches, routers, etc. required for the network will be furnished and installed by the State. If desired by the State, TEN can provide an adder to furnish and install CAT5 as required.

Controls will be upgraded sequentially as equipment is demolished or installed so that there are little to no disruptions. For example, components related to the new chillers will be installed and activated as those chillers are commissioned. Then, after those chillers are providing beneficial service, controls equipment related to the existing 2,500-ton York YK machines can be upgraded.

Measurement and Verification

No savings are claimed for this ECM, and therefore no M&V efforts will be required.

Commissioning Plan

Commissioning will be completed by The Efficiency Network, working with equipment vendors and subcontractors JCI, Optimum Energy and in coordination with and the cooperation of DGS.

Operations and Maintenance Procedures

This ECM should enhance the routine operation of the plant and reduce the diagnostic effort associated with older control systems which have been adapted and changed over time.

Training will be provided by Shawn Deegan and Adam Trosko in tandem with representatives from Johnson Controls and Optimum Energy, and will address interface procedures, general interrogation, temporary and permanent adjustments, and so forth. Training will also cover system components that differ from the

configurations now in place throughout the complex. Warranty procedures will also be addressed. TEN will deliver to DGS comprehensive operations and maintenance manuals including an electronic video of the training provided.

ECM 4C – L&I Chilled Water Capacity Shortfall – Satellite Chiller (not in base project)

The Labor & Industry building experiences high internal humidity and cannot maintain interior air-conditioning setpoints on warm and hot days. Symptoms generally begin to appear as the temperature outdoors rises above 76°F-77°F. As a rule, HVAC equipment schedules are overridden hot weather, running around the clock to remove as much of the excess heat and humidity from the building as possible.

TEN evaluated the CHW systems which serve the Labor and Industry building. Our analysis indicates several causes for the inability of the existing chilled water configuration to satisfy latent and sensible loads during very warm summer weather. For a more detailed discussion of the following issues, please see Appendix C.

1) Labor & Industry air handling unit (AHU) coils are designed for 41°F EWT, while the central CHWS leaving the plant is generally maintained at 42°F. The rise in temperature between the plant and L&I is reported to be on the order of 2°F in warm weather. The PFHX has a design approach of 2°F – but a flow limitation well below the estimated peak load. As a consequence, the CHW temperature entering the penthouse AHU coils in warm weather is never lower than 45°F, or 4°F above design, and may rise into a range of 46°F-49°F in hot weather.

2) The Plate Frame Heat Exchanger (PFHX) serving the high-rise systems has a capacity of 625 tons. Design loads fed by the PFHX are 312 tons in the Weathermaster loops and 758 tons in the AHU coils; totaling 1070 tons of heat rejection, translating to a shortfall of 445 tons. Tabulations from available documentation are reproduced below.

HI-RISE air handling units - Designed for CHWS @ 41F													now served by PFHX @ 46-48F CHWS
			cooling coil entering air (F)			cooling coil leaving air (F)			chilled water		water temp (F)		hi-rise	total
		cfm	DB	WB	h	DB	WB	h	gpm	dP psi	EWT	LWT	tons	tons
AHU-2	North Primary	34500	95.0	75.0	38.7	50.6	50.0	20.5	465	[hot side]	41	53.2	237	237
AHU-3	South Primary	32500	95.0	75.0	38.7	50.6	50.0	20.5	435	[hot side]	41	53.3	223	223
AHU-4A	North Interior	27000	81.5	67.1	31.8	58.1	56.8	24.5	90	[hot side]	41	60.9	75	75
AHU-4B	North Interior	27000	81.5	67.1	31.8	58.1	56.8	24.5	90	[hot side]	41	60.9	75	75
AHU-5A	South Interior	27000	81.5	67.1	31.8	58.1	56.8	24.5	90	[hot side]	41	60.9	75	75
AHU-5B	South Interior	27000	81.5	67.1	31.8	58.1	56.8	24.5	90	[hot side]	41	60.9	75	75
									1260				758	758

LO-RISE air handling units - Designed for CHWS @ 41F													Cooling from Central CHW Loop
			cooling coil entering air (F)			cooling coil leaving air (F)			chilled water		water temp (F)		hi-rise	total
		cfm	DB	WB	h	DB	WB	h	gpm	dP psi	EWT	LWT	tons	tons
AHU-8	EW Interior	32000	83.0	68.7	33.2	59.0	57.8	25.1	104	1.2	41	63.2	0	96
AHU-9	EW Primary	5800	95.0	75.0	38.7	50.0	49.8	20.4	90	1.6	41	51.7	0	40
AHU-10	WW Primary	6100	95.0	75.0	38.7	50.0	49.8	20.4	130	3.3	41	48.8	0	42
AHU-11	WW Interior	14060	83.0	68.3	32.8	59.1	57.5	24.9	52	2.0	41	60.2	0	42
AHU-12	WW Interior	13940	88.0	71.2	35.3	50.2	49.5	20.2	218	1.8	41	49.7	0	79
									594				0	299

Weathermaster Induction - Designed for CHWS @ 50F							LO-Rise served by Central CHW Loop; HI-Rise served by PFHX @ 46-48F CHWS								
	HI-RISE induction				LO-RISE induction								subtotal induction		
	North Face		South Face		West Wing South		West Wing North		East Wing South		East Wing North		CHW tons		
	Btu ea	qty	Btu ea	qty	Btu ea	qty	Btu ea	qty	Btu ea	qty	Btu ea	qty	lo-rise	hi-rise	total
bsmt	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0
fl. 1	4400	16	0	0	4100	12	4100	8	5245	7	4570	8	12.9	5.9	18.8
fl. 2	4400	22	0	0	4950	14	4950	14	5245	7	4570	8	17.7	8.1	25.7
fl. 3	4400	22	4950	24	0	0	0	0	5245	7	4570	8	6.1	18.0	24.1
fl. 4	4400	22	4950	24	4738	8	4738	14	5600	7	4040	8	14.6	18.0	32.6
					3618	6							1.8	0.0	1.8
fl. 5	4400	26	4950	26	---	---	---	---	---	---	---	---	---	20.3	20.3
fl. 6	4400	26	4950	26	---	---	---	---	---	---	---	---	---	20.3	20.3
fl. 7	4400	26	4950	26	---	---	---	---	---	---	---	---	---	20.3	20.3
fl. 8	4400	26	4950	26	---	---	---	---	---	---	---	---	---	20.3	20.3
fl. 9	4400	26	4950	26	---	---	---	---	---	---	---	---	---	20.3	20.3
fl. 10	4400	26	4950	26	---	---	---	---	---	---	---	---	---	20.3	20.3
fl. 11	4400	26	4950	26	---	---	---	---	---	---	---	---	---	20.3	20.3
fl. 12	4400	26	4950	26	---	---	---	---	---	---	---	---	---	20.3	20.3
fl. 13	4400	26	4950	26	---	---	---	---	---	---	---	---	---	20.3	20.3
fl. 14	4400	26	4950	26	---	---	---	---	---	---	---	---	---	20.3	20.3
fl. 15	4400	26	4950	26	---	---	---	---	---	---	---	---	---	20.3	20.3
fl. 16	4400	26	4950	26	---	---	---	---	---	---	---	---	---	20.3	20.3
fl. 17	4400	24	4950	24	---	---	---	---	---	---	---	---	---	18.7	18.7
fl. 18	0	0	0	0	---	---	---	---	---	---	---	---	---	0.0	0.0
													53.2	311.7	364.8

Basement air handling units - Designed for CHWS @ 41F								Cooling from Central CHW Loop
		cooling coil entering air (F)		cooling coil leaving air (F)	chilled water		water temp (F)		hi-rise	total
	cfm	DB		DB	gpm	dP psi	EWT	LWT	tons	tons
~~compressor room~~	~~10750~~	~~90~~	none evident	~~57~~	~~60~~	~~12~~	~~41~~	~~41.0~~		~~0~~
transformer room	2400	80		56	30	3	41	45.1	0	5
					30				0	5

Hi-Rise PFHX - CHWS @ 41F								
cold side				hot side			PFHX @ 41F	
flow	water temp (F)		CHW dP	flow	water temp (F)		approach	design
gpm	EWT	LWT	psi	gpm	EWT	LWT	deg.F	tons
1500	41	51	9.99	1500	53	43	2.0	625
NOTE: compressor room AHU apparently removed. Transformer room AHU served by Central CHW Loop.								

estimated CHW design tons - L&I summary					
	@ 41F	@ 50F	LO-Rise Loop	HI-Rise PFHX	building totals
air handling units	1057	0	299	758	1057
weathermasters	0	365	53	312	365
compressor room	0	0	0	0	0
transformer vault	5	0	5	0	5
L&I total	1062	365	357	1070	1427

3) This branch of the Central Plant CHW loop transitions from 12” to 10” exiting Finance and continues at 10” in service to the Judicial Center and Labor & Industry building. The 10” loop might accommodate a maximum flow in the range of 1,100 to 3,000 gpm, depending upon loop specifics and the authority consulted.

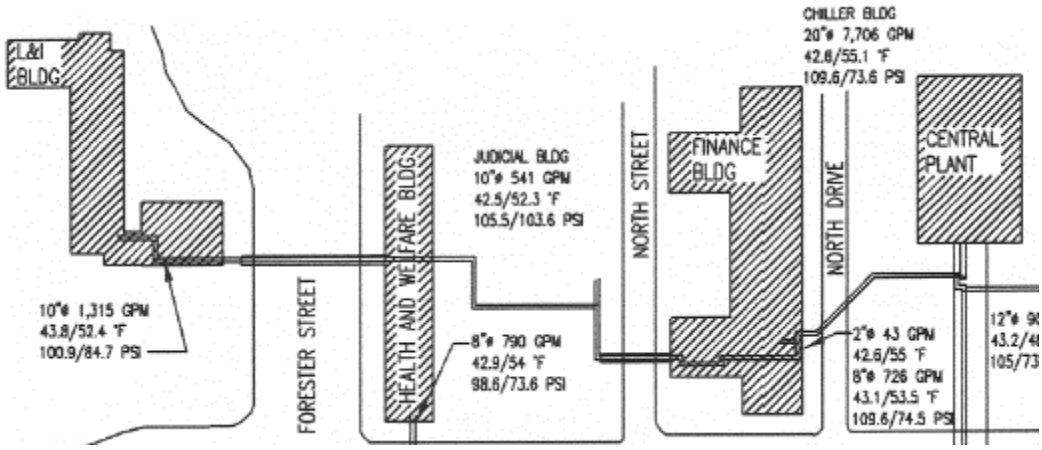
Cooling design to the Judicial Center is 2700 gpm at 42°F entering / 52°F leaving. Relying completely upon the 625 ton L&I PFHX for the high-rise (1500 PFHX gpm at 41°F / 51°F) the additional flow required by East and West Wing air handling alone raises the minimum flow to L&I to just under 1900 gpm at 41°F / 55°F.

Thus the 10” Judicial-L&I branch of the capitol complex CHW system is attempting to support flows estimated at 4600 gpm or more. Even at maximum velocity and pressure drop, a flow rate of 3000 gpm in this loop falls short of required capacity by 1600 gpm. Accounting for 365 tons of heat rejection from the Weathermasters translates to an additional 600 gpm to 900 gpm shortfall, **representing loop flow requirements of 5200 gpm to 5500 gpm** in the 10” loop.

Proposed Solution

In light of the shortfall in delivery temperatures, loop capacity and transfer capacity, TEN proposes the installation of a new chiller in the existing basement chiller room to boost the rate at which heat may be transferred from the building to the central plant under design and near-design conditions. At this time we propose the installation of a new chiller on the order of 500 tons to reduce the supply temperature in the L&I penthouse riser to 41°F from the present range of 45°F - 48°F.

The WM Group schematic below illustrates the routing and size of the loop distribution between Finance and the Labor & Industry building.



TEN proposes to replace one of the two chillers in the abandoned Labor & Industry chilled water plant. This ECM seeks to eliminate the cooling shortfall in a manner that could dovetail with long term plans to eventually operate a complete plant in L&I. The scope has been developed so as to minimize up-front capitol and downstream sunk costs.

- Demolish one abandoned Carrier chiller.
- The other abandoned Carrier chiller will remain as-is.
- Furnish and install one new water-cooled chiller of approximately 500 tons. The new chiller is intended to drive the temperature of the CHW supply leaving the PFHX hot side from the current range of 45°F-48°F downward to the 41°F design required by the HI-RISE air handling systems prior to exiting the basement.
- Pipe the new chiller's condenser cooling circuit to reject heat to the capitol complex central CHW return.
- Furnish and install a new condenser cooling pump with VFD to modulate flow in accord with the heat rejection requirements of the condenser and the temperature available from the central return loop.
- Pipe the chilled water from the hi-rise circuit to the new evaporator.
- Include motorized diverting valves under Optimizer plant control.
- Automate the operation of the system via Optimizer overlaying a new digital plant controller.
- Interface the existing BMS to the new Optimizer with signals for a call for additional cooling and to adjust the effective supply water reset.

This satellite chiller option may alternately be designed for, or made modifiable to be part of, a future stand-alone CWP at a higher first cost. The modifications would be to increase the chiller motor size, add chiller variable speed drive, modify the heat rejection and electrical support infrastructure, pumps, etc.

A sub-option would be to design the chiller now for future standalone CWP concept, with larger motor, VFD, and CWP designed for the future conditions, then operate it all at off-design conditions – 65F ECWT or better – indefinitely until the future standalone CWP is realized.

Measurement and Verification

The kW/ton for this chiller will be very low. But there will still be an increase energy use as the chiller will increase the overall number of ton-hours delivered to the building. Moreover, the additional cooling will be provided at lower temperature than currently available from the hot side. And there will be increases in both chilled and condenser water pumping loads. However, among the solutions which can eliminate the shortfall, this option has the least up-front cost and smallest increase in energy usage to the Capitol Complex. The change in utility expenses shall be proven per option D and added to the baseline energy consumption as a baseline adjustment – in effect, there will be no savings claimed for this ECM.

Commissioning Plan

Equipment installed under this ECM scope will be commissioned in a similar fashion to the chillers in the central plant.

Operations and Maintenance Procedures

All new equipment, valve configurations and BMS equipment installed under this ECM shall be documented in electronic and hard copy for the State. Engagement of the new chiller and associated pumping shall be automated through the plant control system. Training shall be provided for the new system and its components, as well as the operation of the system during periods when the new equipment is to be kept offline.

ECM 5 – Window Film

ECM 5A – Window Film on South Face of L&I

ECM 5B – Window Film on South Face of H&W (not in base project)

Existing Conditions

The double pane windows of the Labor & Industry Building, as well as those of the Health & Welfare Building, were installed less than a decade ago. The replacement windows are aluminum double pane units with a 1" air space and a low-E pyrolytic coating. These double pane windows are in good condition and provide superior thermal performance, but the low-E coating is not sufficient to prevent excessive and uncomfortable levels of solar gain to the interior of the south faces. The east face of Labor & Industry's West Wing also incurs high gains on summer morning through noon. The rate of gain in both buildings is problematic, but more severe in Labor and Industry due to inadequate chilled water cooling on hot days.

Single pane windows on the first floor of Labor & Industry are older. These windows have various glazings and films, and existing conditions are causing cracks in some windows.

Proposed Solution

TEN proposes to apply passive solar control film to the inside panes of the double pane windows on the broad south faces of the two main buildings, the double pane windows of the east face of the L&I west wing, and the single pane windows of those two faces of L&I. Hanita TEK silver 20 has been selected for this application. Performance specifications are summarized as follows:

- UV Reduction – 99%
- Light Reflected (interior) – 62%
- Light Reflected (exterior) – 61%
- Glare Reduction – 79%
- Insulation Emissivity (room-side) – 0.71
- Energy Control Absorbed – 38%
- Total Solar Energy Rejected – 70%

Further details of the film's performance ratings are appended with the cut sheets. Key elements of the Silver 20 performance are an absorption rate well below 50% and aggressive reductions in gain parameters.

- No degradation to the lifespan of the windows. While the Traco windows to be fitted are isolated thermally from the spacer bars, a solar absorption percentage below 50% is nonetheless desired for installation on annealed glass, that being the maximum threshold for non-tempered installations. Absorption in excess of the threshold may develop undesirable levels of heat within the glass.
- Dramatic reduction in glare. The glare reduction of nearly 80% should ease monitor viewing.
- Familiar appearance. The new film is visually similar in most respects to the film already dominating the Rachel Carson edifice.
- Maximized reduction in cooling load due to window solar gain. The film selected mimics the performance of the film used at Rachel Carson for this purpose.
- UV Rejection. In addition to the above, Silver 20 rejects upward of 99% of the UV rays entering the space. This will protect furniture, floors, artwork, computers, equipment and personnel from the damaging

effects of over exposure. Less UV translates to longer lifespan, less fading of floors, carpets, furniture and personal effects; not neglecting of course protection and greater comfort for the occupants who sit in direct sunlight.

The Hanita TEK Silver 20 is one of a small group of "best fit" films that can save money in the long run while providing some improvement in comfort for occupants and a reduction in peak cooling load in both buildings. The installation is planned to be minimally intrusive to the business of State.

- Cover existing sills and any permanent furnishings in the path of the work;
- Retract blinds. Remove and set aside any blind units which fail to retract for re-installation after the film has been installed.
- Wash the inside of the window and leave wet as the basis for water-activated adhesive.
- Apply film to cleaned window interior and trim neatly to size;
- Remove excess water and any air bubbles with a squeegee or film tool;
- Wipe frames and sill trim of any water;
- Re-install any blinds removed;
- Remove dropcloths.

Implementation will require the State to direct occupants to remove personal belongings from the immediate area of the work according to the schedule. **TEN will advise the State of any blinds found incapable of being fully retracted. In the case of these inoperable blinds, TEN will remove the blinds and leave them in the space for later DGS repair and replacement.**

TEN will require a waiver of liability from DGS to install film on the single pane windows in L&I due to existing conditions causing cracks in the windows.

Savings Evaluation

Much of the evaluation data listed is per ASHRAE Handbook, 1989 Fundamentals; SAE version. The analysis estimates CHW system electricity savings in the cooling mode due to a decline in rate of passive solar gain due to insolation. The analysis also estimates heating system steam savings in the heating mode due to a small decline in the rate of thermal conduction loss. No infiltration savings are anticipated.

The estimate of cooling savings attempts to quantify the effect of existing venetian blinds as presently deployed, and assumes a similar level of deployment following implementation.

The analysis recognizes the thermal character of the existing double pane Traco windows and the shading effect of the existing pyrolytic coating.

- Insolation values for calculating window savings associated with a change in shading: page 27.10 Table 8 (ASHRAE Fundamentals) Solar Intensity and Solar Heat Gain Factors for 40° North Latitude. Maximum half day values applied to the determination of peak insolation for various orientations.
- Insolation values for calculating window savings associated with a change in shading: page 27.10 Table 8 Solar Intensity and Solar Heat Gain Factors for 40° North Latitude. Monthly half day totals factored into the determination of annual gain for various orientations.
- Base shading coefficients for unshaded fenestration: page 27.26 Table 20 Shading Coefficients for Single Glass and Insulating Glass. Table selections indicated were selected for baseline condition. For proposed condition, manufacturer's published performance was de-rated in proportion to the ratio of manufacturer's baseline (appendix cut sheets) to ASHRAE baseline.
- Base shading coefficients for shaded fenestration: page 27.31 Table 26 Shading Coefficients for Insulating Glass with Indoor Shading by Venetian Blinds or Roller Shades. Table selections indicated were selected

for baseline condition. For proposed condition, manufacturer's published performance was de-rated in proportion to the ratio of manufacturer's baseline (appendix cut sheets) to ASHRAE baseline. Originally white shades are now faded, dusty and discolored.

- Areas of shaded and unshaded fenestration for various orientations: Manual tabulation of openings on each face including assessed percentage of opening shaded. Views observed through Google Earth.
- Heating balance temperatures of 68°F occupied and 63°F unoccupied: 68°F assumed average winter occupied temperature at times when solar gain is limited, representing a call for heat. Unoccupied policy temperature limit is 63°F. These setpoints pertain only to the evaluation of heating savings.
- Heating occupied hours derived from TMY2 data for the period 6AM – 6 PM weekdays in which temperature outdoors falls below 55°F. Heating unoccupied hours are the remainder of this same period during which the temperature outdoors is less than 55F°F.
- Heating U-values, double-pane glazing: Traco specifications for installed windows in the baseline. Hanita film performance proportioned for the proposed case.
- Single pane glazing – all parameters: performance parameters of the existing film are not known. No baseline or proposed utility consumption has been projected for single pane.
- Internal shading (blinds) deployment percentages of total face area are as follows:

	Labor & Industry	Health & Welfare
East-North-East (ENE)	31% equivalent fully deployed	n/a
South-South-East (SSE)	68% equivalent fully deployed	66% equivalent fully deployed

Shading coefficient ranges from 1.0 for no shading effect to 0.0 for complete shading of the sun's direct rays. For cooling, the instantaneous gain reduction is calculated as the difference between present and proposed coefficients factored by the corresponding area and the peak gain rate. Annual gain reduction applies those same two initial factors to the summer total gain rate.

Measurement and Verification

Utility savings are minor for this upgrade. The improvement benefits occupant comfort and the severity of the shortfall in peak cooling. As described in the subsequent discussion of Measurement and Verification, savings for this ECM will be stipulated based on a calibrated simulation model. Water, sewer, and chemical treatment savings are derived from the reduced load at the central chilled water plant. The savings detailed in the table below were only calculated for window film applied to the double pane windows in the Labor & Industry building. If window film is also applied to the single pane windows on the first floor, savings will increase. The cost of ECM 5A reported in the introduction carries the full cost to apply film to both double and single pane windows.

Stipulated Annual Savings for Window Film – Double Pane Only				
	L&I		**H&W**	
	Energy	**$**	**Energy**	**$**
Electricity (kWh)	55,631	$ 4,203	22,692	$ 1,714
Steam (Mlb)	48	$ 1,188	20	$ 485
Water (kGal)	20	$ 190	8	$ 78
Sewer (kGal)	3	$ 23	1	$ 10
Chemicals		$ 141		$ 57
TOTAL		**$ 5,745**		**$ 2,344**

Commissioning Plan

Commissioning will be completed by The Efficiency Network, working with equipment vendors and subcontractors and in coordination with and the cooperation of DGS.

Operations and Maintenance Procedures

The film will be adhered to the interior glass, so exterior cleaning is not affected by this upgrade. Cleaning to the interior face should be restricted to non-abrasive cleaners and those which do not contain caustic chemicals. A full description is appended to this proposal and training, with all supporting materials, will be provided.

TEN's project economics attribute no O&M savings to this ECM.

ECM 6 – L&I Building Window Sealing (not in base project)

Infiltration rates were at one time a particular problem in the Labor and Industry building.

Existing Conditions

Some years ago the high infiltration rate froze a Weathermaster coil which burst in frigid weather. The problem was found to arise from the crack between the rough opening of the windows and the sill. Subsequent to the coil incident, the state undertook a program to fit fiberglass batting in the pipe space below the sills throughout the building. The work was undertaken indoors, so much as could be accessed via the opening into the pipe space through the terminal unit enclosure.

Most exterior joints have not been re-caulked and there exists the possibility that lengths of crack may remain open to draft in some areas, due either to insufficient original caulking or possibly deterioration.

Proposed Solution

This ECM will replace the sealant in horizontal crack below the sills on each floor of the North and South faces of the Labor and Industry Building.

- Provide, erect, secure and maintain sidewalk canopy protection at the entrances for pedestrian protection.
- Provide, erect, secure and maintain swing stage scaffolds to access all work areas.
- Remove any existing joint sealant materials at the joints between the metal window sills and the stone wall panels.
- Solvent wipe all surfaces to remove any standing dust and debris.
- Install closed cell backer rod and or bond breaker tape to back side of joints to prevent 3rd side adhesion.
- Re-seal these joints using a high-grade silicone joint sealant material.
- Joint sealant color to be selected by the State from the manufacturer's standard color chart.
- Tool joints smooth with a slight concave finish.
- Clean up all debris on a daily basis.

Measurement and Verification

Utility savings from this ECM are relatively small, and typically would not be cost-effective to measure directly. As described in the subsequent discussion of Measurement and Verification, savings for this ECM will be stipulated as $1,824 per year. These savings are composed of 2,833 kWh of electricity and 65 Mlbs of steam.

Commissioning Plan

The preparation, application and curing of sealant under this ECM scope will be commissioned in conjunction with TEN's subcontractors and DGS.

Operations and Maintenance Procedures

The new sealant will seal against wind, snow and rain infiltration. Maintenance effort should be eased somewhat when servicing HVAC components in the perimeter terminal units, since rust and corrosion should not continue to worsen under the influence of weather and condensation as was the case previously in any units proximate to the draft.

ECM 7 – Chilled Water Coil Replacement in Health and Welfare Building

ECM 7A – Chilled Water Coil Replacement for H&W AHU 1 and 2

ECM 7B – Chilled Water Coil Replacement for H&W AHU 3 and 4

Existing Conditions

The Health & Welfare HVAC system is affected by a degradation in capacity suffered by the chilled water coils of the two primary and two interior AHUs. AHU-1 and 2 are located on the east section of the 11th floor and AHU-3 and 4 are on the west section of the 11th floor. The coils in all AHUs have deteriorated to the point that many tubes have been permanently closed to the flow of chilled water due to leakage. Blockages, scaling and buildup inside a cooling coil reduces the ability of the coil to transfer the heating or cooling energy to the air stream resulting in excessive run times to meet the heating and cooling loads. Additionally, the added resistance inside the coil causes an increase in head pressure resulting in increased pumping energy.

The air handling unit casings are presently insulated by ACM. Access to the coils for replacement will required abatement.

Proposed Solution

This ECM shall replace the chilled water coils in AHU-1, AHU-2, AHU-3 and AHU-4 in the Health and Welfare penthouse with new coils that approximate the same cooling capacity. Energy savings can be achieved as the overall heat transfer and efficiency of the coil will be improved. This includes energy savings associated with the chillers, chilled water pumps (lower flow rates with improved heat transfer at the coil), and the air handling units (lower airflow as systems can be satisfied with lower flow rates).

It is not uncommon for system efficiencies to be improved 2-5% with the replacement of the cooling coils but TEN does not know the extent of the current flow restriction how clogged the coils are (TEN's energy savings are calculated with 2-5% in mind). TEN will measure the flow rate of the coil prior to replacement to calculate the flow restriction.

TEN has received one quote to perform the scope described below, but a competitive bid will take place before construction commences. The cost listed in this report for ECM 7A & 7B has been estimated based on the single quote received to include the base scope, however we anticipate being able to include additional scope components after competitive bidding. Any reduction in final cost due to the competitive bid or from scope reduction will be applied to the owner controlled contingency account.

Base Scope

- Abate ACM from the cooling coils and casing areas impacting coil removal.
- Include all necessary elements of removal, disposal, handling, installation, etc.
- Provide selective demolition and remove existing coils
- Design, provide and install new standard chilled water coils with stainless steel casings and stainless steel drain pans
- Include piping connections, insulation, etc.
- Restore interior and exterior casings, insulation on coils, seals, etc. in neat and workmanlike manner

Possible Adders

- 2-piece coils designed to fit inside the freight elevator
- Heavy wall copper tubing – 0.035”
- Freeze protected coils – Cooney freeze block technology
- Weekend labor to finish the coil removal and install in one weekend per AHU (Friday evening to Monday morning)
- New freeze stats
- Replace existing pneumatic valves with new electronically-actuated 2-way valves and digital control signals
- Fabricate mist eliminators for AHU 2 and 4

Under the base project the existing valves, specialties, control, sensors and instrumentation will be retained.

Pricing assumes authorization for any and all adders selected shall be coincident with execution of the base scope in order to avoid incidental charges not estimated.

Measurement and Verification

This ECM is expected to save a relatively small amount of pumping power at the central plant (savings from a baseline that may need to be adjusted – see below) and energy at the air handling unit. An energy model will be calibrated to a coil flow measurement to assess savings.

Replacing the flow-restricted coils may increase energy use by delivering more cooling energy to the building during peak periods. TEN will take flow measurements before coil replacement to assess the level of restriction in the existing coils. A baseline adjustment will be calculated based on those measurements if it is found that the coils were capacity constrained.

Commissioning Plan

Commissioning will be completed by The Efficiency Network, working with equipment vendors and subcontractors and in coordination with and the cooperation of DGS.

Operations and Maintenance Procedures

Abatement of the ACM insulation from the casings of AHU-1 through AHU-4 may reduce any future cost to replace outdoor air dampers (by others). No O&M savings are claimed for this ECM.

MEASUREMENT AND VERIFICATION PLAN

TEN shall provide measurement and verification services to confirm project savings levels as specified in ECM sections of this Energy Audit Report and summarized below.

Due to the seasonal nature of the savings associated with this project, a full operating year will be required to confirm the operating assumptions and annual savings level for the Project.

TEN follows the International Performance Measurement & Verification Protocol (IPMVP), the industry standard for development and implementation of M&V plans in energy savings projects. IPMVP provides four Options for determining savings (A, B, C and D).

TEN shall verify Guaranteed Savings amounts after ECM commissioning as outlined in the table below and agreed upon by Customer and TEN, in accordance with the following options of the International Performance Measurement and Verification Protocol ("IPMVP").

Energy Efficiency Project	IPMVP Option	Pre-Variables	Post Variables
ECM #1: High Efficiency LED Lighting Upgrades			
Retrofit Interior And Exterior	A	Statistically sample pre-retrofit power (kW) lighting measurements with stipulated hours of use. Precision is expected to be better than 10% with 90% confidence.	Statistically sample post retrofit power (kW) lighting measurements with stipulated hours of use. 10% precision with 90% confidence
ECM #2: Central Plant			
Chiller Replacement and Plant Optimization	D/B/C	Simulation of entire chiller plant calibrated to chiller logs and kW metering.	Device level kW, flow, and temperature metering via Optimum Energy platform. A savings analysis using data from the central plant electricity meter will be used to verify the modeled savings (Option C). The model (Option D) will still be the primary verification tool to satisfy the guarantee, but the modeled savings will be no more than 110% of the Option C savings minus chilled water-based savings from other ECMs (electricity only).
Heating Loop Decentralization	A/D	Operating profile and spot pump power measurement.	Simulation of chilled water and steam savings from distribution piping losses.

Energy Efficiency Project	IPMVP Option	Pre-Variables	Post Variables
ECM #3: Central Plant Pumping Upgrades			
Condenser Water Upgrade to Variable Volume (VFD)	Included in ECM 2 above (chiller replacement)		
Chilled Water Pump Motor and VFD Replacement	Included in ECM 2 above (chiller replacement)		
ECM #4: Chilled Water Distribution			
Retro-commissioning	D/B/A	TEN will use an energy analysis model calibrated to utility/BMS data for the building, including HVAC equipment power, operating profiles, set points and temperature reset schedules. For insulation – surface temperatures, lengths of uninsulated or poorly insulation pipes and fittings, pipe diameters, and ambient air conditions. Heat transfer coefficients for the new insulation will be obtained from specification sheets. Assumptions will be made regarding mass flow rates where actual flow rates are not available.	HVAC equipment power, operating profiles, set points and temperature reset schedules M&V for insulation will verify that the insulation is in place and that savings are still being realized.
Metasys BMS Upgrade (Chilled Water Plant)	N/A		
Labor and Industry Satellite Chiller	D/B	Baseline adjustment: increase in electrical energy at L&I and central plant found in post retrofit case (zero savings claimed)	Chiller logs, kW, and kW/ton metering. Energy consumption will include satellite chiller plant consumption plus additional ton-hrs at central plant
ECM #5&6: Upgrade Building Envelope			
Window Film (L&I and H&W)	D	Calibrated simulation- building energy analysis model based on facility characteristics and performance specifications- assumptions stipulated.	Savings stipulated.
Building Sealing	D		
ECM 7 – Replace H&W Chilled Water Coils			
Replace H&W Chilled Water Coils	D	Energy model calibrated to plant conditions and coil flow measurement	Energy model calibrated to plant conditions and coil design flow

Guaranteed Savings Reconciliation

Reconciliation of the energy savings will take place on an annual basis, based upon the measurement and verification protocol identified.

If TEN is unable to reconcile missed savings during a reconciliation period then TEN may undertake, at its own expense, actions to bring that measure into compliance with the savings guarantee - including making necessary adjustments to the missed savings measure, repairing equipment (or replacing the equipment altogether). If these efforts do not result in savings compliance, then TEN will pay the missed savings amount directly to DGS for each reconciliation period during the term of the contract.

ENVIRONMENTAL BENEFITS

Below are various annual environmental benefits of the selected project.

A. 6,368 Tons CO2e

B. 148,293 Equivalent Trees Planted

C. 1,133 Equivalent Cars Removed from The Road

APPENDIX A

Utility Rate Analysis

Electric

The Capitol Complex is on PPL rate schedule LP5. Electric supply charges ($/kWh) are the only variable costs. There are no demand charges ($/kW) for this rate schedule and all other distribution rider charges are fixed on a monthly basis. The electric rate used to calculate ECM savings is $0.075545/kWh. We assume a 1% annual escalation of electric costs to the Capitol in our cash flow analysis.

Month	kWh Consumption	Supply Charges ($)	*Calculated Rate*
Jan-17	5,531,000	$428,324	*$0.0774*
Feb-17	5,479,000	$404,146	*$0.0738*
Mar-17	5,204,000	$424,361	*$0.0815*
Apr-17	5,964,000	$424,835	*$0.0712*
May-17	5,785,000	$418,465	*$0.0723*
Jun-17	6,733,530	$515,520	*$0.0766*
Jul-17	7,875,000	$532,474	*$0.0676*
Aug-17	7,166,000	$527,461	*$0.0736*
Sep-17	6,378,000	$468,709	*$0.0735*
Oct-17	5,731,000	$486,222	*$0.0848*
Nov-17	4,979,000	$404,083	*$0.0812*
Dec-17	5,005,000	$391,919	*$0.0783*
2017 TOTAL	**71,830,530**	**$5,426,519**	***$0.075546***

Water + Sewer

Tariff rates were found on Capitol Region Water's website: https://capitalregionwater.com/financialreports/. The numbers provided here were verified against the monthly bills and found to be accurate. TEN's scope of work only affects water consumption in the central plant. The central plant has a sewer meter that is used to determine the difference between water delivered and flushed to the sewer. For the central plant, the sewer rate is applied only to the actual sewer usage, and the water rate to all water delivered. The water and sewer rates used to determine ECM savings are the 2018 values of $9.46/kGal and $6.99/kGal, respectively. While the actual 4-year growth rates for water and sewer costs were 9.4% and 3.7%, respectively, we assume a 1% annual escalation rate for both utilities when running our cash flow analysis.

Year	Water ($/kGal)	*% Incr.*	Sewer ($/kGal)	*% Incr.*
2014	$6.61		$6.05	
2015	$7.18	*8.6%*	$6.05	*0.0%*
2016	$7.88	*9.7%*	$6.05	*0.0%*
2017	$8.80	*11.7%*	$6.53	*7.9%*
2018	**$9.46**	*7.5%*	**$6.99**	*7.0%*
Compound Annual Growth Rate (2014-2018)		*9.4%*		*3.7%*
Escalation Rate Assumed in Cash Flow Analysis		**1%**		**1%**

Chemical Treatment for Central Plant Water

The condenser water loop in the central plant must be chemically treated in order to maintain operation of the chilled water system. Evaporation of water in the cooling towers as well as blowdown cause make-up water to be introduced from the city water supply, which must be treated. Nick Clark of DGS reports that chemical treatment costs average $10,000 per month over the course of a year. Given average annual water consumption in the central plant of 18,200 kGals, this equates to approximately $7/kGal for chemical treatment costs. TEN uses this rate to calculate chemical cost savings resulting from reduced water use in the central plant, and escalates these savings at 1% annually.

Steam

The buildings listed below have their own steam meter and receive a separate bill. With the exception of the Judicial building, all steam is billed at the same rate across buildings. The Judicial building bill had a discount applied to the cost, but DGS has informed us that this discount will not apply going forward. We have therefore removed the judicial building from the calculation of steam rates. The rate used to calculate ECM savings is $24.64/Mlb with a 1% annual escalation rate.

Steam Usage (Mlbs)

	L&I	H&W	Central Plant	Keystone	Forum	Judicial	Finance	TOTAL	TOTAL Ex. Judicial
Jan-17	1,623	879	8,432	4,064	1,935	1,108	1,974	20,015	**18,907**
Feb-17	1,394	796	7,113	3,757	1,760	892	1,764	17,476	**16,584**
Mar-17	1,709	943	7,902	4,046	1,995	1,007	1,833	19,435	**18,428**
Apr-17	619	333	4,412	1,743	940	563	1,396	10,006	**9,443**
May-17	563	273	4,230	1,626	225	585	362	7,863	**7,278**
Jun-17	438	245	2,454	1,246	207	414	152	5,156	**4,742**
Jul-17	407	211	2,288	1,797	210	374	50	5,336	**4,962**
Aug-17	484	251	2,853	1,643	249	472	58	6,010	**5,538**
Sep-17	420	222	2,892	1,416	238	465	135	5,788	**5,323**
Oct-17	483	253	3,299	1,587	368	376	183	6,549	**6,173**
Nov-17	1,046	592	5,493	2,955	1,852	500	1,959	14,397	**13,897**
Dec-17	1,469	934	6,995	3,975	1,793	791	2,033	17,990	**17,199**
TOTAL	10,653	5,932	58,363	29,855	11,771	7,547	11,899	136,020	**128,473**

Cost ($)

	L&I	H&W	Central Plant	Keystone	Forum	Judicial	Finance	TOTAL	TOTAL Ex. Judicial
Jan-17	$ 37,895	$ 20,520	$ 196,887	$ 94,894	$ 45,182	$ 21,564	$ 46,095	$ 463,038	**$ 441,473**
Feb-17	$ 35,609	$ 20,340	$ 181,737	$ 95,991	$ 44,983	$ 19,323	$ 45,078	$ 443,062	**$ 423,739**
Mar-17	$ 43,652	$ 24,081	$ 201,896	$ 103,375	$ 50,977	$ 21,814	$ 46,843	$ 492,639	**$ 470,825**
Apr-17	$ 15,739	$ 8,476	$ 112,197	$ 44,324	$ 23,907	$ 12,128	$ 35,495	$ 252,266	**$ 240,138**
May-17	$ 14,374	$ 6,967	$ 108,077	$ 41,544	$ 5,739	$ 12,673	$ 9,252	$ 198,625	**$ 185,953**
Jun-17	$ 11,196	$ 6,252	$ 62,700	$ 31,835	$ 5,279	$ 8,968	$ 3,891	$ 130,121	**$ 121,153**
Jul-17	$ 10,389	$ 5,381	$ 58,458	$ 45,913	$ 5,363	$ 8,102	$ 1,280	$ 134,886	**$ 126,784**
Aug-17	$ 12,361	$ 6,418	$ 72,894	$ 41,979	$ 6,365	$ 10,225	$ 1,469	$ 151,710	**$ 141,486**
Sep-17	$ 10,007	$ 5,293	$ 68,887	$ 33,729	$ 5,669	$ 9,269	$ 3,213	$ 136,067	**$ 126,799**
Oct-17	$ 11,496	$ 6,034	$ 78,582	$ 37,802	$ 8,766	$ 7,495	$ 4,352	$ 154,526	**$ 147,031**
Nov-17	$ 24,911	$ 14,106	$ 130,843	$ 70,388	$ 44,108	$ 9,966	$ 46,663	$ 340,986	**$ 331,019**
Dec-17	$ 34,996	$ 22,250	$ 166,621	$ 94,685	$ 42,700	$ 15,767	$ 48,431	$ 425,449	**$ 409,682**
TOTAL	$ 262,624	$ 146,118	$ 1,439,780	$ 736,461	$ 289,036	$ 157,293	$ 292,063	$ 3,323,376	**$ 3,166,083**

Calculated Rate ($/Mlb)

	L&I	H&W	Central Plant	Keystone	Forum	Judicial	Finance	TOTAL	TOTAL Ex. Judicial
Jan-17	$ 23.35	$ 23.35	$ 23.35	$ 23.35	$ 23.35	$ 19.46	$ 23.35	$ 23.13	**$ 23.35**
Feb-17	$ 25.55	$ 25.55	$ 25.55	$ 25.55	$ 25.56	$ 21.66	$ 25.55	$ 25.35	**$ 25.55**
Mar-17	$ 25.55	$ 25.55	$ 25.55	$ 25.55	$ 25.55	$ 21.66	$ 25.55	$ 25.35	**$ 25.55**
Apr-17	$ 25.43	$ 25.43	$ 25.43	$ 25.43	$ 25.43	$ 21.54	$ 25.43	$ 25.21	**$ 25.43**
May-17	$ 25.55	$ 25.55	$ 25.55	$ 25.55	$ 25.55	$ 21.66	$ 25.55	$ 25.26	**$ 25.55**
Jun-17	$ 25.55	$ 25.55	$ 25.55	$ 25.55	$ 25.55	$ 21.66	$ 25.55	$ 25.24	**$ 25.55**
Jul-17	$ 25.55	$ 25.55	$ 25.55	$ 25.55	$ 25.55	$ 21.66	$ 25.55	$ 25.28	**$ 25.55**
Aug-17	$ 25.55	$ 25.55	$ 25.55	$ 25.55	$ 25.55	$ 21.66	$ 25.55	$ 25.24	**$ 25.55**
Sep-17	$ 23.82	$ 23.82	$ 23.82	$ 23.82	$ 23.82	$ 19.93	$ 23.82	$ 23.51	**$ 23.82**
Oct-17	$ 23.82	$ 23.82	$ 23.82	$ 23.82	$ 23.82	$ 19.93	$ 23.82	$ 23.60	**$ 23.82**
Nov-17	$ 23.82	$ 23.82	$ 23.82	$ 23.82	$ 23.82	$ 19.93	$ 23.82	$ 23.68	**$ 23.82**
Dec-17	$ 23.82	$ 23.82	$ 23.82	$ 23.82	$ 23.82	$ 19.93	$ 23.82	$ 23.65	**$ 23.82**
TOTAL	$ 24.65	$ 24.63	$ 24.67	$ 24.67	$ 24.56	$ 20.84	$ 24.54	$ 24.43	**$ 24.64**

APPENDIX B

Lighting Savings Analysis

Base Lighting - Line by Line. Final IGA will be updated with the line by line for the options chosen.

Project: PA DGS Capitol Complex

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
1	Labor & Industry	Penthouse	Elevator Room	12	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	12	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.639	0.309	332	161
2	Labor & Industry	Penthouse	Main Mechanical Room	77	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	77	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	4.100	1.982	2,132	1,031
3	Labor & Industry	Penthouse	Upper Electrical Room	5	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	5	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.266	0.129	138	67
4	Labor & Industry	Penthouse	Air Handler Room	12	30	Jelly Jar Wall Mounted Compact Fluorescent, quad, (1) 26W lamp Glass Jelly Jar	12	7	Wall Mounted Install LED Plug-in Lamp; Hardwire to Socket Light Emitting Diode Lamp, Screw-in, (1) 8W lamp	520	0.357	0.086	186	45
5	Labor & Industry	Penthouse	Main Mechanical Room	3	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	3	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.008	0.008	74	74
6	Labor & Industry	17th Floor	1700 Lunchroom	8	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	8	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.643	0.309	1,337	642
7	Labor & Industry	17th Floor	1700 Restroom	1	30	1'x2' Troffer Recessed Flanged Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	16	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	1040	0.030	0.016	31	16
8	Labor & Industry	17th Floor	1700 Restroom	1	23	3' Vanity Wall Mounted Fluorescent, (1) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	12	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	1040	0.023	0.012	24	12
9	Labor & Industry	17th Floor	Restroom Vestibule	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	1040	0.043	0.017	45	18
10	Labor & Industry	17th Floor	1700 Office	10	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	10	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.803	0.386	1,671	803
11	Labor & Industry	17th Floor	1700 Office	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.482	0.232	1,002	482
12	Labor & Industry	17th Floor	1700 Office	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.482	0.232	1,002	482
13	Labor & Industry	17th Floor	1700 Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
14	Labor & Industry	17th Floor	1700 Office	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.482	0.232	1,002	482
15	Labor & Industry	17th Floor	1700 Office	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.482	0.232	1,002	482
16	Labor & Industry	17th Floor	1700 Suite	24	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	24	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	1.928	0.927	4,010	1,927
17	Labor & Industry	17th Floor	1700 Suite	1	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	1	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.003	0.003	25	25
18	Labor & Industry	17th Floor	1700 Office	4	48	Track Light Surface Mounted Halogen Incandescent, (1) 50W lamp (No Diffuser)	4	7	Surface Mounted Install LED Plug-in MR16 Lamp Light Emitting Diode Lamp, Screw-in, (1) 8W lamp	2080	0.190	0.029	395	60
19	Labor & Industry	17th Floor	Women's Room	7	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	7	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.303	0.118	2,656	1,032
20	Labor & Industry	17th Floor	Conference Room	11	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	11	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.884	0.425	1,378	663
21	Labor & Industry	17th Floor	Conference Room	6	48	Track Light Surface Mounted Halogen Incandescent, (1) 50W lamp (No Diffuser)	6	7	Surface Mounted Install LED Plug-in MR16 Lamp Light Emitting Diode Lamp, Screw-in, (1) 8W lamp	1560	0.285	0.043	445	67
22	Labor & Industry	17th Floor	Conference Room	12	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	12	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	1560	0.520	0.202	811	315
23	Labor & Industry	17th Floor	Open Office 1713	9	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	9	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.723	0.347	1,504	723
24	Labor & Industry	17th Floor	High Voltage Mechanical	3	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	3	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.160	0.077	83	40
25	Labor & Industry	17th Floor	Office 1713 A	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
26	Labor & Industry	17th Floor	Office 1713 B	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
27	Labor & Industry	17th Floor	Service Elevator Vestibule	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.106	0.051	332	161
28	Labor & Industry	17th Floor	Conference Room 1714	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.482	0.232	752	361
29	Labor & Industry	17th Floor	Men's Room	7	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	7	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.303	0.118	2,656	1,032
30	Labor & Industry	17th Floor	JC	1	21	Poker Hat/RLM Shade Surface Mounted Compact Fluorescent, spiral, (1) 23W lamp (No Diffuser)	1	10	Surface Mounted Install LED Screw-in BR30 Lamp Light Emitting Diode Lamp, Screw-in, (1) 11W lamp	1040	0.021	0.010	22	10
31	Labor & Industry	17th Floor	Tele Data Chase	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
32	Labor & Industry	17th Floor	17th Floor Common Area	36	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	36	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	1.560	0.606	4,866	1,890
33	Labor & Industry	17th Floor	17th Floor Common Area	1	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.080	0.039	251	120
34	Labor & Industry	17th Floor	17th Floor Common Area	2	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	2	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.006	0.006	49	49
35	Labor & Industry	17th Floor	1716A Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
36	Labor & Industry	17th Floor	1716B Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
37	Labor & Industry	17th Floor	1718A Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
38	Labor & Industry	17th Floor	1718B Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
39	Labor & Industry	17th Floor	1722 Office	14	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	14	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	1.125	0.541	2,339	1,124
40	Labor & Industry	17th Floor	1722A Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
41	Labor & Industry	17th Floor	1723 Office	11	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	11	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.884	0.425	1,838	883
42	Labor & Industry	17th Floor	1723A Office	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.482	0.232	1,002	482
43	Labor & Industry	17th Floor	1721B Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
44	Labor & Industry	17th Floor	1721B Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
45	Labor & Industry	17th Floor	1719B Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
46	Labor & Industry	17th Floor	1719A Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
47	Labor & Industry	17th Floor	1716-1723 Suite	25	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	25	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	2.008	0.965	6,265	3,012
48	Labor & Industry	17th Floor	1716-1723 Suite	4	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	4	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.173	0.067	541	210
49	Labor & Industry	17th Floor	1716-1723 Suite	2	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	2	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.006	0.006	49	49
50	Labor & Industry	16th Floor	1600 Suite	37	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	37	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	2.972	1.429	9,272	4,457
51	Labor & Industry	16th Floor	1600 Suite	4	53	2'x2' Troffer Recessed Fluorescent, (2) U-Tube, T-8 lamp, Instant Start Ballast Deep Cell Parabolic Diffuser	4	24	Recessed Install 2x2 3-Lamp White Reflector Kit LED 2' T8 Lamp (3) 8W Lamps	3120	0.213	0.095	665	297
52	Labor & Industry	16th Floor	1600 Suite	1	60	Recessed Can 8" Recessed Compact Fluorescent, quad, (2) 26W lamp Prismatic Acrylic Diffuser	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.060	0.017	186	53
53	Labor & Industry	16th Floor	Office Stationery Storage	2	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	2	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	520	0.087	0.034	45	18
54	Labor & Industry	16th Floor	1600 Suite	4	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	4	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.011	0.011	99	99
55	Labor & Industry	16th Floor	1600 Suite	11	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	11	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.477	0.185	1,487	578
56	Labor & Industry	16th Floor	Jodi Hasbrouck Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
57	Labor & Industry	16th Floor	Christmas Tree Storage Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
58	Labor & Industry	16th Floor	Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
59	Labor & Industry	16th Floor	Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
60	Labor & Industry	16th Floor	Christopher Seville Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
61	Labor & Industry	16th Floor	Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
62	Labor & Industry	16th Floor	Jeffrey Banks Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
63	Labor & Industry	16th Floor	Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
64	Labor & Industry	16th Floor	Brian Force Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
65	Labor & Industry	16th Floor	Library Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
66	Labor & Industry	16th Floor	Terry Hoskins Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
67	Labor & Industry	16th Floor	Ron Englar Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
68	Labor & Industry	16th Floor	Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
69	Labor & Industry	16th Floor	Joe Martin Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
70	Labor & Industry	16th Floor	Anna Zimmers Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
71	Labor & Industry	16th Floor	Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
72	Labor & Industry	16th Floor	File Vestibule	1	28	1'x4' Troffer Recessed Fluorescent, (1) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	13	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 13W Lamp	520	0.028	0.013	15	7
73	Labor & Industry	16th Floor	Central Collection	15	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	15	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	1.205	0.579	2,506	1,205
74	Labor & Industry	16th Floor	Women's Room	7	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	7	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	1040	0.303	0.118	315	123
75	Labor & Industry	16th Floor	Unisex Restroom	1	28	1'x4' Troffer Recessed Fluorescent, (1) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	13	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 13W Lamp	1040	0.028	0.013	29	13
76	Labor & Industry	16th Floor	Women's Room	2	28	1'x4' Troffer Recessed Fluorescent, (1) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	13	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 13W Lamp	1040	0.056	0.026	58	27
77	Labor & Industry	16th Floor	Women's Room	2	12	1'x1' Square Recessed Compact Fluorescent, spiral, (1) 13W lamp Prismatic Acrylic Diffuser	2	9	Recessed Retrofit Wall Sconce with Rectangular LED Kit LED Light Fixture. (1) 9W	200	0.023	0.018	5	4
78	Labor & Industry	16th Floor	1613 Suite	9	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	9	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.723	0.347	2,255	1,084
79	Labor & Industry	16th Floor	Electrical Room	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
80	Labor & Industry	16th Floor	Rear Office A	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.482	0.232	1,002	482
81	Labor & Industry	16th Floor	1613 Suite	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.043	0.017	135	53
82	Labor & Industry	16th Floor	Rear Office B	7	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	7	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.562	0.270	1,169	562
83	Labor & Industry	16th Floor	1612 Suite	39	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	39	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	3.133	1.506	9,774	4,698
84	Labor & Industry	16th Floor	Ray Adkins Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
85	Labor & Industry	16th Floor	Dave Marchioni Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
86	Labor & Industry	16th Floor	Nathaniel Smith Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
87	Labor & Industry	16th Floor	Dean Stum Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
88	Labor & Industry	16th Floor	Service Elevator Vestibule	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.106	0.051	332	161
89	Labor & Industry	16th Floor	Storage Room	2	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	2	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	520	0.087	0.034	45	18
90	Labor & Industry	16th Floor	File Room	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	1560	0.043	0.017	68	26

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
91	Labor & Industry	16th Floor	Rear File Storage	3	130	2'x4' Troffer Recessed Fluorescent, (4) 48", ES lamp Prismatic Acrylic Diffuser	3	51	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 13W Lamps	1560	0.390	0.154	608	241
92	Labor & Industry	16th Floor	Office Supply Storage	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	520	0.043	0.017	23	9
93	Labor & Industry	16th Floor	Supply Closet	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	520	0.043	0.017	23	9
94	Labor & Industry	16th Floor	Men's Room	5	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	5	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	1040	0.217	0.084	225	88
95	Labor & Industry	16th Floor	Men's Room	3	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.160	0.077	166	80
96	Labor & Industry	16th Floor	1619 Suite	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.321	0.154	1,002	482
97	Labor & Industry	16th Floor	1619 Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.241	0.116	752	361
98	Labor & Industry	16th Floor	Conference Room 1618	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.241	0.116	376	181
99	Labor & Industry	16th Floor	1622 Suite	7	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	7	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.562	0.270	1,754	843
100	Labor & Industry	16th Floor	1622 Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
101	Labor & Industry	16th Floor	1623 Suite	31	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	31	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	2.490	1.197	7,769	3,734
102	Labor & Industry	16th Floor	Storage Room	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	520	0.161	0.077	84	40
103	Labor & Industry	16th Floor	Christina Slaybaugh Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
104	Labor & Industry	16th Floor	Wendy Barkus Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
105	Labor & Industry	16th Floor	1623 Suite	1	53	2'x2' Troffer Recessed Fluorescent, (2) U-Tube, T-8 lamp, Instant Start Ballast Deep Cell Parabolic Diffuser	1	24	Recessed Install 2x2 3-Lamp White Reflector Kit LED 2' T8 Lamp (3) 8W Lamps	3120	0.053	0.024	166	74
106	Labor & Industry	16th Floor	1623 Suite	2	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	2	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.087	0.034	270	105
107	Labor & Industry	16th Floor	Empty Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
108	Labor & Industry	16th Floor	Field Operations	7	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	7	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.562	0.270	1,754	843
109	Labor & Industry	16th Floor	Storage Closet	1	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	520	0.080	0.039	42	20
110	Labor & Industry	16th Floor	Table Storage	1	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	520	0.080	0.039	42	20
111	Labor & Industry	16th Floor	Conference Room 1626	9	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	9	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.723	0.347	1,128	542
112	Labor & Industry	16th Floor	Corridor/ Common Area	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.482	0.232	1,504	723
113	Labor & Industry	16th Floor	Corridor/ Common Area	38	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	38	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	1.646	0.640	5,136	1,995
114	Labor & Industry	16th Floor	Corridor/ Common Area	5	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	5	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.014	0.014	124	124
115	Labor & Industry	16th Floor	Data Room	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.053	0.026	28	13
116	Labor & Industry	15th Floor	Call Center Suite	213	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	213	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	17.109	8.224	53,379	25,659
117	Labor & Industry	15th Floor	Call Center Suite	27	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	27	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	1.170	0.454	3,649	1,418
118	Labor & Industry	15th Floor	Call Center Suite	6	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	6	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.017	0.017	148	148
119	Labor & Industry	15th Floor	Office 15-123	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.482	0.232	1,002	482
120	Labor & Industry	15th Floor	Operations Manager Office	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.482	0.232	1,002	482
121	Labor & Industry	15th Floor	Site Administrator Office	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.482	0.232	1,002	482
122	Labor & Industry	15th Floor	Storage Closet	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	520	0.043	0.017	23	9
123	Labor & Industry	15th Floor	Office 15-121	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.161	0.077	501	241
124	Labor & Industry	15th Floor	File Storage Office	22	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	22	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	1.767	0.849	3,676	1,767
125	Labor & Industry	15th Floor	High Voltage Room	4	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	4	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.213	0.103	111	54
126	Labor & Industry	15th Floor	Service Elevator Vestibule	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.106	0.051	332	161
127	Labor & Industry	15th Floor	File Storage	3	130	2'x4' Troffer Recessed Fluorescent, (4) 48", ES lamp Prismatic Acrylic Diffuser	3	51	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 13W Lamps	520	0.390	0.154	203	80
128	Labor & Industry	15th Floor	Data Closet	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	260	0.053	0.026	14	7
129	Labor & Industry	15th Floor	Men's Restroom	5	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	5	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	1040	0.217	0.084	225	88
130	Labor & Industry	15th Floor	Men's Restroom	3	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.160	0.077	166	80
131	Labor & Industry	15th Floor	Storage Closet (est)	1	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	520	0.080	0.039	42	20
132	Labor & Industry	14th Floor	James Kayer Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
133	Labor & Industry	14th Floor	1402 Suite	17	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	17	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	1.365	0.656	4,260	2,048
134	Labor & Industry	14th Floor	1402 Suite	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.043	0.017	135	53
135	Labor & Industry	14th Floor	Gloria Chaves Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
136	Labor & Industry	14th Floor	Rose Richardson Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
137	Labor & Industry	14th Floor	Conference Room	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.241	0.116	376	181
138	Labor & Industry	14th Floor	Room 1405	43	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	43	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	3.454	1.660	7,184	3,453
139	Labor & Industry	14th Floor	Room 1405	2	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	2	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	2080	0.087	0.034	180	70
140	Labor & Industry	14th Floor	1405 Office A	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
141	Labor & Industry	14th Floor	1405 Office B	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
142	Labor & Industry	14th Floor	Suite 1418	47	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	47	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	3.775	1.815	11,778	5,662
143	Labor & Industry	14th Floor	1412 Office A	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
144	Labor & Industry	14th Floor	1412 Office B	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
145	Labor & Industry	14th Floor	Tina McBride Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
146	Labor & Industry	14th Floor	Lunch Room	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
147	Labor & Industry	14th Floor	Suite 1418	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.043	0.017	135	53
148	Labor & Industry	14th Floor	Women's Room	8	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	8	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.347	0.135	3,036	1,179
149	Labor & Industry	14th Floor	Women's Room	2	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.106	0.051	933	451
150	Labor & Industry	14th Floor	Women's Room	2	12	1'x1' Square Recessed Compact Fluorescent, spiral, (1) 13W lamp Prismatic Acrylic Diffuser	2	9	Recessed Retrofit Wall Sconce with Rectangular LED Kit LED Light Fixture. (1) 9W	8760	0.023	0.018	206	156
151	Labor & Industry	14th Floor	1415 Suite	9	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	9	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.723	0.347	2,255	1,084
152	Labor & Industry	14th Floor	1415 Suite	4	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	4	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.173	0.067	541	210
153	Labor & Industry	14th Floor	High Voltage Room	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
154	Labor & Industry	14th Floor	1415 Office	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.482	0.232	1,002	482
155	Labor & Industry	14th Floor	Conference Room	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.482	0.232	752	361
156	Labor & Industry	14th Floor	Service Elevator Vestibule	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.106	0.051	332	161
157	Labor & Industry	14th Floor	JC	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.053	0.026	55	27
158	Labor & Industry	14th Floor	File Storage Closet	2	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	2	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	520	0.087	0.034	45	18
159	Labor & Industry	14th Floor	File Storage Room	3	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	3	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.160	0.077	83	40
160	Labor & Industry	14th Floor	Data Closet	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	260	0.053	0.026	14	7
161	Labor & Industry	14th Floor	Men's Room	5	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	5	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.217	0.084	1,897	737
162	Labor & Industry	14th Floor	Men's Room	3	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.160	0.077	1,399	676
163	Labor & Industry	14th Floor	1423 Suite	32	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	32	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	2.570	1.236	8,019	3,855
164	Labor & Industry	14th Floor	1423 Conference Room	5	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	5	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.402	0.193	1,253	602
165	Labor & Industry	14th Floor	1423 Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.321	0.154	1,002	482
166	Labor & Industry	14th Floor	Lindsey Shields Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.321	0.154	1,002	482
167	Labor & Industry	14th Floor	Sara Schreffler Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.321	0.154	1,002	482
168	Labor & Industry	14th Floor	Nicole Sites Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.241	0.116	752	361
169	Labor & Industry	14th Floor	Deb Scalera Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.321	0.154	1,002	482
170	Labor & Industry	14th Floor	Corner Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
171	Labor & Industry	14th Floor	File Room	2	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	2	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	520	0.087	0.034	45	18
172	Labor & Industry	14th Floor	1422 Office	5	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	5	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.402	0.193	835	402
173	Labor & Industry	14th Floor	1424 Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
174	Labor & Industry	14th Floor	Corridor/ Common Space	12	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	12	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.964	0.463	3,007	1,446
175	Labor & Industry	14th Floor	Corridor/ Common Space	42	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	42	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	1.819	0.707	5,677	2,205
176	Labor & Industry	14th Floor	Corridor/ Common Space	7	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	7	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.020	0.020	173	173
177	Labor & Industry	14th Floor	Corridor/ Common Space	8	48	Track Light Surface Mounted Halogen Incandescent, (1) 50W lamp (No Diffuser)	8	7	Surface Mounted Install LED Screw-in PAR20 Lamp Light Emitting Diode Lamp, Screw-in, (1) 8W lamp	3120	0.380	0.058	1,186	180
178	Labor & Industry	13th Floor	Room 1300	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
179	Labor & Industry	13th Floor	Room 1302	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
180	Labor & Industry	13th Floor	File Storage	13	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	13	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	1.044	0.502	2,172	1,044
181	Labor & Industry	13th Floor	File Storage Office	1	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	520	0.080	0.039	42	20
182	Labor & Industry	13th Floor	Room 1306	10	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	10	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.803	0.386	2,506	1,205

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
183	Labor & Industry	13th Floor	Storage Room	1	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	520	0.080	0.039	42	20
184	Labor & Industry	13th Floor	Conference Room	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.321	0.154	501	241
185	Labor & Industry	13th Floor	Office A	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
186	Labor & Industry	13th Floor	Office B	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
187	Labor & Industry	13th Floor	Office C	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
188	Labor & Industry	13th Floor	Office D	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
189	Labor & Industry	13th Floor	1301 Suite	30	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	30	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	2.410	1.158	7,518	3,614
190	Labor & Industry	13th Floor	Office A	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.482	0.232	1,002	482
191	Labor & Industry	13th Floor	Conference Room	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.482	0.232	1,002	482
192	Labor & Industry	13th Floor	Office B	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.482	0.232	1,002	482
193	Labor & Industry	13th Floor	Office C	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.482	0.232	1,002	482
194	Labor & Industry	13th Floor	File Room	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	520	0.161	0.077	84	40
195	Labor & Industry	13th Floor	Women's Room	8	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	8	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.347	0.135	3,036	1,179
196	Labor & Industry	13th Floor	Women's Room	2	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.106	0.051	933	451
197	Labor & Industry	13th Floor	Women's Room	2	12	1'x1' Square Recessed Compact Fluorescent, spiral, (1) 13W lamp Prismatic Acrylic Diffuser	2	9	Recessed Retrofit Wall Sconce with Rectangular LED Kit LED Light Fixture. (1) 9W	8760	0.023	0.018	206	156
198	Labor & Industry	13th Floor	File Storage	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	520	0.482	0.232	251	120
199	Labor & Industry	13th Floor	OIT Suite	130	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	130	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	10.442	5.019	32,579	15,660
200	Labor & Industry	13th Floor	OIT Suite	4	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	4	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.011	0.011	99	99
201	Labor & Industry	13th Floor	High Voltage Room	4	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	4	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.213	0.103	111	54
202	Labor & Industry	13th Floor	Conference Room	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.241	0.116	376	181
203	Labor & Industry	13th Floor	Dave Naisby Office	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.482	0.232	1,002	482
204	Labor & Industry	13th Floor	Service Elevator Vestibule	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.106	0.051	332	161
205	Labor & Industry	13th Floor	OIT Suite	2	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	2	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.087	0.034	270	105
206	Labor & Industry	13th Floor	Katherine Hann Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
207	Labor & Industry	13th Floor	Edward Bowlen Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
208	Labor & Industry	13th Floor	Michael Sage Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
209	Labor & Industry	13th Floor	Elevator Room	6	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	6	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.319	0.154	166	80
210	Labor & Industry	13th Floor	John Malinoski Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
211	Labor & Industry	13th Floor	Data Closet	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.053	0.026	28	13
212	Labor & Industry	13th Floor	Men's Room	5	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	5	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.217	0.084	1,897	737
213	Labor & Industry	13th Floor	Men's Room	3	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.160	0.077	1,399	676
214	Labor & Industry	13th Floor	David Andrews Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
215	Labor & Industry	13th Floor	Corridor/ Common Area	21	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	21	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.910	0.353	2,838	1,103
216	Labor & Industry	13th Floor	Corridor/ Common Area	4	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	4	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.011	0.011	99	99
217	Labor & Industry	12th Floor	Room 1200	84	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	84	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	6.747	3.243	21,051	10,119
218	Labor & Industry	12th Floor	Room 1200	3	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	3	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.008	0.008	74	74
219	Labor & Industry	12th Floor	Room 1200	2	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	2	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.087	0.034	270	105
220	Labor & Industry	12th Floor	Dave Bohanick Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
221	Labor & Industry	12th Floor	Storage Closet	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	520	0.043	0.017	23	9
222	Labor & Industry	12th Floor	Storage Closet	1	42	Drum Surface Mounted Fluorescent, Circline, (1) 44W lamp, preheat ballast Frosted	1	15	Surface Mounted Drum LED Light Fixture. (1) 15W	520	0.042	0.015	22	8
223	Labor & Industry	12th Floor	Storage Closet	1	28	4' Vanity Wall Mounted Fluorescent, (1) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Frosted	1	13	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 13W Lamp	520	0.028	0.013	15	7
224	Labor & Industry	12th Floor	Brandy Burnham Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
225	Labor & Industry	12th Floor	Library Conference Room	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.161	0.077	251	120
226	Labor & Industry	12th Floor	Conference Room	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.321	0.154	501	241
227	Labor & Industry	12th Floor	Storage Room	1	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	520	0.080	0.039	42	20
228	Labor & Industry	12th Floor	Women's Room	7	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	7	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.303	0.118	2,656	1,032

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
229	Labor & Industry	12th Floor	Women's Room	2	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.106	0.051	933	451
230	Labor & Industry	12th Floor	Women's Room	2	12	1'x1' Square Recessed Compact Fluorescent, spiral, (1) 13W lamp Prismatic Acrylic Diffuser	2	9	Recessed Retrofit Wall Sconce with Rectangular LED Kit LED Light Fixture. (1) 9W	8760	0.023	0.018	206	156
231	Labor & Industry	12th Floor	Conference Room A	12	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	12	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.964	0.463	1,504	723
232	Labor & Industry	12th Floor	Room 1220	111	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	111	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	8.916	4.286	27,817	13,371
233	Labor & Industry	12th Floor	Room 1220	4	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	4	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.011	0.011	99	99
234	Labor & Industry	12th Floor	High Voltage Room	3	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	3	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.160	0.077	83	40
235	Labor & Industry	12th Floor	Directors Office	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.482	0.232	1,002	482
236	Labor & Industry	12th Floor	Directors Office A	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
237	Labor & Industry	12th Floor	Directors Office B	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.482	0.232	1,002	482
238	Labor & Industry	12th Floor	Service Elevator Vestibule	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.106	0.051	332	161
239	Labor & Industry	12th Floor	JC	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.053	0.026	55	27
240	Labor & Industry	12th Floor	Elevator Room	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
241	Labor & Industry	12th Floor	Data Closet	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	260	0.053	0.026	14	7
242	Labor & Industry	12th Floor	Men's Room	5	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	5	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.217	0.084	1,897	737
243	Labor & Industry	12th Floor	Men's Room	3	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.160	0.077	1,399	676
244	Labor & Industry	12th Floor	Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
245	Labor & Industry	12th Floor	Conference Room	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
246	Labor & Industry	12th Floor	Conference Room	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
247	Labor & Industry	12th Floor	Storage Closet	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	520	0.043	0.017	23	9
248	Labor & Industry	12th Floor	Small Office Suite	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
249	Labor & Industry	12th Floor	Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
250	Labor & Industry	12th Floor	Corridor/ Common Space	10	60	Recessed Can 8" Recessed Compact Fluorescent, quad, (2) 26W lamp Prismatic Acrylic Diffuser	10	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.596	0.168	1,858	525
251	Labor & Industry	12th Floor	Corridor/ Common Space	2	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	2	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.006	0.006	49	49
252	Labor & Industry	11th Floor	Room 1103A	19	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	19	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	1.526	0.734	4,762	2,289
253	Labor & Industry	11th Floor	Storage Closet	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	520	0.043	0.017	23	9
254	Labor & Industry	11th Floor	Storage Closet	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	520	0.043	0.017	23	9
255	Labor & Industry	11th Floor	Room 1103D	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
256	Labor & Industry	11th Floor	Room 1104	17	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	17	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	1.365	0.656	4,260	2,048
257	Labor & Industry	11th Floor	Corner Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
258	Labor & Industry	11th Floor	Conference Room	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.241	0.116	376	181
259	Labor & Industry	11th Floor	Room 1106	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
260	Labor & Industry	11th Floor	Room 1106 A	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
261	Labor & Industry	11th Floor	Room 1106 B	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
262	Labor & Industry	11th Floor	Room 1107	16	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	16	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	1.285	0.618	4,010	1,927
263	Labor & Industry	11th Floor	Office 1107	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
264	Labor & Industry	11th Floor	Women's Room	8	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	8	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.347	0.135	3,036	1,179
265	Labor & Industry	11th Floor	Women's Room	2	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.106	0.051	933	451
266	Labor & Industry	11th Floor	Women's Room	2	12	1'x1' Square Recessed Compact Fluorescent, spiral, (1) 13W lamp Prismatic Acrylic Diffuser	2	9	Recessed Retrofit Wall Sconce with Rectangular LED Kit LED Light Fixture. (1) 9W	8760	0.023	0.018	206	156
267	Labor & Industry	11th Floor	Corridor/ Common Area	10	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	10	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.803	0.386	2,506	1,205
268	Labor & Industry	11th Floor	Corridor/ Common Area	4	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	4	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.011	0.011	99	99
269	Labor & Industry	11th Floor	Corridor/ Common Area	2	60	Recessed Can 8" Recessed Compact Fluorescent, quad, (2) 26W lamp Prismatic Acrylic Diffuser	2	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.119	0.034	372	105
270	Labor & Industry	11th Floor	Room 1108	9	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	9	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.723	0.347	2,255	1,084
271	Labor & Industry	11th Floor	High Voltage Room	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
272	Labor & Industry	11th Floor	Room 1114	9	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	9	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.723	0.347	1,504	723
273	Labor & Industry	11th Floor	Room 1113	10	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	10	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.803	0.386	2,506	1,205
274	Labor & Industry	11th Floor	Hearing Room	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.482	0.232	1,504	723

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
275	Labor & Industry	11th Floor	Office	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.482	0.232	1,504	723
276	Labor & Industry	11th Floor	Service Elevator Vestibule	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.106	0.051	332	161
277	Labor & Industry	11th Floor	JC	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.053	0.026	55	27
278	Labor & Industry	11th Floor	Room 1116	20	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	20	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	1.606	0.772	5,012	2,409
279	Labor & Industry	11th Floor	Office	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.482	0.232	1,002	482
280	Labor & Industry	11th Floor	Corridor/ Common Area	35	60	Recessed Can 8" Recessed Compact Fluorescent, quad, (2) 26W lamp Prismatic Acrylic Diffuser	35	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	2.085	0.589	6,504	1,838
281	Labor & Industry	11th Floor	Corridor/ Common Area	3	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	3	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.008	0.008	74	74
282	Labor & Industry	11th Floor	Data Closet	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.053	0.026	28	13
283	Labor & Industry	11th Floor	Men's Room	5	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	5	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.217	0.084	1,897	737
284	Labor & Industry	11th Floor	Men's Room	3	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.160	0.077	1,399	676
285	Labor & Industry	11th Floor	Appeals Release	81	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	81	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	6.506	3.127	20,299	9,758
286	Labor & Industry	11th Floor	Appeals Release	3	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	3	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.008	0.008	74	74
287	Labor & Industry	10th Floor	Chief Counsel Suite	102	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	102	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	8.193	3.938	25,562	12,287
288	Labor & Industry	10th Floor	Chief Counsel Suite	22	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	22	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.953	0.370	2,973	1,155
289	Labor & Industry	10th Floor	Chief Counsel Suite	8	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	8	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.023	0.023	198	198
290	Labor & Industry	10th Floor	Marsha Sajer Office	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.482	0.232	1,002	482
291	Labor & Industry	10th Floor	Beth Singer Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
292	Labor & Industry	10th Floor	Troy Rohrbaugh Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
293	Labor & Industry	10th Floor	Copy Room	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
294	Labor & Industry	10th Floor	Copy Room	3	28	Drum Surface Mounted Compact Fluorescent, twin, (2) 13W lamp Frosted	3	15	Surface Mounted Drum LED Light Fixture. (1) 15W	2080	0.084	0.045	175	93
295	Labor & Industry	10th Floor	Storage Closet	1	53	2'x2' Troffer Recessed Fluorescent, (2) U-Tube, T-8 lamp, Instant Start Ballast Deep Cell Parabolic Diffuser	1	24	Recessed Install 2x2 3-Lamp White Reflector Kit LED 2' T8 Lamp (3) 8W Lamps	520	0.053	0.024	28	12
296	Labor & Industry	10th Floor	Storage Closet	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	520	0.043	0.017	23	9
297	Labor & Industry	10th Floor	Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
298	Labor & Industry	10th Floor	Christopher Giovanis Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
299	Labor & Industry	10th Floor	Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
300	Labor & Industry	10th Floor	Carla Arias Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
301	Labor & Industry	10th Floor	Robin Grenoble Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
302	Labor & Industry	10th Floor	Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
303	Labor & Industry	10th Floor	Lisa Sauder Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
304	Labor & Industry	10th Floor	Julie Vitale Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
305	Labor & Industry	10th Floor	Office Supply Storage	1	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.080	0.039	167	80
306	Labor & Industry	10th Floor	Kelly Smith Office	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.482	0.232	1,002	482
307	Labor & Industry	10th Floor	Office	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.482	0.232	1,002	482
308	Labor & Industry	10th Floor	Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
309	Labor & Industry	10th Floor	Conference Room	12	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	12	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.964	0.463	1,504	723
310	Labor & Industry	10th Floor	Small Conference Room	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.241	0.116	376	181
311	Labor & Industry	10th Floor	Catherine Lantzy Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
312	Labor & Industry	10th Floor	Dwight Decker Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
313	Labor & Industry	10th Floor	Beth Harris Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
314	Labor & Industry	10th Floor	Ron Legaspi Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
315	Labor & Industry	10th Floor	Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
316	Labor & Industry	10th Floor	Janet Tarczy Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
317	Labor & Industry	10th Floor	Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
318	Labor & Industry	10th Floor	Daniel Schramm Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
319	Labor & Industry	10th Floor	Shawn Westhafer Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
320	Labor & Industry	10th Floor	Paul Jordan Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
321	Labor & Industry	10th Floor	Law Library	17	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	17	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	1.365	0.656	4,260	2,048
322	Labor & Industry	10th Floor	Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
323	Labor & Industry	10th Floor	Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
324	Labor & Industry	10th Floor	Victoria Gloff Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
325	Labor & Industry	10th Floor	Colleen Reilly Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
326	Labor & Industry	10th Floor	Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
327	Labor & Industry	10th Floor	Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
328	Labor & Industry	10th Floor	Shawn Jayman Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
329	Labor & Industry	10th Floor	Supply Closet	2	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	2	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	520	0.087	0.034	45	18
330	Labor & Industry	10th Floor	ADA Restroom	1	28	1'x4' Troffer Recessed Fluorescent, (1) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	13	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 13W Lamp	1040	0.028	0.013	29	13
331	Labor & Industry	10th Floor	Women's Room	8	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	8	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.347	0.135	3,036	1,179
332	Labor & Industry	10th Floor	Women's Room	2	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.106	0.051	933	451
333	Labor & Industry	10th Floor	Women's Room	2	12	1'x1' Square Recessed Compact Fluorescent, spiral, (1) 13W lamp Prismatic Acrylic Diffuser	2	9	Recessed Retrofit Wall Sconce with Rectangular LED Kit LED Light Fixture. (1) 9W	8760	0.023	0.018	206	156
334	Labor & Industry	10th Floor	Room 1013	9	30	Recessed Can 8" Recessed Compact Fluorescent, quad, (1) 26W lamp Deep Cell Parabolic Diffuser	9	13	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 13W	3120	0.268	0.116	836	361
335	Labor & Industry	10th Floor	Electrical Closet	3	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	3	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.160	0.077	83	40
336	Labor & Industry	10th Floor	Room 1013	6	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	6	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.260	0.101	811	315
337	Labor & Industry	10th Floor	Room 1013	4	60	Recessed Can 8" Recessed Compact Fluorescent, quad, (2) 26W lamp Prismatic Acrylic Diffuser	4	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.238	0.067	743	210
338	Labor & Industry	10th Floor	Corner Office	4	30	Recessed Can 8" Recessed Compact Fluorescent, quad, (1) 26W lamp Deep Cell Parabolic Diffuser	4	13	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 13W	2080	0.119	0.051	248	107
339	Labor & Industry	10th Floor	Office	4	30	Recessed Can 8" Recessed Compact Fluorescent, quad, (1) 26W lamp Deep Cell Parabolic Diffuser	4	13	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 13W	2080	0.119	0.051	248	107
340	Labor & Industry	10th Floor	Robert Schraamm Office	4	60	Recessed Can 8" Recessed Compact Fluorescent, quad, (2) 26W lamp Prismatic Acrylic Diffuser	4	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	2080	0.238	0.067	496	140
341	Labor & Industry	10th Floor	Rebecca McClincy Office	4	60	Recessed Can 8" Recessed Compact Fluorescent, quad, (2) 26W lamp Prismatic Acrylic Diffuser	4	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	2080	0.238	0.067	496	140
342	Labor & Industry	10th Floor	Neil Mahalingham Office	4	60	Recessed Can 8" Recessed Compact Fluorescent, quad, (2) 26W lamp Prismatic Acrylic Diffuser	4	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	2080	0.238	0.067	496	140
343	Labor & Industry	10th Floor	Storage Closet	2	60	Recessed Can 8" Recessed Compact Fluorescent, quad, (2) 26W lamp Prismatic Acrylic Diffuser	2	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	520	0.119	0.034	62	18
344	Labor & Industry	10th Floor	Service Elevator Vestibule	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.106	0.051	332	161
345	Labor & Industry	10th Floor	JC	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.053	0.026	55	27
346	Labor & Industry	10th Floor	Data Closet	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	260	0.106	0.051	28	13
347	Labor & Industry	10th Floor	Men's Room	5	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	5	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.217	0.084	1,897	737
348	Labor & Industry	10th Floor	Men's Room	3	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.160	0.077	1,399	676
349	Labor & Industry	10th Floor	Corridor/ Common Space	43	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	43	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	1.863	0.724	5,812	2,258
350	Labor & Industry	10th Floor	Corridor/ Common Space	4	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	4	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.011	0.011	99	99
351	Labor & Industry	9th Floor	Room 900	11	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	11	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.884	0.425	2,757	1,325
352	Labor & Industry	9th Floor	Room 907	62	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	62	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	4.980	2.394	15,538	7,469
353	Labor & Industry	9th Floor	Room 904	30	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	30	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	2.410	1.158	7,518	3,614
354	Labor & Industry	9th Floor	Room 907	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.043	0.017	135	53
355	Labor & Industry	9th Floor	Room 908	14	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	14	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	1.125	0.541	3,508	1,686
356	Labor & Industry	9th Floor	Women's Room	8	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	8	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.347	0.135	3,036	1,179
357	Labor & Industry	9th Floor	Women's Room	2	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.106	0.051	933	451
358	Labor & Industry	9th Floor	Women's Room	2	12	1'x1' Square Recessed Compact Fluorescent, spiral, (1) 13W lamp Prismatic Acrylic Diffuser	2	9	Recessed Retrofit Wall Sconce with Rectangular LED Kit LED Light Fixture. (1) 9W	8760	0.023	0.018	206	156
359	Labor & Industry	9th Floor	Room 914	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.482	0.232	1,504	723
360	Labor & Industry	9th Floor	High Voltage Room	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
361	Labor & Industry	9th Floor	911-915 Suite	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.321	0.154	1,002	482
362	Labor & Industry	9th Floor	Office 911	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.482	0.232	1,002	482
363	Labor & Industry	9th Floor	Office 915	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.482	0.232	1,002	482
364	Labor & Industry	9th Floor	Service Elevator Vestibule	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.106	0.051	332	161
365	Labor & Industry	9th Floor	JC	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.053	0.026	55	27
366	Labor & Industry	9th Floor	914B	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
367	Labor & Industry	9th Floor	Room 916	26	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	26	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	2.088	1.004	6,516	3,132
368	Labor & Industry	9th Floor	Data Closet	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.053	0.026	28	13
369	Labor & Industry	9th Floor	Men's Room	5	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	5	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.217	0.084	1,897	737
370	Labor & Industry	9th Floor	Men's Room	3	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	3	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.160	0.077	1,399	676
371	Labor & Industry	9th Floor	Conference Room 921	15	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	15	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	1.205	0.579	1,880	903
372	Labor & Industry	9th Floor	Office 9025	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
373	Labor & Industry	9th Floor	Storage Closet	2	130	2'x4' Troffer Recessed Fluorescent, (4) 48", ES lamp Prismatic Acrylic Diffuser	2	51	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 13W Lamps	520	0.260	0.103	135	54
374	Labor & Industry	9th Floor	RDM Suite	50	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	50	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	4.016	1.931	12,530	6,023
375	Labor & Industry	9th Floor	RDM Suite	3	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	3	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.008	0.008	74	74
376	Labor & Industry	9th Floor	Storage Room	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	520	0.043	0.017	23	9
377	Labor & Industry	9th Floor	Storage Closet	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	520	0.043	0.017	23	9
378	Labor & Industry	9th Floor	Corridor/ Common Area	51	60	Recessed Can 8" Recessed Compact Fluorescent, quad, (2) 26W lamp Prismatic Acrylic Diffuser	51	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	3.038	0.858	9,478	2,678
379	Labor & Industry	9th Floor	Corridor/ Common Area	4	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	4	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.011	0.011	99	99
380	Labor & Industry	9th Floor	Corridor/ Common Area	2	60	Recessed Can 6" Recessed Compact Fluorescent, quad, (2) 26W lamp Prismatic Acrylic Diffuser	2	17	Recessed Recessed Can 6" LED Light Fixture. (1) 17W	3120	0.119	0.034	372	105
381	Labor & Industry	9th Floor	Corridor/ Common Area	5	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	5	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.402	0.193	1,253	602
382	Labor & Industry	8th Floor	EAS Open Office Area	238	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	238	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	19.117	9.189	59,644	28,670
383	Labor & Industry	8th Floor	Storage Closet	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	520	0.043	0.017	23	9
384	Labor & Industry	8th Floor	EAS Open Office Area	10	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	10	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.028	0.028	247	247
385	Labor & Industry	8th Floor	Women's Room	8	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	8	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.347	0.135	3,036	1,179
386	Labor & Industry	8th Floor	Women's Room	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.106	0.051	933	451
387	Labor & Industry	8th Floor	Women's Room	2	12	1'x1' Square Recessed Compact Fluorescent, spiral, (1) 13W lamp Prismatic Acrylic Diffuser	2	9	Recessed Retrofit Wall Sconce with Rectangular LED Kit LED Light Fixture. (1) 9W	8760	0.023	0.018	206	156
388	Labor & Industry	8th Floor	High Voltage Room	4	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	4	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.213	0.103	111	54
389	Labor & Industry	8th Floor	Room 811	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
390	Labor & Industry	8th Floor	Conference Room 815	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.482	0.232	752	361
391	Labor & Industry	8th Floor	Service Elevator Vestibule	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2600	0.053	0.026	138	67
392	Labor & Industry	8th Floor	JC	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.053	0.026	55	27
393	Labor & Industry	8th Floor	Computer Room	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.482	0.232	1,002	482
394	Labor & Industry	8th Floor	Storage Closet	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	520	0.043	0.017	23	9
395	Labor & Industry	8th Floor	Data Closet	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.053	0.026	28	13
396	Labor & Industry	8th Floor	Men's Room	5	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	5	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.217	0.084	1,897	737
397	Labor & Industry	8th Floor	Men's Room	3	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.160	0.077	1,399	676
398	Labor & Industry	8th Floor	Corridor/ Common Area	13	60	Recessed Can 8" Recessed Compact Fluorescent, quad, (2) 26W lamp Prismatic Acrylic Diffuser	13	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.774	0.219	2,416	683
399	Labor & Industry	8th Floor	Corridor/ Common Area	2	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	2	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.006	0.006	49	49
400	Labor & Industry	7th Floor	Room 700	69	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	69	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	5.542	2.664	17,292	8,312
401	Labor & Industry	7th Floor	Room 700	3	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	3	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.008	0.008	74	74
402	Labor & Industry	7th Floor	Storages Closet	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	520	0.043	0.017	23	9
403	Labor & Industry	7th Floor	Copy Room	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
404	Labor & Industry	7th Floor	Conference Room	5	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	5	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.402	0.193	627	301
405	Labor & Industry	7th Floor	Room 704	15	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	15	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	1.205	0.579	3,759	1,807
406	Labor & Industry	7th Floor	Women's Room	8	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	8	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.347	0.135	3,036	1,179
407	Labor & Industry	7th Floor	Women's Room	2	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.106	0.051	933	451
408	Labor & Industry	7th Floor	Women's Room	2	12	1'x1' Square Recessed Compact Fluorescent, spiral, (1) 13W lamp Prismatic Acrylic Diffuser	2	9	Recessed Retrofit Wall Sconce with Rectangular LED Kit LED Light Fixture. (1) 9W	8760	0.023	0.018	206	156
409	Labor & Industry	7th Floor	Room 708 Office	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.482	0.232	1,002	482
410	Labor & Industry	7th Floor	Room 708 Office	20	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	20	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	1.606	0.772	5,012	2,409
411	Labor & Industry	7th Floor	Corridor/ Common Area	35	60	Recessed Can 8" Recessed Compact Fluorescent, quad, (2) 26W lamp Prismatic Acrylic Diffuser	35	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	2.085	0.589	6,504	1,838
412	Labor & Industry	7th Floor	Corridor/ Common Area	11	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	11	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.884	0.425	2,757	1,325

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
413	Labor & Industry	7th Floor	Corridor/ Common Area	4	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	4	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.011	0.011	99	99
414	Labor & Industry	7th Floor	High Voltage Room	4	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	4	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.213	0.103	111	54
415	Labor & Industry	7th Floor	Service Elevator Vestibule	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.106	0.051	332	161
416	Labor & Industry	7th Floor	JC	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.053	0.026	55	27
417	Labor & Industry	7th Floor	7054-7061 Work Room	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.482	0.232	1,002	482
418	Labor & Industry	7th Floor	Computer Room	18	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	18	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	1.446	0.695	4,511	2,168
419	Labor & Industry	7th Floor	Men's Room	5	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	5	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	1040	0.217	0.084	225	88
420	Labor & Industry	7th Floor	Men's Room	3	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.160	0.077	166	80
421	Labor & Industry	7th Floor	Data Room	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	260	0.053	0.026	14	7
422	Labor & Industry	7th Floor	Employer Service Area	91	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	91	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	7.309	3.514	22,805	10,962
423	Labor & Industry	7th Floor	Employer Service Area	3	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	3	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.008	0.008	74	74
424	Labor & Industry	6th Floor	Room 600	142	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	142	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	11.406	5.483	35,586	17,106
425	Labor & Industry	6th Floor	Room 600	5	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	5	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.014	0.014	124	124
426	Labor & Industry	6th Floor	Storage Closet	2	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	2	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	520	0.087	0.034	45	18
427	Labor & Industry	6th Floor	Women's Room	8	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	8	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.347	0.135	3,036	1,179
428	Labor & Industry	6th Floor	Women's Room	2	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.106	0.051	933	451
429	Labor & Industry	6th Floor	Women's Room	2	12	1'x1' Square Recessed Compact Fluorescent, spiral, (1) 13W lamp Prismatic Acrylic Diffuser	2	9	Recessed Retrofit Wall Sconce with Rectangular LED Kit LED Light Fixture. (1) 9W	8760	0.023	0.018	206	156
430	Labor & Industry	6th Floor	Electrical Room	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
431	Labor & Industry	6th Floor	Room 611	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.482	0.232	1,002	482
432	Labor & Industry	6th Floor	Room 615	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.482	0.232	1,002	482
433	Labor & Industry	6th Floor	Service Elevator Vestibule	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.106	0.051	332	161
434	Labor & Industry	6th Floor	JC	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.053	0.026	55	27
435	Labor & Industry	6th Floor	Room 612	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
436	Labor & Industry	6th Floor	Corridor/ Common Area	10	60	Recessed Can 8" Recessed Compact Fluorescent, quad, (2) 26W lamp Prismatic Acrylic Diffuser	10	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.596	0.168	1,858	525
437	Labor & Industry	6th Floor	Corridor/ Common Area	2	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	2	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.006	0.006	49	49
438	Labor & Industry	6th Floor	Room 614	9	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	9	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.723	0.347	1,128	542
439	Labor & Industry	6th Floor	Room 625	85	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	85	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	6.827	3.282	21,302	10,239
440	Labor & Industry	6th Floor	Room 625	4	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	4	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.011	0.011	99	99
441	Labor & Industry	6th Floor	Men's Room	5	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	5	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.217	0.084	1,897	737
442	Labor & Industry	6th Floor	Men's Room	3	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.160	0.077	1,399	676
443	Labor & Industry	6th Floor	Data Closet	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	260	0.053	0.026	14	7
444	Labor & Industry	6th Floor	Office 06-002	8	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	8	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.643	0.309	1,337	642
445	Labor & Industry	6th Floor	Storage Closet	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	520	0.043	0.017	23	9
446	Labor & Industry	5th Floor	Room 500	134	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	134	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	10.763	5.174	33,581	16,142
447	Labor & Industry	5th Floor	Room 500	6	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	6	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.017	0.017	148	148
448	Labor & Industry	5th Floor	Storage Closet	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	520	0.043	0.017	23	9
449	Labor & Industry	5th Floor	Women's Room	8	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	8	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.347	0.135	3,036	1,179
450	Labor & Industry	5th Floor	Women's Room	2	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.106	0.051	933	451
451	Labor & Industry	5th Floor	Women's Room	2	12	1'x1' Square Recessed Compact Fluorescent, spiral, (1) 13W lamp Prismatic Acrylic Diffuser	2	9	Recessed Retrofit Wall Sconce with Rectangular LED Kit LED Light Fixture. (1) 9W	8760	0.023	0.018	206	156
452	Labor & Industry	5th Floor	Room 514 Conference Room	5	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	5	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.402	0.193	627	301
453	Labor & Industry	5th Floor	Electrical Closet	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
454	Labor & Industry	5th Floor	Service Elevator Vestibule	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.106	0.051	332	161
455	Labor & Industry	5th Floor	JC	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.053	0.026	55	27
456	Labor & Industry	5th Floor	Conference Room	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.321	0.154	501	241
457	Labor & Industry	5th Floor	Corridor/ Common Area	15	60	Recessed Can 8" Recessed Compact Fluorescent, quad, (2) 26W lamp Prismatic Acrylic Diffuser	15	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.893	0.252	2,788	788
458	Labor & Industry	5th Floor	Corridor/ Common Area	2	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	2	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.006	0.006	49	49

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
459	Labor & Industry	5th Floor	Data Closet	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	260	0.053	0.026	14	7
460	Labor & Industry	5th Floor	Men's Room	5	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	5	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.217	0.084	1,897	737
461	Labor & Industry	5th Floor	Men's Room	3	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.160	0.077	1,399	676
462	Labor & Industry	5th Floor	Room 514	16	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	16	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	1.285	0.618	4,010	1,927
463	Labor & Industry	5th Floor	Office 514	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.482	0.232	1,002	482
464	Labor & Industry	5th Floor	Office 514 A	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
465	Labor & Industry	5th Floor	Office 514 B	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
466	Labor & Industry	5th Floor	Room 528	10	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	10	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.803	0.386	2,506	1,205
467	Labor & Industry	5th Floor	Room 528 Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.161	0.077	501	241
468	Labor & Industry	5th Floor	Room 528 Conference Room	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.241	0.116	752	361
469	Labor & Industry	5th Floor	Room 521-525	65	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	65	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	5.221	2.510	16,289	7,830
470	Labor & Industry	5th Floor	Room 521-525	2	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	2	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.087	0.034	270	105
471	Labor & Industry	5th Floor	Room 521-525	3	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	3	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.008	0.008	74	74
472	Labor & Industry	4th Floor	New Office Wing (LED)	119	34	2'x4' Troffer Recessed LED 4' T8 Lamp (2) 18W Lamps Prismatic Acrylic Diffuser	119	34	Existing luminaire to remain as is No Retrofit. To remain as is.	2080	4.029	4.029	8,381	8,381
473	Labor & Industry	4th Floor	New Office Wing (LED)	24	13	Recessed Can 6" Recessed LED Light Fixture. (1) 14W Frosted	24	13	Existing luminaire to remain as is No Retrofit. To remain as is.	2080	0.316	0.316	657	657
474	Labor & Industry	4th Floor	New Office Wing (LED)	6	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	6	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.017	0.017	148	148
475	Labor & Industry	4th Floor	Room 400	44	130	2'x4' Troffer Recessed Fluorescent, (4) 48", ES lamp Prismatic Acrylic Diffuser	44	51	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 13W Lamps	3120	5.718	2.265	17,841	7,067
476	Labor & Industry	4th Floor	Room 400	9	74	2'x2' Troffer Recessed Fluorescent, (2) U-Tube, ES lamp Prismatic Acrylic Diffuser	9	24	Recessed Install 2x2 3-Lamp White Reflector Kit LED 2' T8 Lamp (3) 8W Lamps	3120	0.666	0.214	2,078	667
477	Labor & Industry	4th Floor	Room 400	3	19	Universal Face Exit Sign Surface Mounted EXIT Incandescent, (2) 10W lamp (No Diffuser)	3	1	Surface Mounted Universal Face Exit Sign; White EXIT Light Emitting Diode, (2) 0.5W lamp, Dual Sided	8760	0.057	0.003	499	26
478	Labor & Industry	4th Floor	Paul Alpaugh Office	8	130	2'x4' Troffer Recessed Fluorescent, (4) 48", ES lamp Prismatic Acrylic Diffuser	8	51	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 13W Lamps	2080	1.040	0.412	2,163	857
479	Labor & Industry	4th Floor	Cubicle Office	4	130	2'x4' Troffer Recessed Fluorescent, (4) 48", ES lamp Prismatic Acrylic Diffuser	4	51	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 13W Lamps	2080	0.520	0.206	1,081	428
480	Labor & Industry	4th Floor	Cubicle Office	3	74	2'x2' Troffer Recessed Fluorescent, (2) U-Tube, ES lamp Prismatic Acrylic Diffuser	3	24	Recessed Install 2x2 3-Lamp White Reflector Kit LED 2' T8 Lamp (3) 8W Lamps	2080	0.222	0.071	462	148
481	Labor & Industry	4th Floor	Check Stop Room	6	130	2'x4' Troffer Recessed Fluorescent, (4) 48", ES lamp Prismatic Acrylic Diffuser	6	51	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 13W Lamps	8760	0.780	0.309	6,831	2,706
482	Labor & Industry	4th Floor	Women's Room	8	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	8	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.347	0.135	3,036	1,179
483	Labor & Industry	4th Floor	Women's Room	2	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.106	0.051	933	451
484	Labor & Industry	4th Floor	Women's Room	2	12	1'x1' Square Recessed Compact Fluorescent, spiral, (1) 13W lamp Prismatic Acrylic Diffuser	2	9	Recessed Retrofit Wall Sconce with Rectangular LED Kit LED Light Fixture. (1) 9W	8760	0.023	0.018	206	156
485	Labor & Industry	4th Floor	Room 410	9	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	9	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.723	0.347	1,128	542
486	Labor & Industry	4th Floor	Electrical Room	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
487	Labor & Industry	4th Floor	Room 413	11	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	11	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.884	0.425	2,757	1,325
488	Labor & Industry	4th Floor	Room 410	1	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1560	0.053	0.026	83	40
489	Labor & Industry	4th Floor	Room 413 Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.321	0.154	1,002	482
490	Labor & Industry	4th Floor	Denise Williams Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
491	Labor & Industry	4th Floor	Charles Shughart Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
492	Labor & Industry	4th Floor	Room 418 A	17	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	17	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	1.365	0.656	4,260	2,048
493	Labor & Industry	4th Floor	Office A	1	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.080	0.039	167	80
494	Labor & Industry	4th Floor	Office A	1	53	2'x2' Troffer Recessed Fluorescent, (2) U-Tube, T-8 lamp, Instant Start Ballast Deep Cell Parabolic Diffuser	1	24	Recessed Install 2x2 3-Lamp White Reflector Kit LED 2' T8 Lamp (3) 8W Lamps	2080	0.053	0.024	111	49
495	Labor & Industry	4th Floor	Office B	1	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.080	0.039	167	80
496	Labor & Industry	4th Floor	Office B	1	53	2'x2' Troffer Recessed Fluorescent, (2) U-Tube, T-8 lamp, Instant Start Ballast Deep Cell Parabolic Diffuser	1	24	Recessed Install 2x2 3-Lamp White Reflector Kit LED 2' T8 Lamp (3) 8W Lamps	2080	0.053	0.024	111	49
497	Labor & Industry	4th Floor	Office C	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
498	Labor & Industry	4th Floor	Office D	1	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.080	0.039	167	80
499	Labor & Industry	4th Floor	Office C	2	53	2'x2' Troffer Recessed Fluorescent, (2) U-Tube, T-8 lamp, Instant Start Ballast Deep Cell Parabolic Diffuser	2	24	Recessed Install 2x2 3-Lamp White Reflector Kit LED 2' T8 Lamp (3) 8W Lamps	2080	0.106	0.048	222	99
500	Labor & Industry	4th Floor	Office D	1	53	2'x2' Troffer Recessed Fluorescent, (2) U-Tube, T-8 lamp, Instant Start Ballast Deep Cell Parabolic Diffuser	1	24	Recessed Install 2x2 3-Lamp White Reflector Kit LED 2' T8 Lamp (3) 8W Lamps	2080	0.053	0.024	111	49
501	Labor & Industry	4th Floor	Hearing Room	5	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	5	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.402	0.193	627	301
502	Labor & Industry	4th Floor	Office E	1	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.080	0.039	167	80
503	Labor & Industry	4th Floor	Office E	1	53	2'x2' Troffer Recessed Fluorescent, (2) U-Tube, T-8 lamp, Instant Start Ballast Deep Cell Parabolic Diffuser	1	24	Recessed Install 2x2 3-Lamp White Reflector Kit LED 2' T8 Lamp (3) 8W Lamps	2080	0.053	0.024	111	49
504	Labor & Industry	4th Floor	Office F	1	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.080	0.039	167	80

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
505	Labor & Industry	4th Floor	Office F	1	53	2'x2' Troffer Recessed Fluorescent, (2) U-Tube, T-8 lamp, Instant Start Ballast Deep Cell Parabolic Diffuser	1	24	Recessed Install 2x2 3-Lamp White Reflector Kit LED 2' T8 Lamp (3) 8W Lamps	2080	0.053	0.024	111	49
506	Labor & Industry	4th Floor	Room 418 A	4	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	4	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.173	0.067	541	210
507	Labor & Industry	4th Floor	Room 418 A	2	53	2'x2' Troffer Recessed Fluorescent, (2) U-Tube, T-8 lamp, Instant Start Ballast Deep Cell Parabolic Diffuser	2	24	Recessed Install 2x2 3-Lamp White Reflector Kit LED 2' T8 Lamp (3) 8W Lamps	3120	0.106	0.048	332	148
508	Labor & Industry	4th Floor	Office G	5	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	5	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.402	0.193	835	402
509	Labor & Industry	4th Floor	Room 418 B	18	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	18	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	1.446	0.695	4,511	2,168
510	Labor & Industry	4th Floor	Law Library	10	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	10	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.803	0.386	1,671	803
511	Labor & Industry	4th Floor	Law Library	1	53	2'x2' Troffer Recessed Fluorescent, (2) U-Tube, T-8 lamp, Instant Start Ballast Deep Cell Parabolic Diffuser	1	24	Recessed Install 2x2 3-Lamp White Reflector Kit LED 2' T8 Lamp (3) 8W Lamps	2080	0.053	0.024	111	49
512	Labor & Industry	4th Floor	Conference Room	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.161	0.077	251	120
513	Labor & Industry	4th Floor	Room 418 B	5	53	2'x2' Troffer Recessed Fluorescent, (2) U-Tube, T-8 lamp, Instant Start Ballast Deep Cell Parabolic Diffuser	5	24	Recessed Install 2x2 3-Lamp White Reflector Kit LED 2' T8 Lamp (3) 8W Lamps	3120	0.266	0.119	831	371
514	Labor & Industry	4th Floor	Room 418 B	3	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	3	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.130	0.050	405	158
515	Labor & Industry	4th Floor	Office A	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
516	Labor & Industry	4th Floor	Office B	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
517	Labor & Industry	4th Floor	Office C	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
518	Labor & Industry	4th Floor	Office D	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
519	Labor & Industry	4th Floor	Cafeteria Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
520	Labor & Industry	4th Floor	Corridor/ Common Area	26	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	26	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	2.088	1.004	6,516	3,132
521	Labor & Industry	4th Floor	Corridor/ Common Area	6	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	6	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.017	0.017	148	148
522	Labor & Industry	4th Floor	Data Closet	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	260	0.053	0.026	14	7
523	Labor & Industry	4th Floor	Men's Room	5	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	5	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.217	0.084	1,897	737
524	Labor & Industry	4th Floor	Men's Room	3	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.160	0.077	1,399	676
525	Labor & Industry	4th Floor	Corridor/ Common Area	11	60	Recessed Can 8" Recessed Compact Fluorescent, quad, (2) 26W lamp Prismatic Acrylic Diffuser	11	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.655	0.185	2,044	578
526	Labor & Industry	4th Floor	Corridor/ Common Area	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.043	0.017	135	53
527	Labor & Industry	4th Floor	Dining Service Corridor	11	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	11	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.884	0.425	2,757	1,325
528	Labor & Industry	4th Floor	Dining Service Corridor	2	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	2	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.006	0.006	49	49
529	Labor & Industry	4th Floor	Dry Storage	4	130	4' Wraparound Surface Mounted Fluorescent, (4) 48", ES lamp Prismatic Acrylic Diffuser	4	51	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 13W Lamps	3640	0.520	0.206	1,892	750
530	Labor & Industry	4th Floor	Walk in Cooler	2	21	Jelly Jar Wall Mounted Compact Fluorescent, spiral, (1) 23W lamp Glass Jelly Jar	2	8	Wall Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.042	0.016	86	34
531	Labor & Industry	4th Floor	Paper Storage	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	520	0.482	0.232	251	120
532	Labor & Industry	4th Floor	Storage Room	3	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.160	0.077	83	40
533	Labor & Industry	4th Floor	Training Room	21	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	21	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1560	1.118	0.541	1,744	843
534	Labor & Industry	4th Floor	Training Room	2	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	2	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.006	0.006	49	49
535	Labor & Industry	4th Floor	Dining Area	47	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	47	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3640	2.503	1.210	9,110	4,404
536	Labor & Industry	4th Floor	Dining Area	7	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	7	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3640	0.562	0.270	2,047	984
537	Labor & Industry	4th Floor	Dining Area	3	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	3	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.008	0.008	74	74
538	Labor & Industry	4th Floor	Dining Area	4	228	Wall Sconce Wall Mounted Incandescent, (2) 120W lamp Frosted	4	16	Wall Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (2) 9W lamp	3640	0.912	0.065	3,320	236
539	Labor & Industry	4th Floor	Serving Area/ Kitchen	14	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	14	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3640	0.745	0.360	2,713	1,312
540	Labor & Industry	4th Floor	Serving Area/ Kitchen	7	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	7	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3640	0.562	0.270	2,047	984
541	Labor & Industry	4th Floor	Serving Area/ Kitchen	10	21	Recessed Can 6" Recessed Compact Fluorescent, spiral, (1) 23W lamp Frosted	10	8	Recessed Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	3640	0.208	0.081	756	295
542	Labor & Industry	4th Floor	Serving Area/ Kitchen	3	228	Wall Sconce Wall Mounted Incandescent, (2) 120W lamp Frosted	3	16	Wall Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (2) 9W lamp	3640	0.684	0.049	2,490	177
543	Labor & Industry	4th Floor	Serving Area/ Kitchen	19	28	1'x4' Troffer Recessed Fluorescent, (1) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	19	13	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 13W Lamp	3640	0.532	0.245	1,935	890
544	Labor & Industry	4th Floor	Serving Area/ Kitchen	4	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	4	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.011	0.011	99	99
545	Labor & Industry	4th Floor	Serving Area/ Kitchen	8	21	Jelly Jar Surface Mounted Compact Fluorescent, spiral, (1) 23W lamp Glass Jelly Jar	8	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	3640	0.166	0.065	604	236
546	Labor & Industry	4th Floor	JC	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	1040	0.043	0.017	45	18
547	Labor & Industry	4th Floor	Storage Room	2	28	1'x4' Troffer Recessed Fluorescent, (1) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	13	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 13W Lamp	3640	0.056	0.026	204	94
548	Labor & Industry	4th Floor	Storage Room	2	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3640	0.106	0.051	388	187
549	Labor & Industry	4th Floor	Serving Area/ Kitchen	3	57	Wall Sconce Wall Mounted Incandescent, (1) 60W lamp Frosted	3	8	Wall Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	3640	0.171	0.024	622	88
550	Labor & Industry	4th Floor	Kitchen Elevator	2	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3640	0.106	0.051	388	187

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
551	Labor & Industry	4th Floor	Kitchen Elevator	1	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3640	0.080	0.039	292	141
552	Labor & Industry	4th Floor	Restroom A	1	130	4' Wraparound Surface Mounted Fluorescent, (4) 48", ES lamp Prismatic Acrylic Diffuser	1	51	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 13W Lamps	200	0.130	0.051	26	10
553	Labor & Industry	4th Floor	Restroom B	1	130	4' Wraparound Surface Mounted Fluorescent, (4) 48", ES lamp Prismatic Acrylic Diffuser	1	51	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 13W Lamps	200	0.130	0.051	26	10
554	Labor & Industry	3rd Floor	Room 300 East Wing	285	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	285	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	22.892	11.004	71,423	34,332
555	Labor & Industry	3rd Floor	Room 300 East Wing	11	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	11	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.031	0.031	272	272
556	Labor & Industry	3rd Floor	Conference Room 300C	5	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	5	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.402	0.193	627	301
557	Labor & Industry	3rd Floor	IT Room	1	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	260	0.080	0.039	21	10
558	Labor & Industry	3rd Floor	Conference Room 300B	10	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	10	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.803	0.386	1,253	602
559	Labor & Industry	3rd Floor	Conference Room 300B	1	53	2'x2' Troffer Recessed Fluorescent, (2) U-Tube, T-8 lamp, Instant Start Ballast Deep Cell Parabolic Diffuser	1	24	Recessed Install 2x2 3-Lamp White Reflector Kit LED 2' T8 Lamp (3) 8W Lamps	1560	0.053	0.024	83	37
560	Labor & Industry	3rd Floor	Christine Yalovich Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
561	Labor & Industry	3rd Floor	Women's Room	8	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	8	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.347	0.135	3,036	1,179
562	Labor & Industry	3rd Floor	Women's Room	2	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.106	0.051	933	451
563	Labor & Industry	3rd Floor	Women's Room	2	12	1'x1' Square Recessed Compact Fluorescent, spiral, (1) 13W lamp Prismatic Acrylic Diffuser	2	9	Recessed Retrofit Wall Sconce with Rectangular LED Kit LED Light Fixture. (1) 9W	8760	0.023	0.018	206	156
564	Labor & Industry	3rd Floor	Files Storage	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
565	Labor & Industry	3rd Floor	Conference Room 300A	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.241	0.116	376	181
566	Labor & Industry	3rd Floor	High Voltage Room	4	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	4	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.213	0.103	111	54
567	Labor & Industry	3rd Floor	Information Service	14	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	14	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	1.125	0.541	3,508	1,686
568	Labor & Industry	3rd Floor	Information Service	1	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	1	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.003	0.003	25	25
569	Labor & Industry	3rd Floor	Drew Brown Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
570	Labor & Industry	3rd Floor	Data Room	6	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	6	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	260	0.319	0.154	83	40
571	Labor & Industry	3rd Floor	Service Elevator Vestibule	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.106	0.051	332	161
572	Labor & Industry	3rd Floor	JC	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.053	0.026	55	27
573	Labor & Industry	3rd Floor	Corridor/ Common Area	10	60	Recessed Can 8" Recessed Compact Fluorescent, quad, (2) 26W lamp Prismatic Acrylic Diffuser	10	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.596	0.168	1,858	525
574	Labor & Industry	3rd Floor	Corridor/ Common Area	2	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	2	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.006	0.006	49	49
575	Labor & Industry	3rd Floor	Data Closet	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	260	0.053	0.026	14	7
576	Labor & Industry	3rd Floor	Men's Room	5	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	5	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.217	0.084	1,897	737
577	Labor & Industry	3rd Floor	Men's Room	3	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.160	0.077	1,399	676
578	Labor & Industry	3rd Floor	Joe Sheridan Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
579	Labor & Industry	3rd Floor	Secure Area Vestibule	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.161	0.077	501	241
580	Labor & Industry	3rd Floor	Secure Area Vestibule	1	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	1	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.003	0.003	25	25
581	Labor & Industry	3rd Floor	Elevator Vestibule	1	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.080	0.039	251	120
582	Labor & Industry	3rd Floor	L&I Equipment Storage	9	53	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	9	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.479	0.232	249	120
583	Labor & Industry	3rd Floor	L&I Equipment Storage	3	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	3	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.160	0.077	83	40
584	Labor & Industry	3rd Floor	Catacomb Corridor	5	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	5	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.266	0.129	831	402
585	Labor & Industry	3rd Floor	Catacomb Corridor	1	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	1	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.003	0.003	25	25
586	Labor & Industry	3rd Floor	Catacombs	52	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	52	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1560	2.769	1.338	4,319	2,088
587	Labor & Industry	3rd Floor	Catacombs	4	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	4	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.011	0.011	99	99
588	Labor & Industry	2nd Floor	Room 252	56	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	56	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	4.498	2.162	14,034	6,746
589	Labor & Industry	2nd Floor	Room 252	3	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	3	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.008	0.008	74	74
590	Labor & Industry	2nd Floor	Conference Room	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.241	0.116	376	181
591	Labor & Industry	2nd Floor	Susan Bickleman Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.241	0.116	752	361
592	Labor & Industry	2nd Floor	IT Room	1	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	260	0.080	0.039	21	10
593	Labor & Industry	2nd Floor	Room 201	14	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	14	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	1.125	0.541	3,508	1,686
594	Labor & Industry	2nd Floor	Men's Room	2	65	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", ES lamp Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.130	0.051	1,138	451
595	Labor & Industry	2nd Floor	Men's Room	2	12	1'x1' Square Recessed Compact Fluorescent, spiral, (1) 13W lamp Prismatic Acrylic Diffuser	2	9	Recessed Retrofit Wall Sconce with Rectangular LED Kit LED Light Fixture. (1) 9W	8760	0.023	0.018	206	156
596	Labor & Industry	2nd Floor	JC	1	21	Poker Hat/RLM Shade Surface Mounted Compact Fluorescent, spiral, (1) 23W lamp (No Diffuser)	1	10	Surface Mounted Install LED Screw-in BR30 Lamp Light Emitting Diode Lamp, Screw-in, (1) 11W lamp	1040	0.021	0.010	22	10

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
597	Labor & Industry	2nd Floor	Women's Room	4	53	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.213	0.103	1,866	902
598	Labor & Industry	2nd Floor	Women's Room	2	12	1'x1' Square Recessed Compact Fluorescent, spiral, (1) 13W lamp Prismatic Acrylic Diffuser	2	9	Recessed Retrofit Wall Sconce with Rectangular LED Kit LED Light Fixture. (1) 9W	8760	0.023	0.018	206	156
599	Labor & Industry	2nd Floor	Mechanical Room	3	38	Poker Hat/RLM Shade Surface Mounted Compact Fluorescent, spiral, (1) 42W lamp (No Diffuser)	3	10	Surface Mounted Install LED Screw-in BR30 Lamp Light Emitting Diode Lamp, Screw-in, (1) 11W lamp	520	0.114	0.030	59	15
600	Labor & Industry	2nd Floor	Room 205	47	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	47	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	3.775	1.815	11,778	5,662
601	Labor & Industry	2nd Floor	Room 202	42	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	42	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	3.374	1.622	10,525	5,059
602	Labor & Industry	2nd Floor	Women's Room	8	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	8	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.347	0.135	3,036	1,179
603	Labor & Industry	2nd Floor	Women's Room	2	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.106	0.051	933	451
604	Labor & Industry	2nd Floor	Women's Room	2	12	1'x1' Square Recessed Compact Fluorescent, spiral, (1) 13W lamp Prismatic Acrylic Diffuser	2	9	Recessed Retrofit Wall Sconce with Rectangular LED Kit LED Light Fixture. (1) 9W	8760	0.023	0.018	206	156
605	Labor & Industry	2nd Floor	Room 212	8	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	8	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.643	0.309	1,002	482
606	Labor & Industry	2nd Floor	Room 213	10	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	10	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.803	0.386	2,506	1,205
607	Labor & Industry	2nd Floor	Randy Stambaugh Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
608	Labor & Industry	2nd Floor	Room 213	3	60	Recessed Can 8" Recessed Compact Fluorescent, quad, (2) 26W lamp Prismatic Acrylic Diffuser	3	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.179	0.050	558	158
609	Labor & Industry	2nd Floor	Nathan Bortner Office	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.482	0.232	1,002	482
610	Labor & Industry	2nd Floor	High Voltage Room	4	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	4	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.213	0.103	111	54
611	Labor & Industry	2nd Floor	Service Elevator Vestibule	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.106	0.051	332	161
612	Labor & Industry	2nd Floor	JC	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.053	0.026	55	27
613	Labor & Industry	2nd Floor	Room 216	15	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	15	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	1.205	0.579	3,759	1,807
614	Labor & Industry	2nd Floor	Matt Kegg Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
615	Labor & Industry	2nd Floor	Data Closet	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	260	0.053	0.026	14	7
616	Labor & Industry	2nd Floor	Men's Room	5	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	5	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.217	0.084	1,897	737
617	Labor & Industry	2nd Floor	Men's Room	3	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.160	0.077	1,399	676
618	Labor & Industry	2nd Floor	Corridor/ Common Area	47	60	Recessed Can 8" Recessed Compact Fluorescent, quad, (2) 26W lamp Prismatic Acrylic Diffuser	47	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	2.800	0.791	8,735	2,468
619	Labor & Industry	2nd Floor	Corridor/ Common Area	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.321	0.154	1,002	482
620	Labor & Industry	2nd Floor	Corridor/ Common Area	6	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	6	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.017	0.017	148	148
621	Labor & Industry	2nd Floor	Room 220	49	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	49	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	3.936	1.892	12,280	5,903
622	Labor & Industry	2nd Floor	Room 220	9	60	Recessed Can 8" Recessed Compact Fluorescent, quad, (2) 26W lamp Prismatic Acrylic Diffuser	9	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.536	0.151	1,673	473
623	Labor & Industry	2nd Floor	Room 220	21	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	21	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	1.687	0.811	5,263	2,530
624	Labor & Industry	2nd Floor	Room 220	2	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	2	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.006	0.006	49	49
625	Labor & Industry	2nd Floor	Keith Bailey Office	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.482	0.232	1,002	482
626	Labor & Industry	2nd Floor	Small Conference Room	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
627	Labor & Industry	2nd Floor	Mark Hoover Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
628	Labor & Industry	2nd Floor	Conference Room 31	9	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	9	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.723	0.347	1,128	542
629	Labor & Industry	2nd Floor	CWIA Area	1	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.080	0.039	251	120
630	Labor & Industry	2nd Floor	CWIA Area	179	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	179	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	14.378	6.911	44,859	21,563
631	Labor & Industry	2nd Floor	CWIA Area	4	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	4	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.011	0.011	99	99
632	Labor & Industry	2nd Floor	Tom Hecht Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
633	Labor & Industry	2nd Floor	Ed Legge Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
634	Labor & Industry	2nd Floor	Wiring Closet	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	260	0.161	0.077	42	20
635	Labor & Industry	1st Floor	Conference Room 162E	8	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	8	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.643	0.309	1,002	482
636	Labor & Industry	1st Floor	Conference Room 162E	11	86	Recessed Can 8" Recessed Halogen Incandescent, (1) 90W lamp (No Diffuser)	11	27	Recessed Recessed Can 8" LED Light Fixture. (1) 27W	1560	0.941	0.294	1,467	459
637	Labor & Industry	1st Floor	Conference Room 162E	2	48	Track Light Surface Mounted Halogen Incandescent, (1) 50W lamp (No Diffuser)	2	7	Surface Mounted Install LED Plug-in MR16 Lamp Light Emitting Diode Lamp, Screw-in, (1) 8W lamp	1560	0.095	0.014	148	22
638	Labor & Industry	1st Floor	Room 155E	30	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	30	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	2.410	1.158	7,518	3,614
639	Labor & Industry	1st Floor	Conference Room 1-83	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.321	0.154	501	241
640	Labor & Industry	1st Floor	Storage Room	1	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	520	0.080	0.039	42	20
641	Labor & Industry	1st Floor	Storage Room	1	80	2'x4' Troffer Surface Mounted Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	39	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	520	0.080	0.039	42	20
642	Labor & Industry	1st Floor	Computer Work Room	8	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	8	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.643	0.309	1,337	642

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
643	Labor & Industry	1st Floor	Elizabeth Parker Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
644	Labor & Industry	1st Floor	Corridor	10	60	Recessed Can 8" Recessed Compact Fluorescent, quad, (2) 26W lamp Prismatic Acrylic Diffuser	10	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.596	0.168	1,858	525
645	Labor & Industry	1st Floor	Corridor	2	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	2	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.006	0.006	49	49
646	Labor & Industry	1st Floor	IT Closet	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	260	0.053	0.026	14	7
647	Labor & Industry	1st Floor	Restroom	1	80	1'x4' Troffer Recessed Flanged Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	39	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	8760	0.080	0.039	704	338
648	Labor & Industry	1st Floor	Restroom	1	80	1'x4' Troffer Recessed Flanged Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	39	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	8760	0.080	0.039	704	338
649	Labor & Industry	1st Floor	Childcare Center 150 Common Hall	4	60	Recessed Can 8" Recessed Compact Fluorescent, quad, (2) 26W lamp Prismatic Acrylic Diffuser	4	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	2080	0.238	0.067	496	140
650	Labor & Industry	1st Floor	Childcare Center 150 Common Hall	1	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	1	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.003	0.003	25	25
651	Labor & Industry	1st Floor	Room 150 Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
652	Labor & Industry	1st Floor	Nursery Room	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.482	0.232	1,002	482
653	Labor & Industry	1st Floor	Playroom	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.482	0.232	1,002	482
654	Labor & Industry	1st Floor	Breakroom	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
655	Labor & Industry	1st Floor	Daycare Room	16	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	16	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	1.285	0.618	2,673	1,285
656	Labor & Industry	1st Floor	Daycare Room	1	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	1	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.003	0.003	25	25
657	Labor & Industry	1st Floor	Daycare Restroom	2	65	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", ES lamp Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.130	0.051	270	107
658	Labor & Industry	1st Floor	Daycare Restroom	2	12	1'x1' Square Recessed Compact Fluorescent, spiral, (1) 13W lamp Prismatic Acrylic Diffuser	2	9	Recessed Retrofit Wall Sconce with Rectangular LED Kit LED Light Fixture. (1) 9W	2080	0.023	0.018	49	37
659	Labor & Industry	1st Floor	Daycare Restroom	1	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	1	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.003	0.003	25	25
660	Labor & Industry	1st Floor	JC	1	21	Poker Hat/RLM Shade Surface Mounted Compact Fluorescent, spiral, (1) 23W lamp (No Diffuser)	1	10	Surface Mounted Install LED Screw-in BR30 Lamp Light Emitting Diode Lamp, Screw-in, (1) 11W lamp	1040	0.021	0.010	22	10
661	Labor & Industry	1st Floor	Daycare Storage	1	65	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", ES lamp Prismatic Acrylic Diffuser	1	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.065	0.026	34	13
662	Labor & Industry	1st Floor	Nursing Room	1	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	520	0.080	0.039	42	20
663	Labor & Industry	1st Floor	Room 101-103	26	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	26	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	2.088	1.004	6,516	3,132
664	Labor & Industry	1st Floor	Conference 100 East	18	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	18	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	1.446	0.695	2,255	1,084
665	Labor & Industry	1st Floor	Conference 100 East	28	86	Recessed Can 8" Recessed Halogen Incandescent, (1) 90W lamp (No Diffuser)	28	27	Recessed Recessed Can 8" LED Light Fixture. (1) 27W	1560	2.394	0.748	3,735	1,168
666	Labor & Industry	1st Floor	Conference 100 East	3	48	Track Light Surface Mounted Halogen Incandescent, (1) 50W lamp (No Diffuser)	3	7	Surface Mounted Install LED Plug-in MR16 Lamp Light Emitting Diode Lamp, Screw-in, (1) 8W lamp	1560	0.143	0.022	222	34
667	Labor & Industry	1st Floor	IT Room	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	260	0.161	0.077	42	20
668	Labor & Industry	1st Floor	Kitchen	4	104	1'x4' Troffer Recessed Flanged Fluorescent, (3) 48", ES lamp Prismatic Acrylic Diffuser	4	39	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.415	0.154	864	321
669	Labor & Industry	1st Floor	Computer Room	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.482	0.232	1,002	482
670	Labor & Industry	1st Floor	Corridor	8	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	8	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.643	0.309	2,005	964
671	Labor & Industry	1st Floor	Corridor	4	60	Recessed Can 8" Recessed Compact Fluorescent, quad, (2) 26W lamp Prismatic Acrylic Diffuser	4	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.238	0.067	743	210
672	Labor & Industry	1st Floor	Corridor	2	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	2	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.006	0.006	49	49
673	Labor & Industry	1st Floor	Ladies Room	8	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	8	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.347	0.135	3,036	1,179
674	Labor & Industry	1st Floor	Ladies Room	2	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.106	0.051	933	451
675	Labor & Industry	1st Floor	Ladies Room	2	12	1'x1' Square Recessed Compact Fluorescent, spiral, (1) 13W lamp Prismatic Acrylic Diffuser	2	9	Recessed Retrofit Wall Sconce with Rectangular LED Kit LED Light Fixture. (1) 9W	8760	0.023	0.018	206	156
676	Labor & Industry	1st Floor	Main Lobby	54	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	54	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	2.339	0.909	7,299	2,836
677	Labor & Industry	1st Floor	Main Lobby	2	80	1'x4' Troffer Recessed Flanged Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	39	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.161	0.077	501	241
678	Labor & Industry	1st Floor	Main Lobby	17	48	Track Light Surface Mounted Halogen Incandescent, (1) 50W lamp (No Diffuser)	17	7	Surface Mounted Install LED Screw-in PAR20 Lamp Light Emitting Diode Lamp, Screw-in, (1) 8W lamp	3120	0.808	0.122	2,519	382
679	Labor & Industry	1st Floor	Main Lobby	90	28	4' Strip Cove Mounted Fluorescent, (1) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	90	13	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 13W Lamp	3120	2.518	1.158	7,856	3,614
680	Labor & Industry	1st Floor	Main Lobby	10	23	3' Strip Cove Mounted Fluorescent, (1) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	10	12	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	3120	0.235	0.119	732	371
681	Labor & Industry	1st Floor	Main Lobby	5	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	5	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.014	0.014	124	124
682	Labor & Industry	1st Floor	Main Lobby	8	65	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", ES lamp Prismatic Acrylic Diffuser	8	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.520	0.206	1,622	642
683	Labor & Industry	1st Floor	Electrical Closet	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
684	Labor & Industry	1st Floor	Fire Command Center	5	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	5	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	1560	0.217	0.084	338	131
685	Labor & Industry	1st Floor	Service Elevator Vestibule	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.106	0.051	332	161
686	Labor & Industry	1st Floor	JC	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.053	0.026	55	27
687	Labor & Industry	1st Floor	Data Closet	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	260	0.106	0.051	28	13
688	Labor & Industry	1st Floor	Men's Room	5	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	5	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.217	0.084	1,897	737

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
689	Labor & Industry	1st Floor	Men's Room	3	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.160	0.077	1,399	676
690	Labor & Industry	1st Floor	Room 125 West	74	65	2'x4' Troffer Recessed Fluorescent, (2) 48", ES lamp Deep Cell Parabolic Diffuser	74	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	4.809	1.905	15,003	5,943
691	Labor & Industry	1st Floor	Room 125 West	7	74	2'x2' Troffer Recessed Fluorescent, (2) U-Tube, ES lamp Deep Cell Parabolic Diffuser	7	24	Recessed Install 2x2 3-Lamp White Reflector Kit LED 2' T8 Lamp (3) 8W Lamps	3120	0.518	0.166	1,616	519
692	Labor & Industry	1st Floor	Room 124	44	104	2'x4' Troffer Recessed Fluorescent, (3) 48", ES lamp Deep Cell Parabolic Diffuser	44	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	4.567	1.699	14,248	5,300
693	Labor & Industry	1st Floor	Room 124	4	65	1'x4' Troffer Recessed Fluorescent, (2) 48", ES lamp Prismatic Acrylic Diffuser	4	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.260	0.103	811	321
694	Labor & Industry	1st Floor	Room 124	1	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	1	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.003	0.003	25	25
695	Labor & Industry	1st Floor	Room 124	13	74	2'x2' Troffer Recessed Fluorescent, (2) U-Tube, ES lamp Deep Cell Parabolic Diffuser	13	24	Recessed Install 2x2 3-Lamp White Reflector Kit LED 2' T8 Lamp (3) 8W Lamps	3120	0.962	0.309	3,002	964
696	Labor & Industry	1st Floor	Room 124	27	65	2'x4' Troffer Recessed Fluorescent, (2) 48", ES lamp Deep Cell Parabolic Diffuser	27	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	1.754	0.695	5,474	2,168
697	Labor & Industry	1st Floor	Office 124-007	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
698	Labor & Industry	1st Floor	Server Room	28	65	2'x4' Troffer Recessed Fluorescent, (2) 48", ES lamp Prismatic Acrylic Diffuser	28	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	1.819	0.721	15,938	6,314
699	Labor & Industry	1st Floor	Large Server Room	86	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	86	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	8760	6.908	3.320	60,512	29,087
700	Labor & Industry	1st Floor	Large Server Room	87	104	2'x4' Troffer Recessed Fluorescent, (3) 48", ES lamp Prismatic Acrylic Diffuser	87	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	8760	9.030	3.359	79,099	29,425
701	Labor & Industry	1st Floor	Large Server Room	2	19	Universal Face Exit Sign Surface Mounted EXIT Incandescent, (2) 10W lamp (No Diffuser)	2	1	Surface Mounted Universal Face Exit Sign; White EXIT Light Emitting Diode, (2) 0.5W lamp, Dual Sided	8760	0.038	0.002	333	17
702	Labor & Industry	1st Floor	Storage Room	2	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
703	Labor & Industry	1st Floor	Large Server Room	1	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	1	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.003	0.003	25	25
704	Labor & Industry	1st Floor	Small Vestibule	1	65	2'x4' Troffer Recessed Fluorescent, (2) 48", ES lamp Deep Cell Parabolic Diffuser	1	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.065	0.026	569	225
705	Labor & Industry	1st Floor	Exit Vestibule	1	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.080	0.039	251	120
706	Labor & Industry	1st Floor	Exit Vestibule	1	28	1'x4' Troffer Recessed Fluorescent, (1) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	13	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 13W Lamp	3120	0.028	0.013	87	40
707	Labor & Industry	1st Floor	Exit Vestibule	2	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	2	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.006	0.006	49	49
708	Labor & Industry	1st Floor	Corridor	14	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	14	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	1.125	0.541	3,508	1,686
709	Labor & Industry	1st Floor	Corridor	1	19	Universal Face Exit Sign Wall Mounted EXIT Compact Fluorescent, (2) 7W lamp (No Diffuser)	1	1	Wall Mounted Universal Face Exit Sign; Black EXIT Light Emitting Diode, (2) 0.5W lamp, Dual Sided	8760	0.019	0.001	166	9
710	Labor & Industry	1st Floor	Corridor	3	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	3	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.008	0.008	74	74
711	Labor & Industry	1st Floor	Women's Room	2	53	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.106	0.051	111	54
712	Labor & Industry	1st Floor	Women's Room	2	12	1'x1' Square Recessed Compact Fluorescent, spiral, (1) 13W lamp Prismatic Acrylic Diffuser	2	9	Recessed Retrofit Wall Sconce with Rectangular LED Kit LED Light Fixture. (1) 9W	1040	0.023	0.018	24	19
713	Labor & Industry	1st Floor	Men's Room	2	53	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.106	0.051	111	54
714	Labor & Industry	1st Floor	Men's Room	2	12	1'x1' Square Recessed Compact Fluorescent, spiral, (1) 13W lamp Prismatic Acrylic Diffuser	2	9	Recessed Retrofit Wall Sconce with Rectangular LED Kit LED Light Fixture. (1) 9W	1040	0.023	0.018	24	19
715	Labor & Industry	1st Floor	Corridor	10	74	2'x2' Troffer Recessed Fluorescent, (2) U-Tube, ES lamp Prismatic Acrylic Diffuser	10	24	Recessed Install 2x2 3-Lamp White Reflector Kit LED 2' T8 Lamp (3) 8W Lamps	3120	0.740	0.238	2,309	741
716	Labor & Industry	1st Floor	Corridor	4	48	Track Light Surface Mounted Halogen Incandescent, (1) 50W lamp (No Diffuser)	4	7	Surface Mounted Install LED Screw-in PAR20 Lamp Light Emitting Diode Lamp, Screw-in, (1) 8W lamp	200	0.190	0.029	38	6
717	Labor & Industry	Basement	DGS Custodial Room	12	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	12	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.639	0.309	1,329	642
718	Labor & Industry	Basement	Office	4	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.213	0.103	443	214
719	Labor & Industry	Basement	Supervisor Office	2	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
720	Labor & Industry	Basement	Generator Room	13	53	4' Industrial Chain Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	13	26	Chain Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.692	0.335	360	174
721	Labor & Industry	Basement	EB-58	6	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	6	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.319	0.154	166	80
722	Labor & Industry	Basement	EB-58	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	520	0.161	0.077	84	40
723	Labor & Industry	Basement	Air Handler Room	14	53	4' Industrial Chain Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	14	26	Chain Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.745	0.360	388	187
724	Labor & Industry	Basement	IT Storage Room A	12	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	12	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1560	0.639	0.309	997	482
725	Labor & Industry	Basement	IT Storage B	8	53	4' Industrial Chain Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	8	26	Chain Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.426	0.206	886	428
726	Labor & Industry	Basement	Maintenance Supervisor Office	6	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	6	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.319	0.154	665	321
727	Labor & Industry	Basement	L&I Storage	16	53	4' Industrial Chain Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	16	26	Chain Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1560	0.852	0.412	1,329	642
728	Labor & Industry	Basement	B50 Storage	14	53	4' Industrial Chain Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	14	26	Chain Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.745	0.360	388	187
729	Labor & Industry	Basement	B-2 Maintenance Shop	20	53	4' Industrial Chain Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	20	26	Chain Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	1.065	0.515	2,215	1,071
730	Labor & Industry	Basement	B-2 Maintenance Shop	2	34	4' Industrial Chain Mounted LED 4' T8 Lamp (2) 18W Lamps Wire Guard Cage	2	34	Existing luminaire to remain as is No Retrofit. To remain as is.	2080	0.068	0.068	141	141
731	Labor & Industry	Basement	B-6 Enviromental Control Office	3	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.160	0.077	332	161
732	Labor & Industry	Basement	B8 Office	3	53	4' Industrial Chain Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	3	26	Chain Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.160	0.077	83	40
733	Labor & Industry	Basement	B13 Office	3	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.160	0.077	332	161
734	Labor & Industry	Basement	B13 Office	3	53	4' Industrial Chain Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	3	26	Chain Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.160	0.077	332	161

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
735	Labor & Industry	Basement	Women's Room	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	8760	0.321	0.154	2,815	1,353
736	Labor & Industry	Basement	Electrical Room	16	53	4' Industrial Chain Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	16	26	Chain Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.852	0.412	443	214
737	Labor & Industry	Basement	B-29 Mechanical Room	30	53	4' Industrial Chain Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	30	26	Chain Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	1.597	0.772	3,323	1,606
738	Labor & Industry	Basement	B-29 Office	2	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
739	Labor & Industry	Basement	B-12 water Pump Room	14	53	4' Industrial Chain Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	14	26	Chain Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.745	0.360	388	187
740	Labor & Industry	Basement	Table Storage Closet	1	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.053	0.026	11	5
741	Labor & Industry	Basement	Storage Closet	1	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.053	0.026	11	5
742	Labor & Industry	Basement	JC	2	53	4' Industrial Chain Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	2	26	Chain Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.106	0.051	111	54
743	Labor & Industry	Basement	Men's Room	3	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.160	0.077	1,399	676
744	Labor & Industry	Basement	Men's Shower Room	3	53	4' Industrial Chain Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	3	26	Chain Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.160	0.077	166	80
745	Labor & Industry	Basement	B-19	6	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	6	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.319	0.154	166	80
746	Labor & Industry	Basement	Corridor	30	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	30	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	2.410	1.158	7,518	3,614
747	Labor & Industry	Basement	Corridor	6	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	6	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.260	0.101	811	315
748	Labor & Industry	Basement	Corridor	4	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	4	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.011	0.011	99	99
749	Labor & Industry	Basement	Mail Room Vestibule	8	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	8	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.643	0.309	2,005	964
750	Labor & Industry	Basement	Loading Dock	16	53	4' Industrial Chain Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	16	26	Chain Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.852	0.412	2,658	1,285
751	Labor & Industry	Basement	Mail Room Vestibule	1	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	1	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.003	0.003	25	25
752	Labor & Industry	Basement	180 Storage	2	130	2'x4' Troffer Recessed Fluorescent, (4) 48", ES lamp Prismatic Acrylic Diffuser	2	51	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 13W Lamps	520	0.260	0.103	135	54
753	Labor & Industry	Basement	Storage Room	3	53	4' Industrial Chain Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	3	26	Chain Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.160	0.077	32	15
754	Labor & Industry	Basement	JC	1	28	Drum Surface Mounted Compact Fluorescent, twin, (2) 13W lamp Frosted	1	15	Surface Mounted Drum LED Light Fixture. (1) 15W	1040	0.028	0.015	29	15
755	Labor & Industry	Basement	Elevator Room Lobby	4	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.213	0.103	111	54
756	Labor & Industry	Basement	Elevator Room Lobby	1	65	2'x4' Troffer Recessed Fluorescent, (2) 48", ES lamp Prismatic Acrylic Diffuser	1	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.065	0.026	34	13
757	Labor & Industry	Basement	Mail Room	26	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	26	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	2.088	1.004	4,344	2,088
758	Labor & Industry	Basement	Mail Room	133	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	133	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	7.082	3.423	14,730	7,121
759	Labor & Industry	Basement	Mail Room	2	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	2	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.006	0.006	49	49
760	Labor & Industry	Basement	Mail Room Breakroom	2	130	2'x4' Troffer Recessed Fluorescent, (4) 48", ES lamp Prismatic Acrylic Diffuser	2	51	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 13W Lamps	2080	0.260	0.103	541	214
761	Labor & Industry	Basement	Mail Room Breakroom	5	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	5	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.402	0.193	835	402
762	Labor & Industry	Basement	Mail Room Breakroom	4	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.213	0.103	443	214
763	Labor & Industry	Basement	High Voltage Room	6	53	4' Industrial Chain Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	6	26	Chain Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.319	0.154	166	80
764	Labor & Industry	Basement	Mail Room Office A	2	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
765	Labor & Industry	Basement	Mail Room Office B	2	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
766	Labor & Industry	Basement	IT Room	1	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	260	0.053	0.026	14	7
767	Labor & Industry	Basement	High Voltage Room	6	65	4' Industrial Surface Mounted Fluorescent, (2) 48", ES lamp (No Diffuser)	6	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.390	0.154	203	80
768	Labor & Industry	Basement	Mail Room	16	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	16	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.852	0.412	2,658	1,285
769	Labor & Industry	Basement	High Voltage Room	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
770	Labor & Industry	Basement	Pump Room	6	65	4' Industrial Surface Mounted Fluorescent, (2) 48", ES lamp (No Diffuser)	6	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.390	0.154	203	80
771	Labor & Industry	Basement	Pump Room	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.053	0.026	28	13
772	Labor & Industry	Basement	Electrical Mechanical Corridor	1	65	4' Industrial Surface Mounted Fluorescent, (2) 48", ES lamp (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.065	0.026	34	13
773	Labor & Industry	Basement	Electrical Mechanical Corridor	3	65	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", ES lamp Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.195	0.077	101	40
774	Labor & Industry	Basement	Electrical Mechanical Corridor	2	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	2	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.006	0.006	49	49
775	Labor & Industry	Stairways	Stairwell 1	38	19	Canopy Fixture Surface Mounted LED Light Fixture. (1) 20W Flat Glass Lens	38	19	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.715	0.715	6,261	6,261
776	Labor & Industry	Stairways	Stairwell 1	1	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	1	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.003	0.003	25	25
777	Labor & Industry	Stairways	Stairwell 2	38	19	Canopy Fixture Surface Mounted LED Light Fixture. (1) 20W Flat Glass Lens	38	19	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.715	0.715	6,261	6,261
778	Labor & Industry	Stairways	Stairwell 2	1	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	1	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.003	0.003	25	25
779	Labor & Industry	Stairways	Stairwell 3	38	19	Canopy Fixture Surface Mounted LED Light Fixture. (1) 20W Flat Glass Lens	38	19	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.715	0.715	6,261	6,261
780	Labor & Industry	Stairways	Stairwell 3	1	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	1	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.003	0.003	25	25

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
781	Labor & Industry	Stairways	Stairwell 4	10	19	Canopy Fixture Surface Mounted LED Light Fixture. (1) 20W Flat Glass Lens	10	19	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.188	0.188	1,648	1,648
782	Labor & Industry	Stairways	Stairwell 5	10	19	Canopy Fixture Surface Mounted LED Light Fixture. (1) 20W Flat Glass Lens	10	19	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.188	0.188	1,648	1,648
783	Labor & Industry	Stairways	Stairwell 6	10	19	Canopy Fixture Surface Mounted LED Light Fixture. (1) 20W Flat Glass Lens	10	19	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.188	0.188	1,648	1,648
784	Labor & Industry	Stairways	Stairwell 4	1	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	1	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.003	0.003	25	25
785	Labor & Industry	Stairways	Stairwell 5	1	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	1	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.003	0.003	25	25
786	Labor & Industry	Stairways	Stairwell 6	1	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	1	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.003	0.003	25	25
787	Labor & Industry	Stairways	Stairwell 3	8	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	8	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.347	0.135	3,036	1,179
788	Labor & Industry	Exterior	Flag Pole Lighting	3	266	Flood Light Slipfitter High Pressure Sodium, (1) 250W lamp Flat Glass Lens	3	79	Slipfitter Flood Light LED Light Fixture. (1) 80W	4380	0.799	0.238	3,498	1,041
789	Labor & Industry	Exterior	Perimeter Lighting	7	43	Wall-Pack Wall Mounted Compact Fluorescent, (1) 42W lamp Prismatic Acrylic Diffuser	7	11	Wall Mounted Install LED Plug-in Lamp; Hardwire to Socket Light Emitting Diode Lamp, Screw-in, (1) 12W lamp	4380	0.303	0.076	1,328	331
790	Labor & Industry	Exterior	Loading Dock	2	116	Canopy Fixture Surface Mounted Metal Halide, (1) 100W lamp Prismatic Acrylic Diffuser	2	40	Surface Mounted Canopy Fixture LED Light Fixture. (1) 40W	4380	0.231	0.079	1,012	347
791	Labor & Industry	Exterior	Entrance	2	194	Post Top Fixture Pole Mounted Metal Halide, (1) 175W lamp Prismatic Acrylic Diffuser	2	51	Pole Mounted Post Top Fixture LED Light Fixture. (1) 52W	4380	0.388	0.103	1,700	451
792	Health & Wellfare	Penthouse	Elevator Room	20	65	4' Industrial Pendant Mounted Fluorescent, (2) 48", ES lamp (No Diffuser)	20	26	Pendant Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	1.300	0.515	676	268
793	Health & Wellfare	Penthouse	Penthouse	4	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	4	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.213	0.103	111	54
794	Health & Wellfare	Penthouse	Penthouse	88	53	4' Industrial Chain Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	88	26	Chain Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	4.686	2.265	2,437	1,178
795	Health & Wellfare	Penthouse	Penthouse	5	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	5	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.014	0.014	124	124
796	Health & Wellfare	Penthouse	Maintenance Shop	2	53	4' Industrial Chain Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	2	26	Chain Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
797	Health & Wellfare	Penthouse	Maintenance Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	520	0.161	0.077	84	40
798	Health & Wellfare	Penthouse	Maintenance Storage	2	53	4' Industrial Chain Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	2	26	Chain Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
799	Health & Wellfare	Penthouse	High Voltage Room	12	53	4' Industrial Chain Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	12	26	Chain Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.639	0.309	332	161
800	Health & Wellfare	10 Floor	Room 1032	37	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	37	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	2.972	1.429	9,272	4,457
801	Health & Wellfare	10 Floor	Room 1032 Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
802	Health & Wellfare	10 Floor	Room 1033	32	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	32	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	2.570	1.236	8,019	3,855
803	Health & Wellfare	10 Floor	Ed Naugle Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
804	Health & Wellfare	10 Floor	Janet Bargh Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
805	Health & Wellfare	10 Floor	Conference Room	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.161	0.077	251	120
806	Health & Wellfare	10 Floor	Brian Lentes Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
807	Health & Wellfare	10 Floor	Room 1026	199	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	199	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	15.984	7.683	49,871	23,972
808	Health & Wellfare	10 Floor	Tom McCleaf Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
809	Health & Wellfare	10 Floor	Room 1026	2	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	2	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.006	0.006	49	49
810	Health & Wellfare	10 Floor	Jill Garland Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
811	Health & Wellfare	10 Floor	Brian Wyant Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
812	Health & Wellfare	10 Floor	Amy Flaherty Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
813	Health & Wellfare	10 Floor	Division Directors Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
814	Health & Wellfare	10 Floor	Conference Room	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.241	0.116	376	181
815	Health & Wellfare	10 Floor	Beth's Butler Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
816	Health & Wellfare	10 Floor	Room 1023	18	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	18	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	1.446	0.695	4,511	2,168
817	Health & Wellfare	10 Floor	Conference Room	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.321	0.154	501	241
818	Health & Wellfare	10 Floor	Cindy Findley Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
819	Health & Wellfare	10 Floor	JC	1	53	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.053	0.026	55	27
820	Health & Wellfare	10 Floor	Men's Room	4	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.213	0.103	1,866	902
821	Health & Wellfare	10 Floor	Men's Room	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.043	0.017	379	147
822	Health & Wellfare	10 Floor	Women's Room	7	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	7	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.373	0.180	3,265	1,578
823	Health & Wellfare	10 Floor	Women's Room	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.043	0.017	379	147
824	Health & Wellfare	10 Floor	Service Elevator Vestibule	4	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	4	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.213	0.103	665	321
825	Health & Wellfare	10 Floor	Electrical Room	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
826	Health & Wellfare	10 Floor	Data Closet	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	260	0.106	0.051	28	13

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
827	Health & Wellfare	10 Floor	Storage Room	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	520	0.321	0.154	167	80
828	Health & Wellfare	10 Floor	Corridor	12	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	12	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.964	0.463	3,007	1,446
829	Health & Wellfare	10 Floor	Corridor	23	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	23	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.996	0.387	3,109	1,208
830	Health & Wellfare	10 Floor	Corridor	3	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	3	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.008	0.008	74	74
831	Health & Wellfare	9th Floor	Room 932	18	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	18	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	1.446	0.695	4,511	2,168
832	Health & Wellfare	9th Floor	Room 932 Office	5	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	5	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.402	0.193	835	402
833	Health & Wellfare	9th Floor	Room 933	63	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	63	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	5.060	2.432	15,788	7,589
834	Health & Wellfare	9th Floor	Conference Room	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.241	0.116	376	181
835	Health & Wellfare	9th Floor	Sharon Watkins Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
836	Health & Wellfare	9th Floor	Ram Nambiar Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
837	Health & Wellfare	9th Floor	Marshal Ma Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
838	Health & Wellfare	9th Floor	Room 926	44	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	44	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	3.534	1.699	11,027	5,300
839	Health & Wellfare	9th Floor	Anil Nair Offic	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
840	Health & Wellfare	9th Floor	Room 912	50	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	50	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	4.016	1.931	12,530	6,023
841	Health & Wellfare	9th Floor	Bill Wiegmann Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
842	Health & Wellfare	9th Floor	Room 912	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.043	0.017	135	53
843	Health & Wellfare	9th Floor	Meghna Patel Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
844	Health & Wellfare	9th Floor	Christine Filipovich Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
845	Health & Wellfare	9th Floor	Room 913	26	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	26	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	2.088	1.004	6,516	3,132
846	Health & Wellfare	9th Floor	Room 213 File Room	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.161	0.077	251	120
847	Health & Wellfare	9th Floor	Room 213 Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.161	0.077	251	120
848	Health & Wellfare	9th Floor	Conference Room 909	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.321	0.154	501	241
849	Health & Wellfare	9th Floor	Conference Room 907	8	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	8	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.643	0.309	1,002	482
850	Health & Wellfare	9th Floor	Room 905	8	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	8	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.643	0.309	2,005	964
851	Health & Wellfare	9th Floor	Room 902	29	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	29	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	2.329	1.120	7,268	3,493
852	Health & Wellfare	9th Floor	Office A	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.161	0.077	501	241
853	Health & Wellfare	9th Floor	Office B	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.161	0.077	501	241
854	Health & Wellfare	9th Floor	Conference Room	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.161	0.077	501	241
855	Health & Wellfare	9th Floor	Office D	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.161	0.077	501	241
856	Health & Wellfare	9th Floor	Office E	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.161	0.077	501	241
857	Health & Wellfare	9th Floor	Storage Room	1	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.080	0.039	251	120
858	Health & Wellfare	9th Floor	Room 903	5	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	5	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.402	0.193	1,253	602
859	Health & Wellfare	9th Floor	Ken Martz Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
860	Health & Wellfare	9th Floor	Laura Conrad Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
861	Health & Wellfare	9th Floor	Office A	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
862	Health & Wellfare	9th Floor	Office B	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
863	Health & Wellfare	9th Floor	Women's Room	7	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	7	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.373	0.180	3,265	1,578
864	Health & Wellfare	9th Floor	Women's Room	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.043	0.017	379	147
865	Health & Wellfare	9th Floor	JC	1	53	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.053	0.026	55	27
866	Health & Wellfare	9th Floor	Men's Room	4	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.213	0.103	1,866	902
867	Health & Wellfare	9th Floor	Men's Room	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.043	0.017	379	147
868	Health & Wellfare	9th Floor	Service Elevator Vestibule	4	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	4	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.213	0.103	665	321
869	Health & Wellfare	9th Floor	Health Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.241	0.116	376	181
870	Health & Wellfare	9th Floor	Data Closet	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	260	0.106	0.051	28	13
871	Health & Wellfare	9th Floor	Electrical Room	2	53	4' Industrial Chain Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	2	26	Chain Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
872	Health & Wellfare	9th Floor	Corridor	23	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	23	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	1.847	0.888	5,764	2,771

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
873	Health & Wellfare	9th Floor	Corridor	23	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	23	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.996	0.387	3,109	1,208
874	Health & Wellfare	9th Floor	Corridor	3	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	3	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.008	0.008	74	74
875	Health & Wellfare	8th Floor	Room 833	23	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	23	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	1.847	0.888	5,764	2,771
876	Health & Wellfare	8th Floor	Room 832	72	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	72	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	5.783	2.780	18,044	8,673
877	Health & Wellfare	8th Floor	Office Supply Closet	2	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	2	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	520	0.087	0.034	45	18
878	Health & Wellfare	8th Floor	Xia Wang Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
879	Health & Wellfare	8th Floor	Robert Deatherage Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
880	Health & Wellfare	8th Floor	Christine Sowers Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
881	Health & Wellfare	8th Floor	Lori Stubbs Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
882	Health & Wellfare	8th Floor	Lori Diehl Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
883	Health & Wellfare	8th Floor	Directors Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
884	Health & Wellfare	8th Floor	Room 825	18	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	18	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	1.446	0.695	4,511	2,168
885	Health & Wellfare	8th Floor	Alison Taylor Office	5	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	5	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.402	0.193	835	402
886	Health & Wellfare	8th Floor	Wendy Carson Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
887	Health & Wellfare	8th Floor	Karin Simpson Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
888	Health & Wellfare	8th Floor	Tanya Leshko Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
889	Health & Wellfare	8th Floor	Keith Fickel Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
890	Health & Wellfare	8th Floor	Jonathan Koltash Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
891	Health & Wellfare	8th Floor	Yvette Kostelac Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
892	Health & Wellfare	8th Floor	Copy Room	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
893	Health & Wellfare	8th Floor	Neil Hittinger Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
894	Health & Wellfare	8th Floor	Doug Snyder Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
895	Health & Wellfare	8th Floor	Kayla Rosencrans Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
896	Health & Wellfare	8th Floor	Jaime Black Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
897	Health & Wellfare	8th Floor	Carol Mowery Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
898	Health & Wellfare	8th Floor	Nicholas Peters Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
899	Health & Wellfare	8th Floor	Law Library	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.241	0.116	376	181
900	Health & Wellfare	8th Floor	Room 825	6	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	6	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.260	0.101	811	315
901	Health & Wellfare	8th Floor	Department of Health	71	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	71	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	5.703	2.741	17,793	8,553
902	Health & Wellfare	8th Floor	Conference Room 812	16	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	16	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	1.285	0.618	2,005	964
903	Health & Wellfare	8th Floor	Small Conference Room	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.161	0.077	251	120
904	Health & Wellfare	8th Floor	Tama Immel Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
905	Health & Wellfare	8th Floor	April Hutcheson Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
906	Health & Wellfare	8th Floor	William Freeman Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
907	Health & Wellfare	8th Floor	Neil Malady Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
908	Health & Wellfare	8th Floor	Pat Keatng Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
909	Health & Wellfare	8th Floor	Shannon Baker Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
910	Health & Wellfare	8th Floor	Sarah Newman Boateng Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
911	Health & Wellfare	8th Floor	Small Foyer	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
912	Health & Wellfare	8th Floor	Parker Beene Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
913	Health & Wellfare	8th Floor	Tina Novosel Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
914	Health & Wellfare	8th Floor	Director	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.482	0.232	1,002	482
915	Health & Wellfare	8th Floor	Kitchen	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	2080	0.043	0.017	90	35
916	Health & Wellfare	8th Floor	Storage Closet	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	520	0.043	0.017	23	9
917	Health & Wellfare	8th Floor	Danielle Pierre Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
918	Health & Wellfare	8th Floor	Raphael Barishansky Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
919	Health & Wellfare	8th Floor	Secretary for QA Office	5	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	5	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.402	0.193	835	402
920	Health & Wellfare	8th Floor	Arlene Seid Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
921	Health & Wellfare	8th Floor	Carolyn Bynes Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
922	Health & Wellfare	8th Floor	Conference Room	5	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	5	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.402	0.193	835	402
923	Health & Wellfare	8th Floor	Lori Gutierrez Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
924	Health & Wellfare	8th Floor	Kimberly Early Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
925	Health & Wellfare	8th Floor	Cjloe Vinoya Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
926	Health & Wellfare	8th Floor	Loren Robinson Office	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.482	0.232	1,002	482
927	Health & Wellfare	8th Floor	Jennifer Dugan Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
928	Health & Wellfare	8th Floor	Lauren Hughes Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
929	Health & Wellfare	8th Floor	Department of Health	2	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	2	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.006	0.006	49	49
930	Health & Wellfare	8th Floor	Men's Room	4	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.213	0.103	1,866	902
931	Health & Wellfare	8th Floor	Men's Room	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.043	0.017	379	147
932	Health & Wellfare	8th Floor	JC	1	53	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.053	0.026	55	27
933	Health & Wellfare	8th Floor	Womens Room	7	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	7	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.373	0.180	3,265	1,578
934	Health & Wellfare	8th Floor	Womens Room	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.043	0.017	379	147
935	Health & Wellfare	8th Floor	Service Elevator Vestibule	4	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	4	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.213	0.103	665	321
936	Health & Wellfare	8th Floor	Corridor	23	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	23	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.996	0.387	3,109	1,208
937	Health & Wellfare	8th Floor	Corridor	11	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	11	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.884	0.425	2,757	1,325
938	Health & Wellfare	8th Floor	Corridor	3	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	3	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.008	0.008	74	74
939	Health & Wellfare	8th Floor	Electrical Closet	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
940	Health & Wellfare	8th Floor	Shower Room	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	1040	0.043	0.017	45	18
941	Health & Wellfare	8th Floor	Restroom	2	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	2	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	1040	0.087	0.034	90	35
942	Health & Wellfare	8th Floor	Restroom	1	32	2' Mirror Vanity Wall Mounted Fluorescent, (2) 18" T8 lamp (No Diffuser)	1	17	Wall Mounted 2' Mirror Vanity LED Light Fixture. (1) 17W	1040	0.032	0.017	34	18
943	Health & Wellfare	7th Floor	Family Health 7th Floor East	165	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	165	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	13.253	6.371	41,350	19,876
944	Health & Wellfare	7th Floor	Conference Room	5	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	5	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.402	0.193	627	301
945	Health & Wellfare	7th Floor	Large Conference Room	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.482	0.232	752	361
946	Health & Wellfare	7th Floor	Kelly Holland Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
947	Health & Wellfare	7th Floor	Erin McCarty Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
948	Health & Wellfare	7th Floor	Cindy Dundas Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
949	Health & Wellfare	7th Floor	Charolin Cass	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
950	Health & Wellfare	7th Floor	Tara Trego Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
951	Health & Wellfare	7th Floor	Family Health 7th Floor East	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.043	0.017	135	53
952	Health & Wellfare	7th Floor	7th Floor West	111	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	111	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	8.916	4.286	27,817	13,371
953	Health & Wellfare	7th Floor	POS Testing Room	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.321	0.154	501	241
954	Health & Wellfare	7th Floor	Susquehanna Room	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.321	0.154	501	241
955	Health & Wellfare	7th Floor	Storage Room	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	520	0.161	0.077	84	40
956	Health & Wellfare	7th Floor	Keystone Room	16	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	16	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	1.285	0.618	2,005	964
957	Health & Wellfare	7th Floor	Break Room	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.161	0.077	501	241
958	Health & Wellfare	7th Floor	Storage Room	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	520	0.241	0.116	125	60
959	Health & Wellfare	7th Floor	Joseph McLaughlin Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
960	Health & Wellfare	7th Floor	Copy Room	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.161	0.077	501	241
961	Health & Wellfare	7th Floor	Abigail Coleman Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
962	Health & Wellfare	7th Floor	Mark Shirk Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
963	Health & Wellfare	7th Floor	Capital Room	5	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	5	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.402	0.193	627	301
964	Health & Wellfare	7th Floor	William Cramer Office	5	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	5	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.402	0.193	627	301

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
965	Health & Wellfare	7th Floor	Storage Room	1	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	520	0.080	0.039	42	20
966	Health & Wellfare	7th Floor	UPS Room	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	520	0.161	0.077	84	40
967	Health & Wellfare	7th Floor	7th Floor West	2	53	2'x2' Troffer Recessed Fluorescent, (2) U-Tube, T-8 lamp, Instant Start Ballast Deep Cell Parabolic Diffuser	2	24	Recessed Install 2x2 3-Lamp White Reflector Kit LED 2' T8 Lamp (3) 8W Lamps	3120	0.106	0.048	332	148
968	Health & Wellfare	7th Floor	7th Floor West	2	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	2	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.006	0.006	49	49
969	Health & Wellfare	7th Floor	JC	1	53	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.053	0.026	55	27
970	Health & Wellfare	7th Floor	Men's Room	4	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.213	0.103	1,866	902
971	Health & Wellfare	7th Floor	Men's Room	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.043	0.017	379	147
972	Health & Wellfare	7th Floor	Womens Room	7	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	7	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.373	0.180	3,265	1,578
973	Health & Wellfare	7th Floor	Womens Room	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.043	0.017	379	147
974	Health & Wellfare	7th Floor	Service Elevator Vestibule	4	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	4	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.213	0.103	665	321
975	Health & Wellfare	7th Floor	Electrical Closet	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
976	Health & Wellfare	7th Floor	Corridor	23	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	23	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.996	0.387	3,109	1,208
977	Health & Wellfare	7th Floor	Corridor	2	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	2	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.006	0.006	49	49
978	Health & Wellfare	6th Floor	Room 631	10	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	10	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.803	0.386	2,506	1,205
979	Health & Wellfare	6th Floor	Copy Room	1	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.080	0.039	251	120
980	Health & Wellfare	6th Floor	Open Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
981	Health & Wellfare	6th Floor	Sheila Page Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
982	Health & Wellfare	6th Floor	Jacci Rowe Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
983	Health & Wellfare	6th Floor	Open Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
984	Health & Wellfare	6th Floor	Open Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
985	Health & Wellfare	6th Floor	Dahl Krow Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
986	Health & Wellfare	6th Floor	Jill Kachmar Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
987	Health & Wellfare	6th Floor	Michelle Strauser Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
988	Health & Wellfare	6th Floor	Open Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
989	Health & Wellfare	6th Floor	Keith Forry Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
990	Health & Wellfare	6th Floor	Open Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
991	Health & Wellfare	6th Floor	Conference Room	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
992	Health & Wellfare	6th Floor	Open Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
993	Health & Wellfare	6th Floor	Ed Slavinsky Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
994	Health & Wellfare	6th Floor	Room 627	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
995	Health & Wellfare	6th Floor	Open Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
996	Health & Wellfare	6th Floor	Room 631	6	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	6	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.260	0.101	811	315
997	Health & Wellfare	6th Floor	Room 632	39	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	39	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	3.133	1.506	9,774	4,698
998	Health & Wellfare	6th Floor	Lawerence Clark Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
999	Health & Wellfare	6th Floor	Open Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1000	Health & Wellfare	6th Floor	Open Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1001	Health & Wellfare	6th Floor	Lolly Bentch Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1002	Health & Wellfare	6th Floor	Susan Jones Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1003	Health & Wellfare	6th Floor	Holli Senior Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1004	Health & Wellfare	6th Floor	Sunny Podolak Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
1005	Health & Wellfare	6th Floor	John Collins Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
1006	Health & Wellfare	6th Floor	Conference Room	5	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	5	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.402	0.193	835	402
1007	Health & Wellfare	6th Floor	Room 625	8	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	8	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.643	0.309	2,005	964
1008	Health & Wellfare	6th Floor	Laura Dietz Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1009	Health & Wellfare	6th Floor	Vending Machines	5	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	5	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.402	0.193	1,253	602
1010	Health & Wellfare	6th Floor	Room 623	13	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	13	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	1.044	0.502	3,258	1,566

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
1011	Health & Wellfare	6th Floor	Robert Robinson Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
1012	Health & Wellfare	6th Floor	Data Closet	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	260	0.161	0.077	42	20
1013	Health & Wellfare	6th Floor	Room 610	8	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	8	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.643	0.309	2,005	964
1014	Health & Wellfare	6th Floor	Copy Room	1	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.080	0.039	251	120
1015	Health & Wellfare	6th Floor	Kimberly Buffington Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
1016	Health & Wellfare	6th Floor	Room 613	9	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	9	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.723	0.347	2,255	1,084
1017	Health & Wellfare	6th Floor	James Jenkins Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1018	Health & Wellfare	6th Floor	Open Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
1019	Health & Wellfare	6th Floor	Room 611	16	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	16	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	1.285	0.618	4,010	1,927
1020	Health & Wellfare	6th Floor	Cheryl Henne Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1021	Health & Wellfare	6th Floor	Room 606	44	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	44	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	3.534	1.699	11,027	5,300
1022	Health & Wellfare	6th Floor	Directors Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
1023	Health & Wellfare	6th Floor	Storage	1	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	520	0.080	0.039	42	20
1024	Health & Wellfare	6th Floor	Room 602	9	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	9	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.723	0.347	2,255	1,084
1025	Health & Wellfare	6th Floor	Jonathan McVey Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1026	Health & Wellfare	6th Floor	Ben Laudermilch Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1027	Health & Wellfare	6th Floor	Rebekah Ludwick Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1028	Health & Wellfare	6th Floor	Karen Herrling Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
1029	Health & Wellfare	6th Floor	Renee Ratti Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1030	Health & Wellfare	6th Floor	Room 605	34	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	34	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	2.731	1.313	8,521	4,096
1031	Health & Wellfare	6th Floor	Corner Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1032	Health & Wellfare	6th Floor	Rhonda Dolen Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1033	Health & Wellfare	6th Floor	Conference Room	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.241	0.116	376	181
1034	Health & Wellfare	6th Floor	JC	1	53	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.053	0.026	55	27
1035	Health & Wellfare	6th Floor	Men's Room	4	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.213	0.103	1,866	902
1036	Health & Wellfare	6th Floor	Men's Room	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.043	0.017	379	147
1037	Health & Wellfare	6th Floor	Womens Room	7	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	7	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.373	0.180	3,265	1,578
1038	Health & Wellfare	6th Floor	Womens Room	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.043	0.017	379	147
1039	Health & Wellfare	6th Floor	Service Elevator Vestibule	5	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	5	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.266	0.129	831	402
1040	Health & Wellfare	6th Floor	Service Elevator Vestibule	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.043	0.017	135	53
1041	Health & Wellfare	6th Floor	Electrical Closet	2	53	4' Industrial Chain Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	2	26	Chain Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
1042	Health & Wellfare	6th Floor	Room 616	13	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	13	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	1.044	0.502	3,258	1,566
1043	Health & Wellfare	6th Floor	Room 616	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.043	0.017	135	53
1044	Health & Wellfare	6th Floor	Storage Room	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
1045	Health & Wellfare	6th Floor	Jason Mahoney Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
1046	Health & Wellfare	6th Floor	Maintenance Storage	9	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	9	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.723	0.347	1,504	723
1047	Health & Wellfare	6th Floor	Corridor	24	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	24	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	1.928	0.927	6,015	2,891
1048	Health & Wellfare	6th Floor	Corridor	23	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	23	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.996	0.387	3,109	1,208
1049	Health & Wellfare	6th Floor	Corridor	5	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	5	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.014	0.014	124	124
1050	Health & Wellfare	5th Floor	Room 525	28	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	28	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	2.249	1.081	7,017	3,373
1051	Health & Wellfare	5th Floor	Conference Room	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.321	0.154	501	241
1052	Health & Wellfare	5th Floor	Michelle Helper Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1053	Health & Wellfare	5th Floor	Michelle Shaughnessy Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1054	Health & Wellfare	5th Floor	Eileen Feeser Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1055	Health & Wellfare	5th Floor	Teddi Szymanski Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1056	Health & Wellfare	5th Floor	Gerald Gilingham Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
1057	Health & Wellfare	5th Floor	Dennis Bookwalter Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1058	Health & Wellfare	5th Floor	Dan Goldstein Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
1059	Health & Wellfare	5th Floor	Robert Molnar Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1060	Health & Wellfare	5th Floor	Jen Swails Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
1061	Health & Wellfare	5th Floor	Room 525	8	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	8	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.347	0.135	1,081	420
1062	Health & Wellfare	5th Floor	Copy Room	1	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.080	0.039	251	120
1063	Health & Wellfare	5th Floor	Karen Vogelsong Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
1064	Health & Wellfare	5th Floor	Open Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1065	Health & Wellfare	5th Floor	Andrea Cellasio Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1066	Health & Wellfare	5th Floor	Barbara Klinger Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1067	Health & Wellfare	5th Floor	Rick Cauffiel Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1068	Health & Wellfare	5th Floor	Mark Weaver Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1069	Health & Wellfare	5th Floor	Mark Weaver Office	2	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	2	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.087	0.034	270	105
1070	Health & Wellfare	5th Floor	Room 528	72	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	72	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	5.783	2.780	18,044	8,673
1071	Health & Wellfare	5th Floor	Rear Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
1072	Health & Wellfare	5th Floor	Susan Williamson Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1073	Health & Wellfare	5th Floor	Conference Room	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.161	0.077	251	120
1074	Health & Wellfare	5th Floor	Open Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1075	Health & Wellfare	5th Floor	Data Closet (est)	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	260	0.161	0.077	42	20
1076	Health & Wellfare	5th Floor	Room 514	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.321	0.154	501	241
1077	Health & Wellfare	5th Floor	Room 512	26	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	26	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	2.088	1.004	6,516	3,132
1078	Health & Wellfare	5th Floor	Office A	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1079	Health & Wellfare	5th Floor	Office B	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1080	Health & Wellfare	5th Floor	Office A	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1081	Health & Wellfare	5th Floor	Office C	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1082	Health & Wellfare	5th Floor	Kristen Ahrens Office	5	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	5	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.402	0.193	835	402
1083	Health & Wellfare	5th Floor	Jackie Epstein Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
1084	Health & Wellfare	5th Floor	Kevin Dressler Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
1085	Health & Wellfare	5th Floor	Kelly Arnold Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1086	Health & Wellfare	5th Floor	Terri Meyer Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1087	Health & Wellfare	5th Floor	Jennifer Grimm Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1088	Health & Wellfare	5th Floor	Lisa Wagner Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1089	Health & Wellfare	5th Floor	Lisa Gaylor Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1090	Health & Wellfare	5th Floor	Nancy Thaler Office	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.482	0.232	1,002	482
1091	Health & Wellfare	5th Floor	Room 512	5	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	5	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.217	0.084	676	263
1092	Health & Wellfare	5th Floor	Room 501	17	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	17	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	1.365	0.656	4,260	2,048
1093	Health & Wellfare	5th Floor	Office A	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1094	Health & Wellfare	5th Floor	Conference Room	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.161	0.077	251	120
1095	Health & Wellfare	5th Floor	Storage Room	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	520	0.161	0.077	84	40
1096	Health & Wellfare	5th Floor	Conference Room	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.482	0.232	752	361
1097	Health & Wellfare	5th Floor	Room 515	27	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	27	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	2.169	1.042	6,766	3,253
1098	Health & Wellfare	5th Floor	Leesa Allen Office	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.482	0.232	1,002	482
1099	Health & Wellfare	5th Floor	Erin Slabonick Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1100	Health & Wellfare	5th Floor	Lucia Roberto Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1101	Health & Wellfare	5th Floor	David Kelley Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1102	Health & Wellfare	5th Floor	Corner Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
1103	Health & Wellfare	5th Floor	Allen Fischer Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
1104	Health & Wellfare	5th Floor	JC	1	53	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.053	0.026	55	27
1105	Health & Wellfare	5th Floor	Men's Room	4	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.213	0.103	1,866	902
1106	Health & Wellfare	5th Floor	Women's Room	7	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	7	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.373	0.180	3,265	1,578
1107	Health & Wellfare	5th Floor	Men's Room	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.043	0.017	379	147
1108	Health & Wellfare	5th Floor	Women's Room	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.043	0.017	379	147
1109	Health & Wellfare	5th Floor	Service Elevator Vestibule	5	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	5	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.266	0.129	831	402
1110	Health & Wellfare	5th Floor	Electrical Closet	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
1111	Health & Wellfare	5th Floor	Room 516	11	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	11	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.884	0.425	2,757	1,325
1112	Health & Wellfare	5th Floor	Corridor	24	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	24	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	1.928	0.927	6,015	2,891
1113	Health & Wellfare	5th Floor	Corridor	25	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	25	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	1.083	0.421	3,379	1,313
1114	Health & Wellfare	5th Floor	Corridor	5	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	5	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.014	0.014	124	124
1115	Health & Wellfare	5th Floor	Room 516	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	2080	0.043	0.017	90	35
1116	Health & Wellfare	4th Floor	Office of Income Maintenance	79	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	79	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	6.345	3.050	19,798	9,517
1117	Health & Wellfare	4th Floor	Conference Room	7	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	7	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.562	0.270	877	422
1118	Health & Wellfare	4th Floor	Office 426A	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1119	Health & Wellfare	4th Floor	Office 426B	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1120	Health & Wellfare	4th Floor	Office 426C	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
1121	Health & Wellfare	4th Floor	Office 426D	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1122	Health & Wellfare	4th Floor	Office 426E	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1123	Health & Wellfare	4th Floor	Office 426F	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
1124	Health & Wellfare	4th Floor	Office 428	5	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	5	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.402	0.193	835	402
1125	Health & Wellfare	4th Floor	Office 430	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
1126	Health & Wellfare	4th Floor	Office 432	14	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	14	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	1.125	0.541	2,339	1,124
1127	Health & Wellfare	4th Floor	Office 432B	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
1128	Health & Wellfare	4th Floor	Office 432A	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.482	0.232	1,002	482
1129	Health & Wellfare	4th Floor	Office 433 Vestibule	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1130	Health & Wellfare	4th Floor	Office 433	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.482	0.232	1,002	482
1131	Health & Wellfare	4th Floor	Office 431	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.482	0.232	1,002	482
1132	Health & Wellfare	4th Floor	Office 427	5	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	5	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.402	0.193	835	402
1133	Health & Wellfare	4th Floor	Office 425F	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1134	Health & Wellfare	4th Floor	Office 425E	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1135	Health & Wellfare	4th Floor	Office 425D	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1136	Health & Wellfare	4th Floor	Office 425C	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1137	Health & Wellfare	4th Floor	Office 425B	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1138	Health & Wellfare	4th Floor	Office 425A	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1139	Health & Wellfare	4th Floor	Office 423	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
1140	Health & Wellfare	4th Floor	Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1141	Health & Wellfare	4th Floor	Office 423A	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1142	Health & Wellfare	4th Floor	Office 423B	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1143	Health & Wellfare	4th Floor	Office 423C	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1144	Health & Wellfare	4th Floor	Office 423D	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
1145	Health & Wellfare	4th Floor	Office of Income Maintenance	1	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	1	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.003	0.003	25	25
1146	Health & Wellfare	4th Floor	Data Closet	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	260	0.161	0.077	42	20
1147	Health & Wellfare	4th Floor	Room 412	11	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	11	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.884	0.425	2,757	1,325
1148	Health & Wellfare	4th Floor	Conference Room	5	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	5	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.402	0.193	627	301

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
1149	Health & Wellfare	4th Floor	Sheila Theodorou Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
1150	Health & Wellfare	4th Floor	Room 415-401	54	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	54	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	4.337	2.085	13,533	6,505
1151	Health & Wellfare	4th Floor	Bill Posavec Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1152	Health & Wellfare	4th Floor	Angela Fortney Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
1153	Health & Wellfare	4th Floor	Charles Frick Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
1154	Health & Wellfare	4th Floor	Rick Smith Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1155	Health & Wellfare	4th Floor	Jennifer Fraker Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1156	Health & Wellfare	4th Floor	Ronald Melusky Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
1157	Health & Wellfare	4th Floor	Beth Al-Nawasreh Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
1158	Health & Wellfare	4th Floor	Tim OLeary Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1159	Health & Wellfare	4th Floor	Theresa Boucher Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1160	Health & Wellfare	4th Floor	Toni Hoffecker Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1161	Health & Wellfare	4th Floor	Room 402-408	38	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	38	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	3.052	1.467	9,523	4,578
1162	Health & Wellfare	4th Floor	Michelle Herring Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
1163	Health & Wellfare	4th Floor	Tina Long Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
1164	Health & Wellfare	4th Floor	Breakroom	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1165	Health & Wellfare	4th Floor	Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
1166	Health & Wellfare	4th Floor	Mac Spiker Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
1167	Health & Wellfare	4th Floor	Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1168	Health & Wellfare	4th Floor	Daniel Boyd Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1169	Health & Wellfare	4th Floor	Room 410	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1170	Health & Wellfare	4th Floor	JC	1	53	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.053	0.026	55	27
1171	Health & Wellfare	4th Floor	Men's Room	4	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.213	0.103	1,866	902
1172	Health & Wellfare	4th Floor	Men's Room	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.043	0.017	379	147
1173	Health & Wellfare	4th Floor	Women's Room	7	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	7	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.373	0.180	3,265	1,578
1174	Health & Wellfare	4th Floor	Women's Room	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.043	0.017	379	147
1175	Health & Wellfare	4th Floor	Service Elevator Vestibule	5	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	5	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.266	0.129	831	402
1176	Health & Wellfare	4th Floor	Electrical Closet	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
1177	Health & Wellfare	4th Floor	Storage Closet	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	520	0.043	0.017	23	9
1178	Health & Wellfare	4th Floor	Corridor	13	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	13	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	1.044	0.502	3,258	1,566
1179	Health & Wellfare	4th Floor	Corridor	23	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	23	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.996	0.387	3,109	1,208
1180	Health & Wellfare	4th Floor	Corridor	4	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	4	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.011	0.011	99	99
1181	Health & Wellfare	3rd Floor	Human Services East Wing 333	34	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	34	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	2.731	1.313	8,521	4,096
1182	Health & Wellfare	3rd Floor	Conference Room 328	5	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	5	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.402	0.193	835	402
1183	Health & Wellfare	3rd Floor	Office 329	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1184	Health & Wellfare	3rd Floor	Office 330B	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
1185	Health & Wellfare	3rd Floor	Office 330C	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1186	Health & Wellfare	3rd Floor	Office 332	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1187	Health & Wellfare	3rd Floor	Office 334	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.482	0.232	1,002	482
1188	Health & Wellfare	3rd Floor	Storage Room	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1189	Health & Wellfare	3rd Floor	Office 335	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
1190	Health & Wellfare	3rd Floor	Office 333	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
1191	Health & Wellfare	3rd Floor	Storage 333	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	2080	0.043	0.017	90	35
1192	Health & Wellfare	3rd Floor	Corner Office 333	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.482	0.232	1,002	482
1193	Health & Wellfare	3rd Floor	Office 333 Storage	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	2080	0.043	0.017	90	35
1194	Health & Wellfare	3rd Floor	Office 333 Restroom	2	28	1'x1' Square Recessed Compact Fluorescent, twin, (2) 13W lamp Prismatic Acrylic Diffuser	2	9	Recessed Retrofit Wall Sconce with Rectangular LED Kit LED Light Fixture. (1) 9W	2080	0.056	0.018	116	37

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
1195	Health & Wellfare	3rd Floor	Office 331	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1196	Health & Wellfare	3rd Floor	Office 331A	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1197	Health & Wellfare	3rd Floor	Office 330	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1198	Health & Wellfare	3rd Floor	Human Services East Wing 333	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.043	0.017	135	53
1199	Health & Wellfare	3rd Floor	Human Services East Wing 333	1	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	1	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.003	0.003	25	25
1200	Health & Wellfare	3rd Floor	Supply Closet	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	520	0.161	0.077	84	40
1201	Health & Wellfare	3rd Floor	Room 327	15	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	15	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	1.205	0.579	1,880	903
1202	Health & Wellfare	3rd Floor	Storage Closet	1	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	520	0.080	0.039	42	20
1203	Health & Wellfare	3rd Floor	Room 326	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.321	0.154	1,002	482
1204	Health & Wellfare	3rd Floor	Office A	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1205	Health & Wellfare	3rd Floor	Office B	1	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.080	0.039	167	80
1206	Health & Wellfare	3rd Floor	Storage Room	1	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.080	0.039	125	60
1207	Health & Wellfare	3rd Floor	Office C	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1208	Health & Wellfare	3rd Floor	Office D	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1209	Health & Wellfare	3rd Floor	Room 325	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
1210	Health & Wellfare	3rd Floor	Room 325A	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1211	Health & Wellfare	3rd Floor	Room 322-324	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.482	0.232	1,504	723
1212	Health & Wellfare	3rd Floor	Room 322-324	3	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	3	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.130	0.050	405	158
1213	Health & Wellfare	3rd Floor	Office A	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1214	Health & Wellfare	3rd Floor	Office B	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1215	Health & Wellfare	3rd Floor	Office C	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1216	Health & Wellfare	3rd Floor	Office D	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1217	Health & Wellfare	3rd Floor	James Dougherty Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1218	Health & Wellfare	3rd Floor	Officer Of General Counsel	78	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	78	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	6.265	3.012	13,032	6,264
1219	Health & Wellfare	3rd Floor	Data Closet	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	260	0.161	0.077	42	20
1220	Health & Wellfare	3rd Floor	Copy Room	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.321	0.154	1,002	482
1221	Health & Wellfare	3rd Floor	Officer Of General Counsel	2	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	2	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.006	0.006	49	49
1222	Health & Wellfare	3rd Floor	Robert Miller Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1223	Health & Wellfare	3rd Floor	Addie Abelson Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1224	Health & Wellfare	3rd Floor	Jonathan Curtis Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1225	Health & Wellfare	3rd Floor	Rebecca Taylor Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1226	Health & Wellfare	3rd Floor	Cynthia Williams Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1227	Health & Wellfare	3rd Floor	Sallie Rodgers Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
1228	Health & Wellfare	3rd Floor	Doris Leisch Office	5	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	5	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.402	0.193	835	402
1229	Health & Wellfare	3rd Floor	Kathleen Grogan Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1230	Health & Wellfare	3rd Floor	Edward Cherry Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
1231	Health & Wellfare	3rd Floor	Thomas Car Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
1232	Health & Wellfare	3rd Floor	Mary Patterson Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1233	Health & Wellfare	3rd Floor	Stephan Gorka Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1234	Health & Wellfare	3rd Floor	Matthew McLees Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
1235	Health & Wellfare	3rd Floor	Storage Closet	1	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	520	0.080	0.039	42	20
1236	Health & Wellfare	3rd Floor	Camille Howlett Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1237	Health & Wellfare	3rd Floor	Office 300B	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1238	Health & Wellfare	3rd Floor	Office 300C	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1239	Health & Wellfare	3rd Floor	Redeate Dessalegn Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1240	Health & Wellfare	3rd Floor	Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
1241	Health & Wellfare	3rd Floor	Storage Closet	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	520	0.043	0.017	23	9
1242	Health & Wellfare	3rd Floor	Diana Clark Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
1243	Health & Wellfare	3rd Floor	Aaron Haynes Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
1244	Health & Wellfare	3rd Floor	Dale Jenkins Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1245	Health & Wellfare	3rd Floor	Helene Loux Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1246	Health & Wellfare	3rd Floor	Lara Antonuk Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
1247	Health & Wellfare	3rd Floor	Dan Fellin Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
1248	Health & Wellfare	3rd Floor	Peter Garcia Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1249	Health & Wellfare	3rd Floor	Kimberly Thomas Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1250	Health & Wellfare	3rd Floor	Robert Teplitz Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1251	Health & Wellfare	3rd Floor	Matthew Golden Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
1252	Health & Wellfare	3rd Floor	Marisa Cohan Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
1253	Health & Wellfare	3rd Floor	Conference Room	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
1254	Health & Wellfare	3rd Floor	Scott Foster Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1255	Health & Wellfare	3rd Floor	JC	1	53	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.053	0.026	55	27
1256	Health & Wellfare	3rd Floor	Men's Room	4	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.213	0.103	1,866	902
1257	Health & Wellfare	3rd Floor	Men's Room	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.043	0.017	379	147
1258	Health & Wellfare	3rd Floor	Women's Room	7	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	7	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.373	0.180	3,265	1,578
1259	Health & Wellfare	3rd Floor	Women's Room	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.043	0.017	379	147
1260	Health & Wellfare	3rd Floor	Service Elevator Vestibule	5	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	5	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.266	0.129	831	402
1261	Health & Wellfare	3rd Floor	Electrical Closet	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
1262	Health & Wellfare	3rd Floor	Nursing Room	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	520	0.043	0.017	23	9
1263	Health & Wellfare	3rd Floor	Corridor	5	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	5	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.402	0.193	1,253	602
1264	Health & Wellfare	3rd Floor	Corridor	23	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	23	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.996	0.387	3,109	1,208
1265	Health & Wellfare	3rd Floor	Corridor	2	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	2	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.006	0.006	49	49
1266	Health & Wellfare	2nd Floor	Room 234	8	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	8	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.643	0.309	2,005	964
1267	Health & Wellfare	2nd Floor	Corner Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
1268	Health & Wellfare	2nd Floor	Office A	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1269	Health & Wellfare	2nd Floor	Office B	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1270	Health & Wellfare	2nd Floor	Office C	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1271	Health & Wellfare	2nd Floor	Office D	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
1272	Health & Wellfare	2nd Floor	Room 235	25	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	25	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	2.008	0.965	6,265	3,012
1273	Health & Wellfare	2nd Floor	Kathleen Watkins Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1274	Health & Wellfare	2nd Floor	Yvonne Cooper Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1275	Health & Wellfare	2nd Floor	Room 235	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.043	0.017	135	53
1276	Health & Wellfare	2nd Floor	Room 226	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.321	0.154	1,002	482
1277	Health & Wellfare	2nd Floor	Pam Lemasters Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1278	Health & Wellfare	2nd Floor	Daniel Ray Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
1279	Health & Wellfare	2nd Floor	Room 229	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.482	0.232	1,002	482
1280	Health & Wellfare	2nd Floor	Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
1281	Health & Wellfare	2nd Floor	Room 225	18	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	18	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	1.446	0.695	4,511	2,168
1282	Health & Wellfare	2nd Floor	Lori Millar Office	5	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	5	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.402	0.193	835	402
1283	Health & Wellfare	2nd Floor	Wesley Alexander Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1284	Health & Wellfare	2nd Floor	Tanya Ingram Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1285	Health & Wellfare	2nd Floor	Conference Room	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
1286	Health & Wellfare	2nd Floor	Room 222	37	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	37	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	2.972	1.429	9,272	4,457

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
1287	Health & Wellfare	2nd Floor	Christie Kahler Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1288	Health & Wellfare	2nd Floor	Office A	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1289	Health & Wellfare	2nd Floor	Office B	1	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.080	0.039	167	80
1290	Health & Wellfare	2nd Floor	Storage 221	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	520	0.161	0.077	84	40
1291	Health & Wellfare	2nd Floor	Office of Income Service West Wing	121	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	121	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	9.719	4.672	30,323	14,576
1292	Health & Wellfare	2nd Floor	Data Closet	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1293	Health & Wellfare	2nd Floor	Room 210	10	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	10	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.803	0.386	1,671	803
1294	Health & Wellfare	2nd Floor	Room 222	2	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	2	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.087	0.034	270	105
1295	Health & Wellfare	2nd Floor	Room 213	9	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	9	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.723	0.347	2,255	1,084
1296	Health & Wellfare	2nd Floor	Breakroom	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.241	0.116	752	361
1297	Health & Wellfare	2nd Floor	Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
1298	Health & Wellfare	2nd Floor	NormaJean Hill Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
1299	Health & Wellfare	2nd Floor	Michael Butson Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1300	Health & Wellfare	2nd Floor	Office A	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1301	Health & Wellfare	2nd Floor	Office B	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1302	Health & Wellfare	2nd Floor	Office C	5	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	5	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.402	0.193	835	402
1303	Health & Wellfare	2nd Floor	Office D	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
1304	Health & Wellfare	2nd Floor	Office of Income Service West Wing	2	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	2	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.006	0.006	49	49
1305	Health & Wellfare	2nd Floor	JC	1	53	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.053	0.026	55	27
1306	Health & Wellfare	2nd Floor	Men's Restroom	4	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.213	0.103	1,866	902
1307	Health & Wellfare	2nd Floor	Men's Restroom	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.043	0.017	379	147
1308	Health & Wellfare	2nd Floor	Women's Restroom	7	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	7	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.373	0.180	3,265	1,578
1309	Health & Wellfare	2nd Floor	Women's Restroom	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.043	0.017	379	147
1310	Health & Wellfare	2nd Floor	Service Elevator Vestibule	3	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	3	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.160	0.077	498	241
1311	Health & Wellfare	2nd Floor	Nursing Room	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
1312	Health & Wellfare	2nd Floor	Storage Closet	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	520	0.043	0.017	23	9
1313	Health & Wellfare	2nd Floor	Electrical Closet	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
1314	Health & Wellfare	2nd Floor	Corridor	11	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	11	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.884	0.425	2,757	1,325
1315	Health & Wellfare	2nd Floor	Corridor	23	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	23	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.996	0.387	3,109	1,208
1316	Health & Wellfare	2nd Floor	Corridor	3	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	3	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.008	0.008	74	74
1317	Health & Wellfare	1st Floor	Policy Programs Annex	55	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	55	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	4.418	2.124	13,783	6,625
1318	Health & Wellfare	1st Floor	Policy Programs Annex	1	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	1	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.003	0.003	25	25
1319	Health & Wellfare	1st Floor	Christina Phillips Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
1320	Health & Wellfare	1st Floor	Ellen Whitesell Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1321	Health & Wellfare	1st Floor	Vending Area Vestibule	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.482	0.232	1,504	723
1322	Health & Wellfare	1st Floor	Vending Area Vestibule	1	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	1	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.003	0.003	25	25
1323	Health & Wellfare	1st Floor	Room126	30	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	30	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	2.410	1.158	5,012	2,409
1324	Health & Wellfare	1st Floor	End Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.321	0.154	501	241
1325	Health & Wellfare	1st Floor	Dan Cramer Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1326	Health & Wellfare	1st Floor	Office A	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
1327	Health & Wellfare	1st Floor	Office B	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
1328	Health & Wellfare	1st Floor	Conference Room	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
1329	Health & Wellfare	1st Floor	Room 131	9	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	9	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.723	0.347	2,255	1,084
1330	Health & Wellfare	1st Floor	Copy Room	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.161	0.077	501	241
1331	Health & Wellfare	1st Floor	Amy Grippi Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1332	Health & Wellfare	1st Floor	Cathy Utz Office	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.482	0.232	1,002	482

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
1333	Health & Wellfare	1st Floor	Storage Room	1	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.080	0.039	167	80
1334	Health & Wellfare	1st Floor	Room 129	15	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	15	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	1.205	0.579	1,880	903
1335	Health & Wellfare	1st Floor	Room 127	13	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	13	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	1.044	0.502	3,258	1,566
1336	Health & Wellfare	1st Floor	Mens Room	5	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	5	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.266	0.129	2,332	1,127
1337	Health & Wellfare	1st Floor	Mens Room	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.043	0.017	379	147
1338	Health & Wellfare	1st Floor	JC	1	53	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.053	0.026	55	27
1339	Health & Wellfare	1st Floor	Women's Room	6	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	6	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.319	0.154	2,799	1,353
1340	Health & Wellfare	1st Floor	Women's Room	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	8760	0.043	0.017	379	147
1341	Health & Wellfare	1st Floor	Fire Control Room	4	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.213	0.103	443	214
1342	Health & Wellfare	1st Floor	Electrical Closet	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
1343	Health & Wellfare	1st Floor	Data Closet	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	260	0.161	0.077	42	20
1344	Health & Wellfare	1st Floor	Room 108-110	26	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	26	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	2.088	1.004	6,516	3,132
1345	Health & Wellfare	1st Floor	Copy Room	1	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.080	0.039	251	120
1346	Health & Wellfare	1st Floor	Conference Room 116	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.161	0.077	251	120
1347	Health & Wellfare	1st Floor	Room 108-110	2	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	2	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.087	0.034	270	105
1348	Health & Wellfare	1st Floor	Room 106	37	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	37	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	2.972	1.429	9,272	4,457
1349	Health & Wellfare	1st Floor	Traci Taylor Office	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
1350	Health & Wellfare	1st Floor	Room 106	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.043	0.017	135	53
1351	Health & Wellfare	1st Floor	Room 103	64	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	64	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	5.141	2.471	16,039	7,710
1352	Health & Wellfare	1st Floor	Conference Room 113	6	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.482	0.232	752	361
1353	Health & Wellfare	1st Floor	Stephanie Golden Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1354	Health & Wellfare	1st Floor	Gloria Gillian Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1355	Health & Wellfare	1st Floor	TaWonda Jones Office	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
1356	Health & Wellfare	1st Floor	Conference Room	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.241	0.116	376	181
1357	Health & Wellfare	1st Floor	Entry Vestibule	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.321	0.154	1,002	482
1358	Health & Wellfare	1st Floor	Entry Vestibule	1	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	1	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.003	0.003	25	25
1359	Health & Wellfare	1st Floor	Service Elevator Vestibule	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.241	0.116	752	361
1360	Health & Wellfare	1st Floor	IT Room	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	260	0.161	0.077	42	20
1361	Health & Wellfare	1st Floor	Corridor	24	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	24	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	1.928	0.927	6,015	2,891
1362	Health & Wellfare	1st Floor	Corridor	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.043	0.017	135	53
1363	Health & Wellfare	1st Floor	Corridor	4	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	4	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.011	0.011	99	99
1364	Health & Wellfare	1st Floor	Main Lobby	34	28	Indirect Linear Pendant Mounted Fluorescent, (1) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	34	13	Pendant Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 13W Lamp	3120	0.951	0.438	2,968	1,365
1365	Health & Wellfare	1st Floor	Main Lobby	4	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	4	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.173	0.067	541	210
1366	Health & Wellfare	1st Floor	Main Lobby	8	28	1'x1' Square Recessed Compact Fluorescent, twin, (2) 13W lamp Prismatic Acrylic Diffuser	8	9	Recessed Retrofit Wall Sconce with Rectangular LED Kit LED Light Fixture. (1) 9W	3120	0.224	0.071	698	222
1367	Health & Wellfare	1st Floor	Main Lobby	4	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	4	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.011	0.011	99	99
1368	Health & Wellfare	Basement	West Wing Restricted Area	61	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	61	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	4.900	2.355	15,287	7,348
1369	Health & Wellfare	Basement	Sam Colechio Office	28	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	28	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	2.249	1.081	4,678	2,249
1370	Health & Wellfare	Basement	West Wing Restricted Area	1	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	1	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.003	0.003	25	25
1371	Health & Wellfare	Basement	East Basement Vestibule	1	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.080	0.039	251	120
1372	Health & Wellfare	Basement	East Basement Vestibule	1	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	1	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.003	0.003	25	25
1373	Health & Wellfare	Basement	East Basement Vestibule	1	53	4' Industrial Chain Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	1	26	Chain Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.053	0.026	166	80
1374	Health & Wellfare	Basement	Room 035	11	53	4' Industrial Chain Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	11	26	Chain Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.586	0.283	305	147
1375	Health & Wellfare	Basement	Mechanical Storage	16	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	16	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.852	0.412	443	214
1376	Health & Wellfare	Basement	Storage Room	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	520	0.161	0.077	84	40
1377	Health & Wellfare	Basement	Supply Storage	8	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	8	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.426	0.206	222	107
1378	Health & Wellfare	Basement	Room B-24	13	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	13	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	1.044	0.502	1,629	783

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
1379	Health & Wellfare	Basement	Storage Room	3	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.160	0.077	83	40
1380	Health & Wellfare	Basement	Mens Room	6	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	6	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.319	0.154	2,799	1,353
1381	Health & Wellfare	Basement	Mens Room	14	53	4' Vapor Proof Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	14	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.745	0.360	6,530	3,157
1382	Health & Wellfare	Basement	Women's Room	10	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	10	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.532	0.257	4,664	2,255
1383	Health & Wellfare	Basement	Women's Room	4	53	4' Vapor Proof Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.213	0.103	1,866	902
1384	Health & Wellfare	Basement	Small Corridor	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1560	0.106	0.051	166	80
1385	Health & Wellfare	Basement	High Voltage Room	9	53	4' Industrial Chain Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	9	26	Chain Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.479	0.232	249	120
1386	Health & Wellfare	Basement	Snack Bar Storage	2	53	4' Industrial Chain Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	2	26	Chain Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
1387	Health & Wellfare	Basement	Storage	2	53	4' Industrial Chain Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	2	26	Chain Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
1388	Health & Wellfare	Basement	High Voltage Room	1	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	1	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.003	0.003	25	25
1389	Health & Wellfare	Basement	Elevator Mechanical	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
1390	Health & Wellfare	Basement	Steam Equipment Room	16	53	4' Industrial Chain Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	16	26	Chain Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1560	0.852	0.412	1,329	642
1391	Health & Wellfare	Basement	Service Elevator Vestibule	6	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	6	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.319	0.154	997	482
1392	Health & Wellfare	Basement	Hot Water Closet	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.053	0.026	28	13
1393	Health & Wellfare	Basement	Hot Water Closet	1	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	520	0.080	0.039	42	20
1394	Health & Wellfare	Basement	Pipe Chase	1	53	4' Strip Wall Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.053	0.026	11	5
1395	Health & Wellfare	Basement	Loading Dock	18	53	4' Vapor Proof Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	18	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	4380	0.958	0.463	4,198	2,029
1396	Health & Wellfare	Basement	Loading Dock	1	86	Wall-Pack Wall Mounted Metal Halide, (1) 70W lamp Prismatic Acrylic Diffuser	1	12	Wall Mounted Wall-Pack LED Light Fixture. (1) 12W	4380	0.086	0.012	376	52
1397	Health & Wellfare	Basement	IT Room	6	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	6	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.319	0.154	166	80
1398	Health & Wellfare	Basement	Generator Room	4	53	4' Industrial Chain Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	4	26	Chain Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.213	0.103	111	54
1399	Health & Wellfare	Basement	Snack Bar Room	31	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	31	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	1.651	0.798	858	415
1400	Health & Wellfare	Basement	Snack Bar Office	2	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
1401	Health & Wellfare	Basement	Snack Bar Room	2	21	Jelly Jar Surface Mounted Compact Fluorescent, spiral, (1) 23W lamp Glass Jelly Jar	2	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	520	0.042	0.016	22	8
1402	Health & Wellfare	Basement	Supply Storage	1	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.053	0.026	28	13
1403	Health & Wellfare	Basement	Mail Storage	13	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	13	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.692	0.335	360	174
1404	Health & Wellfare	Basement	Room B02 Mail Room	25	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	25	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	2.008	0.965	6,265	3,012
1405	Health & Wellfare	Basement	Mail Room Office	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
1406	Health & Wellfare	Basement	Room B05	20	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	20	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	1.065	0.515	554	268
1407	Health & Wellfare	Basement	Room B-03	23	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	23	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	1.847	0.888	2,882	1,385
1408	Health & Wellfare	Basement	Room B-03	1	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	1	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	1560	0.043	0.017	68	26
1409	Health & Wellfare	Basement	Electrician Office	10	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	10	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1560	0.532	0.257	831	402
1410	Health & Wellfare	Basement	Fire Pump Room	9	53	4' Industrial Chain Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	9	26	Chain Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.479	0.232	249	120
1411	Health & Wellfare	Basement	Corridor	20	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	20	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	1.606	0.772	5,012	2,409
1412	Health & Wellfare	Basement	Corridor	19	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp (No Diffuser)	19	17	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 17W	3120	0.823	0.320	2,568	998
1413	Health & Wellfare	Basement	Corridor	3	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	3	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.008	0.008	74	74
1414	Health & Wellfare	Stairwells	East Stairway	3	53	1'x4' Troffer Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.160	0.077	1,399	676
1415	Health & Wellfare	Stairwells	West Stairway	3	53	1'x4' Troffer Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.160	0.077	1,399	676
1416	Health & Wellfare	Stairwells	Center Stairway	3	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	3	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.160	0.077	1,399	676
1417	Health & Wellfare	Stairwells	East Stairway	21	53	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	21	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	1.118	0.541	9,795	4,735
1418	Health & Wellfare	Stairwells	West Stairway	21	53	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	21	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	1.118	0.541	9,795	4,735
1419	Health & Wellfare	Stairwells	Center Stairway	21	53	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	21	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	1.118	0.541	9,795	4,735
1420	Health & Wellfare	Elevators	Elevator 1	4	42	3' Strip Cove Mounted Fluorescent, (2) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	4	24	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (2) 12W Lamps	8760	0.166	0.095	1,455	833
1421	Health & Wellfare	Elevators	Elevator 2	4	42	3' Strip Cove Mounted Fluorescent, (2) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	4	24	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (2) 12W Lamps	8760	0.166	0.095	1,455	833
1422	Health & Wellfare	Elevators	Elevator 3	4	42	3' Strip Cove Mounted Fluorescent, (2) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	4	24	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (2) 12W Lamps	8760	0.166	0.095	1,455	833
1423	Health & Wellfare	Elevators	Elevator 4	4	42	3' Strip Cove Mounted Fluorescent, (2) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	4	24	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (2) 12W Lamps	8760	0.166	0.095	1,455	833
1424	Health & Wellfare	Elevators	Elevator 5	4	42	3' Strip Cove Mounted Fluorescent, (2) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	4	24	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (2) 12W Lamps	8760	0.166	0.095	1,455	833

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
1425	Health & Wellfare	Elevators	Elevator 6	4	42	3' Strip Cove Mounted Fluorescent, (2) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	4	24	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (2) 12W Lamps	8760	0.166	0.095	1,455	833
1426	Health & Wellfare	Exterior	Perimeter Lighting	10	28	1'x1' Square Recessed Compact Fluorescent, twin, (2) 13W lamp Prismatic Acrylic Diffuser	10	9	Recessed Retrofit Wall Sconce with Rectangular LED Kit LED Light Fixture. (1) 9W	4380	0.280	0.089	1,225	390
1427	North Office Building	Penthouse	Main Penthouse	25	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	25	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	1.331	0.644	692	335
1428	North Office Building	Penthouse	Crawl Space	12	21	Bare-Lamp Keyless Socket Surface Mounted Compact Fluorescent, spiral, (1) 23W lamp (No Diffuser)	12	8	Surface Mounted LED Bare-Lamp Keyless Socket Retrofit Lamp/Fixture Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	520	0.249	0.097	130	51
1429	North Office Building	6th Floor	Room 600-601	18	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	18	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.958	0.463	2,990	1,446
1430	North Office Building	6th Floor	Office	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.160	0.077	332	161
1431	North Office Building	6th Floor	Conference Room	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.160	0.077	332	161
1432	North Office Building	6th Floor	Electrical Closet	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.053	0.026	28	13
1433	North Office Building	6th Floor	Men's Room Vestibule	1	30	1'x2' Troffer Recessed Flanged Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	16	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	8760	0.030	0.016	261	139
1434	North Office Building	6th Floor	Men's Room	6	53	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	6	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.319	0.154	2,799	1,353
1435	North Office Building	6th Floor	Men's Room	1	30	1'x2' Troffer Recessed Flanged Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	16	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	8760	0.030	0.016	261	139
1436	North Office Building	6th Floor	Men's Room	1	53	4' Vanity Wall Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Frosted	1	26	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.053	0.026	466	225
1437	North Office Building	6th Floor	Men's Room	1	30	2' Vanity Wall Mounted Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Frosted	1	16	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	8760	0.030	0.016	261	139
1438	North Office Building	6th Floor	JC	1	42	Drum Surface Mounted Fluorescent, Circline, (1) 44W lamp, preheat ballast Frosted	1	15	Surface Mounted Drum LED Light Fixture. (1) 15W	1040	0.042	0.015	43	15
1439	North Office Building	6th Floor	Room 602	6	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	6	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.319	0.154	665	321
1440	North Office Building	6th Floor	IT Room	10	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	10	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.532	0.257	1,108	535
1441	North Office Building	6th Floor	Server Room	6	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	6	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.319	0.154	665	321
1442	North Office Building	6th Floor	Room 603	28	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	28	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	1.491	0.721	4,652	2,249
1443	North Office Building	6th Floor	Storage Room	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
1444	North Office Building	6th Floor	Office A	4	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.213	0.103	443	214
1445	North Office Building	6th Floor	Office B	5	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	5	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.266	0.129	554	268
1446	North Office Building	6th Floor	Office C	4	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.213	0.103	443	214
1447	North Office Building	6th Floor	Office D	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.160	0.077	332	161
1448	North Office Building	6th Floor	Office E	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.160	0.077	332	161
1449	North Office Building	6th Floor	Office F	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.160	0.077	332	161
1450	North Office Building	6th Floor	Office G	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.160	0.077	332	161
1451	North Office Building	6th Floor	Office H	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.160	0.077	332	161
1452	North Office Building	6th Floor	Office I	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.160	0.077	332	161
1453	North Office Building	6th Floor	Office J	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.160	0.077	332	161
1454	North Office Building	6th Floor	Office K	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.160	0.077	332	161
1455	North Office Building	6th Floor	Office L	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.160	0.077	332	161
1456	North Office Building	6th Floor	Office M	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.160	0.077	332	161
1457	North Office Building	6th Floor	Office N	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.160	0.077	332	161
1458	North Office Building	6th Floor	Library	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
1459	North Office Building	6th Floor	Conference Room	5	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	5	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1560	0.266	0.129	415	201
1460	North Office Building	6th Floor	Room 610	6	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	6	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.319	0.154	997	482
1461	North Office Building	6th Floor	Conference Room	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1560	0.160	0.077	249	120
1462	North Office Building	6th Floor	Office A	4	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.213	0.103	443	214
1463	North Office Building	6th Floor	Office B	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
1464	North Office Building	6th Floor	Room 611	43	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	43	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	2.290	1.107	7,144	3,453
1465	North Office Building	6th Floor	Conference Room A	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.106	0.051	332	161
1466	North Office Building	6th Floor	Room 611	3	30	2'x2' Troffer Recessed Flanged Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	16	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	3120	0.089	0.048	279	148
1467	North Office Building	6th Floor	Office A	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.160	0.077	498	241
1468	North Office Building	6th Floor	Conference Room B	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.106	0.051	332	161
1469	North Office Building	6th Floor	Women's Room Vestibule	1	30	1'x2' Troffer Recessed Flanged Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	16	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	8760	0.030	0.016	261	139
1470	North Office Building	6th Floor	Women's Room	7	53	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	7	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.373	0.180	3,265	1,578

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
1471	North Office Building	6th Floor	Women's Room	1	30	1'x2' Troffer Recessed Flanged Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	16	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	8760	0.030	0.016	261	139
1472	North Office Building	6th Floor	Women's Room	2	53	4' Vanity Wall Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Frosted	2	26	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.106	0.051	933	451
1473	North Office Building	6th Floor	Women's Room	1	30	2' Vanity Wall Mounted Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Frosted	1	16	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	8760	0.030	0.016	261	139
1474	North Office Building	6th Floor	Electrical Closet	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.053	0.026	28	13
1475	North Office Building	6th Floor	Room 613	9	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	9	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.479	0.232	1,495	723
1476	North Office Building	6th Floor	Corridor	11	28	2'x4' Troffer Recessed Flanged Fluorescent, (1) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	11	13	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 13W Lamp	3120	0.308	0.142	960	442
1477	North Office Building	6th Floor	Corridor	2	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	2	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.006	0.006	49	49
1478	North Office Building	6th Floor	Data Closet	1	65	4' Industrial Surface Mounted Fluorescent, (2) 48", ES lamp (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	260	0.065	0.026	17	7
1479	North Office Building	6th Floor	Corridor	3	6	Fire Emergency Semi Recessed Compact Fluorescent, spiral, (1) 7W lamp Blue Glass Diffuser	3	5	Semi Recessed Install LED Screw-in PAR16 Lamp Light Emitting Diode Lamp, Screw-in, (1) 6W lamp	8760	0.019	0.016	166	142
1480	North Office Building	5th Floor	Room 500	32	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	32	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	1.704	0.824	5,316	2,570
1481	North Office Building	5th Floor	Office A	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.160	0.077	332	161
1482	North Office Building	5th Floor	Conference Room	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1560	0.160	0.077	249	120
1483	North Office Building	5th Floor	Room 500	5	30	2'x2' Troffer Recessed Flanged Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	5	16	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	3120	0.149	0.079	465	247
1484	North Office Building	5th Floor	Electrical Closet	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.053	0.026	28	13
1485	North Office Building	5th Floor	Men's Room Vestibule	1	30	1'x2' Troffer Recessed Flanged Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	16	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	3120	0.030	0.016	93	49
1486	North Office Building	5th Floor	Men's Room	6	53	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	6	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.319	0.154	2,799	1,353
1487	North Office Building	5th Floor	Men's Room	1	30	1'x2' Troffer Recessed Flanged Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	16	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	8760	0.030	0.016	261	139
1488	North Office Building	5th Floor	JC	1	42	Drum Surface Mounted Fluorescent, Circline, (1) 44W lamp, preheat ballast Frosted	1	15	Surface Mounted Drum LED Light Fixture. (1) 15W	1040	0.042	0.015	43	15
1489	North Office Building	5th Floor	Men's Room	1	53	4' Vanity Wall Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Frosted	1	26	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.053	0.026	466	225
1490	North Office Building	5th Floor	Men's Room	1	30	2' Vanity Wall Mounted Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Frosted	1	16	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	8760	0.030	0.016	261	139
1491	North Office Building	5th Floor	Room 502-503	120	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	120	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	6.390	3.089	19,936	9,637
1492	North Office Building	5th Floor	Office A	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.160	0.077	332	161
1493	North Office Building	5th Floor	Conference Room A	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
1494	North Office Building	5th Floor	Conference Room B	6	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	6	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.319	0.154	665	321
1495	North Office Building	5th Floor	Office B	1	60	Chandelier Chain Mounted Light Emitting Diode Lamp, Screw-in, (10) 7W lamp (No Diffuser)	1	60	Existing luminaire to remain as is No Retrofit. To remain as is.	2080	0.060	0.060	124	124
1496	North Office Building	5th Floor	Restroom	1	53	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.053	0.026	55	27
1497	North Office Building	5th Floor	Restroom	1	30	2' Vanity Wall Mounted Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Frosted	1	16	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	1040	0.030	0.016	31	16
1498	North Office Building	5th Floor	Office B	12	14	Recessed Can 5" Recessed Compact Fluorescent, spiral, (1) 15W lamp (No Diffuser)	12	10	Recessed Install LED Screw-in BR30 Lamp Light Emitting Diode Lamp, Screw-in, (1) 11W lamp	2080	0.162	0.119	338	247
1499	North Office Building	5th Floor	Kitchen	4	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.213	0.103	665	321
1500	North Office Building	5th Floor	Conference Room C	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1560	0.160	0.077	249	120
1501	North Office Building	5th Floor	Supply Storage	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
1502	North Office Building	5th Floor	Room 515	19	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	19	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	1.012	0.489	3,157	1,526
1503	North Office Building	5th Floor	Conference Room A	5	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	5	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1560	0.266	0.129	415	201
1504	North Office Building	5th Floor	Office A	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
1505	North Office Building	5th Floor	Office B	6	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	6	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.319	0.154	665	321
1506	North Office Building	5th Floor	Office C	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.160	0.077	332	161
1507	North Office Building	5th Floor	Office D	1	60	Chandelier Chain Mounted Light Emitting Diode Lamp, Screw-in, (10) 7W lamp (No Diffuser)	1	60	Existing luminaire to remain as is No Retrofit. To remain as is.	2080	0.060	0.060	124	124
1508	North Office Building	5th Floor	Conference Room B	6	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	6	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1560	0.319	0.154	498	241
1509	North Office Building	5th Floor	Office E	1	60	Chandelier Chain Mounted Light Emitting Diode Lamp, Screw-in, (10) 7W lamp (No Diffuser)	1	60	Existing luminaire to remain as is No Retrofit. To remain as is.	2080	0.060	0.060	124	124
1510	North Office Building	5th Floor	Restroom	1	53	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.053	0.026	55	27
1511	North Office Building	5th Floor	Office B	1	30	2'x2' Troffer Recessed Flanged Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	1	16	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	2080	0.030	0.016	62	33
1512	North Office Building	5th Floor	Office D	12	14	Recessed Can 5" Recessed Compact Fluorescent, spiral, (1) 15W lamp (No Diffuser)	12	10	Recessed Install LED Screw-in BR30 Lamp Light Emitting Diode Lamp, Screw-in, (1) 11W lamp	2080	0.162	0.119	338	247
1513	North Office Building	5th Floor	Office E	17	14	Recessed Can 5" Recessed Compact Fluorescent, spiral, (1) 15W lamp (No Diffuser)	17	10	Recessed Install LED Screw-in BR30 Lamp Light Emitting Diode Lamp, Screw-in, (1) 11W lamp	2080	0.230	0.168	479	350
1514	North Office Building	5th Floor	Restroom	1	30	2' Vanity Wall Mounted Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Frosted	1	16	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	1040	0.030	0.016	31	16
1515	North Office Building	5th Floor	Office F	4	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	4	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.213	0.103	443	214
1516	North Office Building	5th Floor	Conference Room C	6	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	6	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1560	0.319	0.154	498	241

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
1517	North Office Building	5th Floor	Room 515	2	30	2'x2' Troffer Recessed Flanged Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	2	16	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	3120	0.060	0.032	186	99
1518	North Office Building	5th Floor	Women's Room Vestibule	1	30	1'x2' Troffer Recessed Flanged Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	16	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	3120	0.030	0.016	93	49
1519	North Office Building	5th Floor	Women's Room	7	53	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	7	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.373	0.180	3,265	1,578
1520	North Office Building	5th Floor	Women's Room	1	30	1'x2' Troffer Recessed Flanged Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	16	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	8760	0.030	0.016	261	139
1521	North Office Building	5th Floor	Women's Room	2	53	4' Vanity Wall Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Frosted	2	26	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.106	0.051	933	451
1522	North Office Building	5th Floor	Women's Room	1	30	2' Vanity Wall Mounted Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Frosted	1	16	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	8760	0.030	0.016	261	139
1523	North Office Building	5th Floor	Electrical Closet	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.053	0.026	28	13
1524	North Office Building	5th Floor	Data Closet	1	65	4' Industrial Surface Mounted Fluorescent, (2) 48", ES lamp (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	260	0.065	0.026	17	7
1525	North Office Building	5th Floor	Corridor	9	28	2'x4' Troffer Recessed Flanged Fluorescent, (1) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	9	13	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 13W Lamp	3120	0.252	0.116	786	361
1526	North Office Building	5th Floor	Corridor	2	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	2	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.006	0.006	49	49
1527	North Office Building	5th Floor	Corridor	3	6	Fire Emergency Semi Recessed Compact Fluorescent, spiral, (1) 7W lamp Blue Glass Diffuser	3	5	Semi Recessed Install LED Screw-in PAR16 Lamp Light Emitting Diode Lamp, Screw-in, (1) 6W lamp	8760	0.019	0.016	166	142
1528	North Office Building	4th Floor	Room 400	5	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	5	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.266	0.129	831	402
1529	North Office Building	4th Floor	Room 401	12	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	12	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.639	0.309	1,994	964
1530	North Office Building	4th Floor	Electrical Closet	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.053	0.026	28	13
1531	North Office Building	4th Floor	Men's Room Vestibule	1	30	1'x2' Troffer Recessed Flanged Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	16	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	3120	0.030	0.016	93	49
1532	North Office Building	4th Floor	JC	1	42	Drum Surface Mounted Fluorescent, Circline, (1) 44W lamp, preheat ballast Frosted	1	15	Surface Mounted Drum LED Light Fixture. (1) 15W	1040	0.042	0.015	43	15
1533	North Office Building	4th Floor	Men's Room	6	53	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	6	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.319	0.154	2,799	1,353
1534	North Office Building	4th Floor	Men's Room	1	30	1'x2' Troffer Recessed Flanged Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	16	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	8760	0.030	0.016	261	139
1535	North Office Building	4th Floor	Men's Room	1	53	4' Vanity Wall Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Frosted	1	26	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.053	0.026	466	225
1536	North Office Building	4th Floor	Men's Room	1	30	2' Vanity Wall Mounted Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Frosted	1	16	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	8760	0.030	0.016	261	139
1537	North Office Building	4th Floor	Room 403	29	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	29	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	1.544	0.746	4,818	2,329
1538	North Office Building	4th Floor	Office A	4	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.213	0.103	443	214
1539	North Office Building	4th Floor	Office A	1	30	2'x2' Troffer Recessed Flanged Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	16	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	2080	0.030	0.016	62	33
1540	North Office Building	4th Floor	Office B	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.160	0.077	332	161
1541	North Office Building	4th Floor	Office C	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.160	0.077	332	161
1542	North Office Building	4th Floor	Office D	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.160	0.077	332	161
1543	North Office Building	4th Floor	Office E	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
1544	North Office Building	4th Floor	Office F	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
1545	North Office Building	4th Floor	Office G	4	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.213	0.103	443	214
1546	North Office Building	4th Floor	Office H	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.160	0.077	332	161
1547	North Office Building	4th Floor	Conference Room	5	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	5	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1560	0.266	0.129	415	201
1548	North Office Building	4th Floor	Room 404	6	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	6	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.319	0.154	997	482
1549	North Office Building	4th Floor	Room 405	6	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	6	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.319	0.154	997	482
1550	North Office Building	4th Floor	Room 406-409	42	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	42	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	2.236	1.081	6,978	3,373
1551	North Office Building	4th Floor	Room 410	19	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	19	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	1.012	0.489	3,157	1,526
1552	North Office Building	4th Floor	Room 414	23	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	23	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	1.225	0.592	3,821	1,847
1553	North Office Building	4th Floor	Office A	4	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.213	0.103	443	214
1554	North Office Building	4th Floor	Restroom	1	53	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.053	0.026	55	27
1555	North Office Building	4th Floor	Restroom	1	30	2' Vanity Wall Mounted Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Frosted	1	16	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	1040	0.030	0.016	31	16
1556	North Office Building	4th Floor	Room 414	4	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	4	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.213	0.103	665	321
1557	North Office Building	4th Floor	Office B	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
1558	North Office Building	4th Floor	Office C	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
1559	North Office Building	4th Floor	Office D	4	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.213	0.103	443	214
1560	North Office Building	4th Floor	Office E	6	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	6	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.319	0.154	665	321
1561	North Office Building	4th Floor	Restroom	1	53	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.053	0.026	55	27
1562	North Office Building	4th Floor	Restroom	1	83	Non-Linear Vanity Wall Mounted Compact Fluorescent, spiral, (4) 23W lamp Frosted	1	32	Wall Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (4) 9W lamp	1040	0.083	0.032	86	34

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
1563	North Office Building	4th Floor	Office F	4	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	4	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.213	0.103	443	214
1564	North Office Building	4th Floor	Conference Room A	6	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	6	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1560	0.319	0.154	498	241
1565	North Office Building	4th Floor	Conference Room B	9	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	9	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1560	0.479	0.232	748	361
1566	North Office Building	4th Floor	File Room	1	53	4' Strip Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1560	0.053	0.026	83	40
1567	North Office Building	4th Floor	Women's Room Vestibule	1	30	1'x2' Troffer Recessed Flanged Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	16	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	3120	0.030	0.016	93	49
1568	North Office Building	4th Floor	Women's Room	7	53	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	7	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.373	0.180	3,265	1,578
1569	North Office Building	4th Floor	Women's Room	1	30	1'x2' Troffer Recessed Flanged Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	16	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	8760	0.030	0.016	261	139
1570	North Office Building	4th Floor	Women's Room	2	53	4' Vanity Wall Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Frosted	2	26	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.106	0.051	933	451
1571	North Office Building	4th Floor	Women's Room	1	30	2' Vanity Wall Mounted Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Frosted	1	16	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	8760	0.030	0.016	261	139
1572	North Office Building	4th Floor	Electrical Closet	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.053	0.026	28	13
1573	North Office Building	4th Floor	Room 415	20	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	20	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	1.065	0.515	3,323	1,606
1574	North Office Building	4th Floor	Data Closet	1	65	4' Industrial Surface Mounted Fluorescent, (2) 48", ES lamp (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	260	0.065	0.026	17	7
1575	North Office Building	4th Floor	Corridor	9	28	2'x4' Troffer Recessed Flanged Fluorescent, (1) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	9	13	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 13W Lamp	3120	0.252	0.116	786	361
1576	North Office Building	4th Floor	Corridor	2	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	2	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.006	0.006	49	49
1577	North Office Building	4th Floor	Corridor	3	6	Fire Emergency Semi Recessed Compact Fluorescent, spiral, (1) 7W lamp Blue Glass Diffuser	3	5	Semi Recessed Install LED Screw-in PAR16 Lamp Light Emitting Diode Lamp, Screw-in, (1) 6W lamp	8760	0.019	0.016	166	142
1578	North Office Building	3rd Floor	Room 300	14	28	4' Wraparound Surface Mounted Fluorescent, (1) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	14	13	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 13W Lamp	260	0.392	0.180	102	47
1579	North Office Building	3rd Floor	Room 301	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.160	0.077	498	241
1580	North Office Building	3rd Floor	Office A	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
1581	North Office Building	3rd Floor	Office B	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
1582	North Office Building	3rd Floor	Storage Room	1	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.053	0.026	28	13
1583	North Office Building	3rd Floor	Conference Room	6	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	6	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1560	0.319	0.154	498	241
1584	North Office Building	3rd Floor	Electrical Closet	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.053	0.026	28	13
1585	North Office Building	3rd Floor	Men's Room Vestibule	1	30	1'x2' Troffer Recessed Flanged Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	16	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	3120	0.030	0.016	93	49
1586	North Office Building	3rd Floor	JC	1	42	Drum Surface Mounted Fluorescent, Circline, (1) 44W lamp, preheat ballast Frosted	1	15	Surface Mounted Drum LED Light Fixture. (1) 15W	1040	0.042	0.015	43	15
1587	North Office Building	3rd Floor	Men's Room	6	53	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	6	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.319	0.154	2,799	1,353
1588	North Office Building	3rd Floor	Men's Room	1	30	1'x2' Troffer Recessed Flanged Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	16	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	8760	0.030	0.016	261	139
1589	North Office Building	3rd Floor	Men's Room	1	53	4' Vanity Wall Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Frosted	1	26	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.053	0.026	466	225
1590	North Office Building	3rd Floor	Men's Room	1	30	2' Vanity Wall Mounted Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Frosted	1	16	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	8760	0.030	0.016	261	139
1591	North Office Building	3rd Floor	Room 302	27	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	27	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	1.438	0.695	4,486	2,168
1592	North Office Building	3rd Floor	Kitchenette	1	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.053	0.026	166	80
1593	North Office Building	3rd Floor	Office A	5	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	5	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.266	0.129	554	268
1594	North Office Building	3rd Floor	Office A	1	30	2'x2' Troffer Recessed Flanged Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	16	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	2080	0.030	0.016	62	33
1595	North Office Building	3rd Floor	Office B	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.160	0.077	332	161
1596	North Office Building	3rd Floor	Office C	5	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	5	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.266	0.129	554	268
1597	North Office Building	3rd Floor	Office D	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.160	0.077	332	161
1598	North Office Building	3rd Floor	Office E	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
1599	North Office Building	3rd Floor	Office F	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.160	0.077	332	161
1600	North Office Building	3rd Floor	Office G	1	380	Chandelier Chain Mounted Incandescent, (10) 40W lamp (No Diffuser)	1	380	Existing luminaire to remain as is No Retrofit. To remain as is.	2080	0.380	0.380	790	790
1601	North Office Building	3rd Floor	Office G Restroom	1	30	2' Vanity Wall Mounted Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Frosted	1	16	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	1040	0.030	0.016	31	16
1602	North Office Building	3rd Floor	Office G	18	14	Recessed Can 5" Recessed Compact Fluorescent, spiral, (1) 15W lamp (No Diffuser)	18	10	Recessed Install LED Screw-in BR30 Lamp Light Emitting Diode Lamp, Screw-in, (1) 11W lamp	2080	0.244	0.178	507	371
1603	North Office Building	3rd Floor	Office H	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.160	0.077	332	161
1604	North Office Building	3rd Floor	Conference Room	12	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	12	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1560	0.639	0.309	997	482
1605	North Office Building	3rd Floor	Room 305	23	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	23	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	1.225	0.592	3,821	1,847
1606	North Office Building	3rd Floor	Office A	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
1607	North Office Building	3rd Floor	Office B	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
1608	North Office Building	3rd Floor	Office C	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
1609	North Office Building	3rd Floor	Office D	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.160	0.077	332	161
1610	North Office Building	3rd Floor	Room 306	6	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	6	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.319	0.154	665	321
1611	North Office Building	3rd Floor	Office A	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
1612	North Office Building	3rd Floor	Office B	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
1613	North Office Building	3rd Floor	Room 307	10	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	10	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.532	0.257	1,661	803
1614	North Office Building	3rd Floor	Office A	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
1615	North Office Building	3rd Floor	Office B	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
1616	North Office Building	3rd Floor	Office C	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.160	0.077	332	161
1617	North Office Building	3rd Floor	Room 308	35	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	35	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	1.864	0.901	5,815	2,811
1618	North Office Building	3rd Floor	Kitchenette	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.106	0.051	332	161
1619	North Office Building	3rd Floor	Office A	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.160	0.077	332	161
1620	North Office Building	3rd Floor	Office B	4	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.213	0.103	443	214
1621	North Office Building	3rd Floor	Office B Restroom	1	30	2' Vanity Wall Mounted Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Frosted	1	16	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	1040	0.030	0.016	31	16
1622	North Office Building	3rd Floor	Office C	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.160	0.077	332	161
1623	North Office Building	3rd Floor	Office B Restroom	1	53	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.053	0.026	55	27
1624	North Office Building	3rd Floor	Computer Room	13	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	13	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.692	0.335	1,440	696
1625	North Office Building	3rd Floor	Computer Room	1	30	2'x2' Troffer Recessed Flanged Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	16	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	2080	0.030	0.016	62	33
1626	North Office Building	3rd Floor	Women's Room Vestibule	1	30	1'x2' Troffer Recessed Flanged Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	16	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	3120	0.030	0.016	93	49
1627	North Office Building	3rd Floor	Women's Room	7	53	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	7	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.373	0.180	3,265	1,578
1628	North Office Building	3rd Floor	Women's Room	1	30	1'x2' Troffer Recessed Flanged Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	16	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	8760	0.030	0.016	261	139
1629	North Office Building	3rd Floor	Women's Room	2	53	4' Vanity Wall Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Frosted	2	26	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.106	0.051	933	451
1630	North Office Building	3rd Floor	Women's Room	1	30	2' Vanity Wall Mounted Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Frosted	1	16	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	8760	0.030	0.016	261	139
1631	North Office Building	3rd Floor	Electrical Closet	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.053	0.026	28	13
1632	North Office Building	3rd Floor	Room 309	11	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	11	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.586	0.283	1,827	883
1633	North Office Building	3rd Floor	Office A	5	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	5	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.266	0.129	554	268
1634	North Office Building	3rd Floor	Room 309	1	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.053	0.026	166	80
1635	North Office Building	3rd Floor	Data Closet	1	65	4' Industrial Surface Mounted Fluorescent, (2) 48", ES lamp (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	260	0.065	0.026	17	7
1636	North Office Building	3rd Floor	Corridor	9	28	2'x4' Troffer Recessed Flanged Fluorescent, (1) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	9	13	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 13W Lamp	3120	0.252	0.116	786	361
1637	North Office Building	3rd Floor	Corridor	2	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	2	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.006	0.006	49	49
1638	North Office Building	3rd Floor	Corridor	3	6	Fire Emergency Semi Recessed Compact Fluorescent, spiral, (1) 7W lamp Blue Glass Diffuser	3	5	Semi Recessed Install LED Screw-in PAR16 Lamp Light Emitting Diode Lamp, Screw-in, (1) 6W lamp	8760	0.019	0.016	166	142
1639	North Office Building	3rd Floor	Corridor	15	8	Track Light Surface Mounted Light Emitting Diode Lamp, Screw-in, (1) 9W lamp (No Diffuser)	15	8	Existing luminaire to remain as is No Retrofit. To remain as is.	3120	0.115	0.115	360	360
1640	North Office Building	2nd Floor	Room 200	6	130	2'x4' Troffer Recessed Fluorescent, (4) 48", ES lamp Prismatic Acrylic Diffuser	6	51	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 13W Lamps	520	0.780	0.309	405	161
1641	North Office Building	2nd Floor	Room 201	36	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	36	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	1.917	0.927	5,981	2,891
1642	North Office Building	2nd Floor	Office A	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
1643	North Office Building	2nd Floor	Storage Room	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
1644	North Office Building	2nd Floor	Office B	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.160	0.077	332	161
1645	North Office Building	2nd Floor	Electrical Closet	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.053	0.026	28	13
1646	North Office Building	2nd Floor	Men's Room Vestibule	1	30	1'x2' Troffer Recessed Flanged Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	16	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	3120	0.030	0.016	93	49
1647	North Office Building	2nd Floor	JC	1	42	Drum Surface Mounted Fluorescent, Circline, (1) 44W lamp, preheat ballast Frosted	1	15	Surface Mounted Drum LED Light Fixture. (1) 15W	8760	0.042	0.015	364	130
1648	North Office Building	2nd Floor	Men's Room	5	53	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	5	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.266	0.129	2,332	1,127
1649	North Office Building	2nd Floor	Men's Room	3	30	1'x2' Troffer Recessed Flanged Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	16	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	8760	0.089	0.048	783	416
1650	North Office Building	2nd Floor	Men's Room	1	53	4' Vanity Wall Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Frosted	1	26	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.053	0.026	466	225
1651	North Office Building	2nd Floor	Men's Room	1	30	2' Vanity Wall Mounted Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Frosted	1	16	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	8760	0.030	0.016	261	139
1652	North Office Building	2nd Floor	Room 202	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.106	0.051	332	161
1653	North Office Building	2nd Floor	Room 200	2	92	2'x2' Troffer Recessed Fluorescent, (4) 24", STD lamp Prismatic Acrylic Diffuser	2	32	Recessed T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (4) 8W Lamps	520	0.184	0.063	96	33
1654	North Office Building	2nd Floor	Office A	2	30	2'x2' Troffer Recessed Flanged Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	16	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	2080	0.060	0.032	124	66

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
1655	North Office Building	2nd Floor	Room 203	70	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	70	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	3.727	1.802	11,629	5,622
1656	North Office Building	2nd Floor	Office A	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
1657	North Office Building	2nd Floor	Office B	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
1658	North Office Building	2nd Floor	Office C	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
1659	North Office Building	2nd Floor	Office D	4	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.213	0.103	443	214
1660	North Office Building	2nd Floor	Office E	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.160	0.077	332	161
1661	North Office Building	2nd Floor	Office F	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
1662	North Office Building	2nd Floor	Office G	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
1663	North Office Building	2nd Floor	Room 203	1	30	2'x2' Troffer Recessed Flanged Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	16	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	3120	0.030	0.016	93	49
1664	North Office Building	2nd Floor	Room 206	16	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	16	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.852	0.412	2,658	1,285
1665	North Office Building	2nd Floor	Mezzanine Storage	3	53	2'x4' Troffer Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.160	0.077	83	40
1666	North Office Building	2nd Floor	Room 207	25	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	25	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	1.331	0.644	4,153	2,008
1667	North Office Building	2nd Floor	Office A	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.160	0.077	332	161
1668	North Office Building	2nd Floor	Room 207	2	30	2'x2' Troffer Recessed Flanged Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	16	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	3120	0.060	0.032	186	99
1669	North Office Building	2nd Floor	Room 210	67	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	67	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	3.568	1.725	11,131	5,381
1670	North Office Building	2nd Floor	Room 210	4	30	2'x2' Troffer Recessed Flanged Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	16	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	3120	0.119	0.063	372	198
1671	North Office Building	2nd Floor	Conference Room A	2	53	2'x4' Troffer Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1560	0.106	0.051	166	80
1672	North Office Building	2nd Floor	Office A	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
1673	North Office Building	2nd Floor	Conference Room B	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1560	0.160	0.077	249	120
1674	North Office Building	2nd Floor	Office B	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.160	0.077	332	161
1675	North Office Building	2nd Floor	Office C	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
1676	North Office Building	2nd Floor	Office C	1	30	2'x2' Troffer Recessed Flanged Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	16	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	2080	0.030	0.016	62	33
1677	North Office Building	2nd Floor	Women's Room Vestibule	1	30	1'x2' Troffer Recessed Flanged Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	16	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	3120	0.030	0.016	93	49
1678	North Office Building	2nd Floor	Women's Room	10	53	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	10	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.532	0.257	4,664	2,255
1679	North Office Building	2nd Floor	Women's Room	2	53	4' Vanity Wall Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Frosted	2	26	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.106	0.051	933	451
1680	North Office Building	2nd Floor	Women's Room	1	30	2' Vanity Wall Mounted Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Frosted	1	16	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	8760	0.030	0.016	261	139
1681	North Office Building	2nd Floor	Electrical Closet	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.053	0.026	28	13
1682	North Office Building	2nd Floor	Data Closet	1	65	4' Industrial Surface Mounted Fluorescent, (2) 48", ES lamp (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	260	0.065	0.026	17	7
1683	North Office Building	2nd Floor	Corridor	15	28	2'x4' Troffer Recessed Flanged Fluorescent, (1) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	15	13	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 13W Lamp	3120	0.420	0.193	1,309	602
1684	North Office Building	2nd Floor	Corridor	3	6	Fire Emergency Semi Recessed Compact Fluorescent, spiral, (1) 7W lamp Blue Glass Diffuser	3	5	Semi Recessed Install LED Screw-in PAR16 Lamp Light Emitting Diode Lamp, Screw-in, (1) 6W lamp	8760	0.019	0.016	166	142
1685	North Office Building	2nd Floor	Corridor	2	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	2	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.006	0.006	49	49
1686	North Office Building	1st Floor	Room 100	22	130	2'x4' Troffer Recessed Fluorescent, (4) 48", ES lamp Prismatic Acrylic Diffuser	22	51	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 13W Lamps	520	2.859	1.133	1,487	589
1687	North Office Building	1st Floor	Electrical Closet	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.053	0.026	28	13
1688	North Office Building	1st Floor	Men's Room Vestibule	2	30	1'x2' Troffer Recessed Flanged Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	16	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	8760	0.060	0.032	522	278
1689	North Office Building	1st Floor	JC	1	42	Drum Surface Mounted Fluorescent, Circline, (1) 44W lamp, preheat ballast Frosted	1	15	Surface Mounted Drum LED Light Fixture. (1) 15W	1040	0.042	0.015	43	15
1690	North Office Building	1st Floor	Men's Room	7	53	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	7	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.373	0.180	3,265	1,578
1691	North Office Building	1st Floor	Men's Room	1	30	1'x2' Troffer Recessed Flanged Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	16	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	8760	0.030	0.016	261	139
1692	North Office Building	1st Floor	Men's Room	1	53	4' Vanity Wall Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Frosted	1	26	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.053	0.026	466	225
1693	North Office Building	1st Floor	Men's Room	1	30	2' Vanity Wall Mounted Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Frosted	1	16	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	8760	0.030	0.016	261	139
1694	North Office Building	1st Floor	Room 112-113	10	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	10	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.532	0.257	1,661	803
1695	North Office Building	1st Floor	Office A	5	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	5	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.266	0.129	554	268
1696	North Office Building	1st Floor	Office B	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
1697	North Office Building	1st Floor	Kitchenette	4	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.213	0.103	665	321
1698	North Office Building	1st Floor	Room 114	14	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	14	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.745	0.360	2,326	1,124
1699	North Office Building	1st Floor	Office A	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
1700	North Office Building	1st Floor	Room 115	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.106	0.051	332	161

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
1701	North Office Building	1st Floor	Room 116	17	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	17	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.905	0.438	2,824	1,365
1702	North Office Building	1st Floor	Conference Room	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1560	0.106	0.051	166	80
1703	North Office Building	1st Floor	Office A	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.160	0.077	332	161
1704	North Office Building	1st Floor	Office B	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
1705	North Office Building	1st Floor	Room 117	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.160	0.077	498	241
1706	North Office Building	1st Floor	Conference Room	4	30	2'x2' Troffer Recessed Flanged Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	16	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	1560	0.119	0.063	186	99
1707	North Office Building	1st Floor	Conference Room	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1560	0.106	0.051	166	80
1708	North Office Building	1st Floor	Room 117	2	30	2'x2' Troffer Recessed Flanged Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	16	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	3120	0.060	0.032	186	99
1709	North Office Building	1st Floor	Storage Room A	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
1710	North Office Building	1st Floor	Storage Room B	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
1711	North Office Building	1st Floor	Room 118	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	260	0.106	0.051	28	13
1712	North Office Building	1st Floor	Room 119	14	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	14	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.745	0.360	388	187
1713	North Office Building	1st Floor	Women's Room Vestibule	1	30	1'x2' Troffer Recessed Flanged Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	16	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	8760	0.030	0.016	261	139
1714	North Office Building	1st Floor	Women's Room	10	53	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	10	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.532	0.257	4,664	2,255
1715	North Office Building	1st Floor	Women's Room	2	53	4' Vanity Wall Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Frosted	2	26	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.106	0.051	933	451
1716	North Office Building	1st Floor	Women's Room	1	30	2' Vanity Wall Mounted Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Frosted	1	16	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	8760	0.030	0.016	261	139
1717	North Office Building	1st Floor	Electrical Closet	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.053	0.026	28	13
1718	North Office Building	1st Floor	Room 120-121	8	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	8	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.426	0.206	1,329	642
1719	North Office Building	1st Floor	Storage Room A	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.160	0.077	83	40
1720	North Office Building	1st Floor	Storage Room B	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.160	0.077	83	40
1721	North Office Building	1st Floor	Corridor	3	70	Chandelier Chain Mounted Compact Fluorescent, spiral, (6) 13W lamp Frosted	3	70	Existing luminaire to remain as is No Retrofit. To remain as is.	3120	0.211	0.211	659	659
1722	North Office Building	1st Floor	Corridor	14	30	2'x2' Troffer Recessed Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Frosted	14	16	Recessed T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	3120	0.417	0.222	1,301	692
1723	North Office Building	1st Floor	Corridor	3	6	Fire Emergency Semi Recessed Compact Fluorescent, spiral, (1) 7W lamp Blue Glass Diffuser	3	5	Semi Recessed Install LED Screw-in PAR16 Lamp Light Emitting Diode Lamp, Screw-in, (1) 6W lamp	8760	0.019	0.016	166	142
1724	North Office Building	1st Floor	Corridor	4	12	1'x1' Square Recessed Compact Fluorescent, spiral, (1) 13W lamp Prismatic Acrylic Diffuser	4	9	Recessed Retrofit Wall Sconce with Rectangular LED Kit LED Light Fixture. (1) 9W	3120	0.047	0.036	146	111
1725	North Office Building	1st Floor	Corridor	4	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	4	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.011	0.011	99	99
1726	North Office Building	Ground	Room G25	24	30	2'x2' Troffer Recessed Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	24	16	Recessed T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	3120	0.715	0.380	2,230	1,186
1727	North Office Building	Ground	Room G25	7	14	Recessed Can 5" Recessed Compact Fluorescent, spiral, (1) 15W lamp (No Diffuser)	7	10	Recessed Install LED Screw-in BR30 Lamp Light Emitting Diode Lamp, Screw-in, (1) 11W lamp	200	0.095	0.069	19	14
1728	North Office Building	Ground	Room G26	9	12	Globe Chain Mounted Compact Fluorescent, spiral, (1) 13W lamp Frosted	9	8	Chain Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	3120	0.106	0.073	329	227
1729	North Office Building	Ground	Room G27	59	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	59	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	3.142	1.519	9,802	4,738
1730	North Office Building	Ground	Office A	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.160	0.077	332	161
1731	North Office Building	Ground	Conference Room	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1560	0.106	0.051	166	80
1732	North Office Building	Ground	Copy Room	1	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.053	0.026	166	80
1733	North Office Building	Ground	Storage Room A	1	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.053	0.026	28	13
1734	North Office Building	Ground	Storage Room B	1	65	4' Strip Wall Mounted Fluorescent, (2) 48", ES lamp (No Diffuser)	1	26	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.065	0.026	34	13
1735	North Office Building	Ground	End of Hall Vestibule	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.106	0.051	332	161
1736	North Office Building	Ground	Maintenance Storage	16	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	16	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1560	0.852	0.412	1,329	642
1737	North Office Building	Ground	Freight Elevator Room	20	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	20	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1560	1.065	0.515	1,661	803
1738	North Office Building	Ground	Freight Elevator Room	2	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	2	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.006	0.006	49	49
1739	North Office Building	Ground	Freight Elevator	2	53	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.106	0.051	933	451
1740	North Office Building	Ground	Vacuum Repair Shop	4	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1560	0.213	0.103	332	161
1741	North Office Building	Ground	Service Stairwell	6	42	3' Strip Recessed Fluorescent, (2) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	24	Recessed T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (2) 12W Lamps	8760	0.249	0.143	2,182	1,249
1742	North Office Building	Ground	Service Stairwell	1	11	Universal Face Exit Sign Surface Mounted EXIT Compact Fluorescent, (1) 9W lamp (No Diffuser)	1	9	Surface Mounted Upgrade EXIT Sign LED Light Fixture. (1) 9W	8760	0.011	0.009	95	78
1743	North Office Building	Ground	Room G30	7	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	7	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.373	0.180	1,163	562
1744	North Office Building	Ground	Storage Room	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.160	0.077	83	40
1745	North Office Building	Ground	Office A	4	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.213	0.103	443	214
1746	North Office Building	Ground	Office B	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
1747	North Office Building	Ground	Office C	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
1748	North Office Building	Ground	Office D	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
1749	North Office Building	Ground	Room G31	9	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	9	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.479	0.232	1,495	723
1750	North Office Building	Ground	Room G31	1	53	2'x4' Troffer Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.053	0.026	166	80
1751	North Office Building	Ground	Room G31	2	53	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.106	0.051	332	161
1752	North Office Building	Ground	Women's Room Vestibule	1	30	1'x2' Troffer Recessed Flanged Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	16	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	3120	0.030	0.016	93	49
1753	North Office Building	Ground	Women's Room	10	53	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	10	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.532	0.257	4,664	2,255
1754	North Office Building	Ground	Women's Room	2	53	4' Vanity Wall Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Frosted	2	26	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.106	0.051	933	451
1755	North Office Building	Ground	Women's Room	1	30	2' Vanity Wall Mounted Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Frosted	1	16	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	8760	0.030	0.016	261	139
1756	North Office Building	Ground	Electrical Closet	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.053	0.026	28	13
1757	North Office Building	Ground	Room G33	14	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	14	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.745	0.360	2,326	1,124
1758	North Office Building	Ground	Office A	1	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.053	0.026	111	54
1759	North Office Building	Ground	Data Closet (est)	1	65	4' Industrial Surface Mounted Fluorescent, (2) 48", ES lamp (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	260	0.065	0.026	17	7
1760	North Office Building	Ground	Room G04	16	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	16	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.852	0.412	2,658	1,285
1761	North Office Building	Ground	Electrical Closet	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.053	0.026	28	13
1762	North Office Building	Ground	Mens Room Vestibule	1	30	1'x2' Troffer Recessed Flanged Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	16	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	3120	0.030	0.016	93	49
1763	North Office Building	Ground	JC	1	42	Drum Surface Mounted Fluorescent, Circline, (1) 44W lamp, preheat ballast Frosted	1	15	Surface Mounted Drum LED Light Fixture. (1) 15W	1040	0.042	0.015	43	15
1764	North Office Building	Ground	Men's Room	7	53	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	7	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.373	0.180	3,265	1,578
1765	North Office Building	Ground	Men's Room	1	30	1'x2' Troffer Recessed Flanged Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	16	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	8760	0.030	0.016	261	139
1766	North Office Building	Ground	Men's Room	2	53	4' Vanity Wall Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Frosted	2	26	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.106	0.051	933	451
1767	North Office Building	Ground	Room G05	9	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	9	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.479	0.232	1,495	723
1768	North Office Building	Ground	Office A	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
1769	North Office Building	Ground	Office B	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
1770	North Office Building	Ground	Room G06	4	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.213	0.103	665	321
1771	North Office Building	Ground	Kitchenette	1	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.053	0.026	166	80
1772	North Office Building	Ground	Office A	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.160	0.077	332	161
1773	North Office Building	Ground	Conference Room	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
1774	North Office Building	Ground	Open Office	6	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	6	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.319	0.154	997	482
1775	North Office Building	Ground	Office B	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
1776	North Office Building	Ground	Room G07 (est)	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.160	0.077	498	241
1777	North Office Building	Ground	Room G7A	15	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	15	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.799	0.386	415	201
1778	North Office Building	Ground	Room G7A	3	30	2'x2' Troffer Recessed Flanged Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	16	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	520	0.089	0.048	46	25
1779	North Office Building	Ground	Room G08	10	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	10	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.532	0.257	1,661	803
1780	North Office Building	Ground	Conference Room	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
1781	North Office Building	Ground	Room G09	8	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	8	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.426	0.206	222	107
1782	North Office Building	Ground	Room G10	4	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.213	0.103	111	54
1783	North Office Building	Ground	Hearing Room 2	4	361	Chandelier Pendant Mounted Compact Fluorescent, Biax, (10) 40W lamp Frosted	4	153	Pendant Mounted Install LED Plug-in BIAX Lamp Light Emitting Diode Lamp, Screw-in, (10) 17W lamp	1560	1.444	0.612	2,253	955
1784	North Office Building	Ground	Hearing Room 2	2	238	Recessed Can 8" Recessed Halogen Incandescent, (1) 250W lamp (No Diffuser)	2	238	Existing luminaire to remain as is No Retrofit. To remain as is.	1560	0.475	0.475	741	741
1785	North Office Building	Ground	Hearing Room 2	5	23	Task Light Surface Mounted Compact Fluorescent, spiral, (2) 13W lamp (No Diffuser)	5	7	Surface Mounted Install LED Screw-in T10 Reading Lamp Light Emitting Diode Lamp, Screw-in, (2) 4W lamp	1560	0.117	0.036	183	56
1786	North Office Building	Ground	Chambers Vestibule	6	53	2'x2' Troffer Recessed Fluorescent, (2) U-Tube, T-8 lamp, Instant Start Ballast Prismatic Acrylic Diffuser	6	24	Recessed Install 2x2 3-Lamp White Reflector Kit LED 2' T8 Lamp (3) 8W Lamps	1560	0.319	0.143	498	222
1787	North Office Building	Ground	Hearing Room 3	4	361	Chandelier Pendant Mounted Compact Fluorescent, Biax, (10) 40W lamp Frosted	4	153	Pendant Mounted Install LED Plug-in BIAX Lamp Light Emitting Diode Lamp, Screw-in, (10) 17W lamp	1560	1.444	0.612	2,253	955
1788	North Office Building	Ground	Hearing Room 3	2	238	Recessed Can 8" Recessed Halogen Incandescent, (1) 250W lamp (No Diffuser)	2	238	Existing luminaire to remain as is No Retrofit. To remain as is.	1560	0.475	0.475	741	741
1789	North Office Building	Ground	Hearing Room 3	5	23	Task Light Surface Mounted Compact Fluorescent, spiral, (2) 13W lamp (No Diffuser)	5	7	Surface Mounted Install LED Screw-in T10 Reading Lamp Light Emitting Diode Lamp, Screw-in, (2) 4W lamp	1560	0.117	0.036	183	56
1790	North Office Building	Ground	Hearing Room 1	4	31	Globe Chain Mounted Light Emitting Diode Lamp, Screw-in, (4) 9W lamp Styled/Custom Diffuser	4	31	Existing luminaire to remain as is No Retrofit. To remain as is.	1560	0.123	0.123	192	192
1791	North Office Building	Ground	Hearing Room 1	6	18	Globe Chain Mounted Light Emitting Diode Lamp, Screw-in, (3) 7W lamp Styled/Custom Diffuser	6	18	Existing luminaire to remain as is No Retrofit. To remain as is.	1560	0.108	0.108	168	168
1792	North Office Building	Ground	Hearing Room 1	31	13	Recessed Can 6" Recessed LED Light Fixture. (1) 14W (No Diffuser)	31	13	Existing luminaire to remain as is No Retrofit. To remain as is.	1560	0.408	0.408	637	637

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
1793	North Office Building	Ground	Room G13	30	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	30	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	1.597	0.772	4,984	2,409
1794	North Office Building	Ground	Room G13	1	30	2'x2' Troffer Recessed Flanged Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	16	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	3120	0.030	0.016	93	49
1795	North Office Building	Ground	Office A	4	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.213	0.103	443	214
1796	North Office Building	Ground	Server Room (est)	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	260	0.106	0.051	28	13
1797	North Office Building	Ground	Room G13A	6	55	2'x2' Troffer Recessed Fluorescent, (4) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	32	Recessed T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (4) 8W Lamps	3120	0.330	0.190	1,031	593
1798	North Office Building	Ground	Room G15	22	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	22	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	1.171	0.566	3,655	1,767
1799	North Office Building	Ground	Office A	3	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.160	0.077	332	161
1800	North Office Building	Ground	Room G16	4	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.213	0.103	443	214
1801	North Office Building	Ground	Mechanical Room	14	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	14	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.745	0.360	388	187
1802	North Office Building	Ground	Upper Mechanical Room	19	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	19	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	1.012	0.489	526	254
1803	North Office Building	Ground	Room G17	15	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	15	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.799	0.386	2,492	1,205
1804	North Office Building	Ground	Stairwell (Senate JC)	1	101	2'x4' Troffer Recessed Flanged Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	51	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 13W Lamps	2080	0.101	0.051	210	107
1805	North Office Building	Ground	Room G21	14	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	14	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.745	0.360	2,326	1,124
1806	North Office Building	Ground	Room G20 Conference Room	6	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	6	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1560	0.319	0.154	498	241
1807	North Office Building	Ground	Room G 23	6	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	6	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.319	0.154	665	321
1808	North Office Building	Ground	Corridor	25	28	2'x4' Troffer Recessed Fluorescent, (1) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	25	13	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 13W Lamp	3120	0.699	0.322	2,182	1,004
1809	North Office Building	Ground	Corridor	32	53	Direct/Indirect Pendant Pendant Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	32	26	Pendant Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	1.704	0.824	5,316	2,570
1810	North Office Building	Ground	Corridor	4	12	1'x1' Square Recessed Compact Fluorescent, spiral, (1) 13W lamp Prismatic Acrylic Diffuser	4	9	Recessed Retrofit Wall Sconce with Rectangular LED Kit LED Light Fixture. (1) 9W	3120	0.047	0.036	146	111
1811	North Office Building	Ground	Corridor	5	6	Fire Emergency Semi Recessed Compact Fluorescent, spiral, (1) 7W lamp Blue Glass Diffuser	5	5	Semi Recessed Install LED Screw-in PAR16 Lamp Light Emitting Diode Lamp, Screw-in, (1) 6W lamp	8760	0.032	0.027	277	237
1812	North Office Building	Ground	Corridor	10	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	10	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.028	0.028	247	247
1813	North Office Building	Ground	Corridor	4	70	Chandelier Chain Mounted Compact Fluorescent, spiral, (6) 13W lamp Frosted	4	49	Chain Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (6) 9W lamp	3120	0.282	0.194	879	607
1814	North Office Building	Ground	Corridor	3	94	Chandelier Chain Mounted Compact Fluorescent, spiral, (8) 13W lamp Frosted	3	65	Chain Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (8) 9W lamp	3120	0.282	0.194	879	607
1815	North Office Building	Ground	Room G16 Data Closet	1	53	4' Strip Wall Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	260	0.053	0.026	14	7
1816	North Office Building	Basement	Fan Room Area	6	21	Bare-Lamp Keyless Socket Surface Mounted Compact Fluorescent, spiral, (1) 23W lamp (No Diffuser)	6	8	Surface Mounted LED Bare-Lamp Keyless Socket Retrofit Lamp/Fixture Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	520	0.125	0.049	65	25
1817	North Office Building	Basement	Fan Room Area	24	21	Poker Hat/RLM Shade Surface Mounted Compact Fluorescent, spiral, (1) 23W lamp (No Diffuser)	24	10	Surface Mounted Install LED Screw-in BR30 Lamp Light Emitting Diode Lamp, Screw-in, (1) 11W lamp	520	0.498	0.238	259	124
1818	North Office Building	Basement	Room B03	10	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	10	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.532	0.257	1,108	535
1819	North Office Building	Basement	Room B03	1	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.053	0.026	111	54
1820	North Office Building	Basement	Supply Storage	2	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
1821	North Office Building	Basement	Office A	2	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
1822	North Office Building	Basement	Office B	2	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
1823	North Office Building	Basement	Office C	2	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
1824	North Office Building	Basement	Room B04	10	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	10	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.532	0.257	1,661	803
1825	North Office Building	Basement	Office A	3	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.160	0.077	332	161
1826	North Office Building	Basement	Office B	2	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
1827	North Office Building	Basement	Room B04	1	30	2'x2' Troffer Recessed Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	16	Recessed T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	3120	0.030	0.016	93	49
1828	North Office Building	Basement	Office C	13	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	13	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.692	0.335	1,440	696
1829	North Office Building	Basement	State Supply Room	14	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	14	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.745	0.360	1,551	750
1830	North Office Building	Basement	Room B05	15	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	15	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.799	0.386	1,661	803
1831	North Office Building	Basement	Room B06	8	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	8	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.426	0.206	222	107
1832	North Office Building	Basement	Locker Vestibule	1	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.053	0.026	166	80
1833	North Office Building	Basement	Room B07	5	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	5	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.266	0.129	831	402
1834	North Office Building	Basement	Restroom	1	53	4' Vanity Wall Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Frosted	1	26	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.053	0.026	55	27
1835	North Office Building	Basement	Pipe Chase Service Corridor	3	53	4' Vanity Wall Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Frosted	3	26	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1560	0.160	0.077	249	120
1836	North Office Building	Basement	Office Area	9	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	9	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.479	0.232	997	482
1837	North Office Building	Basement	Room B08	15	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	15	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.799	0.386	2,492	1,205
1838	North Office Building	Basement	Office Area	16	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	16	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.852	0.412	1,772	857

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
1839	North Office Building	Basement	Office Area	3	53	1'x4' Troffer Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.160	0.077	332	161
1840	North Office Building	Basement	Room B09	30	21	Poker Hat/RLM Shade Surface Mounted Compact Fluorescent, spiral, (1) 23W lamp (No Diffuser)	30	10	Surface Mounted Install LED Screw-in BR30 Lamp Light Emitting Diode Lamp, Screw-in, (1) 11W lamp	520	0.623	0.297	324	154
1841	North Office Building	Basement	Room B10-11	24	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	24	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	1.278	0.618	665	321
1842	North Office Building	Basement	Generator Room	4	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	4	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.213	0.103	111	54
1843	North Office Building	Basement	Room B13	8	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	8	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.426	0.206	222	107
1844	North Office Building	Basement	B14 Vestibule	1	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.053	0.026	166	80
1845	North Office Building	Basement	Caged Area	1	53	1'x4' Troffer Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.053	0.026	466	225
1846	North Office Building	Basement	Room B15	19	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	19	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	1.012	0.489	526	254
1847	North Office Building	Basement	Room B15	2	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	2	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.006	0.006	49	49
1848	North Office Building	Basement	Room B16	5	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	5	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.266	0.129	138	67
1849	North Office Building	Basement	Room B17	7	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	7	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.373	0.180	194	94
1850	North Office Building	Basement	Room B18	14	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	14	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.745	0.360	388	187
1851	North Office Building	Basement	Room B19	18	43	Recessed Can 8" Recessed Compact Fluorescent, (1) 42W lamp Flat Glass Lens	18	8	Recessed Recessed Can 6" with 8" Trim Ring LED Light Fixture. (1) 8W	2080	0.780	0.143	1,622	297
1852	North Office Building	Basement	Women's Room	4	53	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.213	0.103	1,866	902
1853	North Office Building	Basement	Women's Room	1	53	4' Vanity Wall Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Frosted	1	26	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.053	0.026	466	225
1854	North Office Building	Basement	Men's Room	5	53	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	5	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.266	0.129	2,332	1,127
1855	North Office Building	Basement	Men's Room	1	53	4' Vanity Wall Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Frosted	1	26	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.053	0.026	466	225
1856	North Office Building	Basement	Men's Room	1	30	2' Vanity Wall Mounted Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Frosted	1	16	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	8760	0.030	0.016	261	139
1857	North Office Building	Basement	Room B20	8	80	1'x4' Troffer Surface Mounted Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	8	39	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.643	0.309	1,002	482
1858	North Office Building	Basement	Breakroom	1	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.080	0.039	125	60
1859	North Office Building	Basement	Room B20	23	53	1'x4' Troffer Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	23	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	260	1.225	0.592	318	154
1860	North Office Building	Basement	Room B22	18	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	18	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.958	0.463	498	241
1861	North Office Building	Basement	Office A	4	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.213	0.103	111	54
1862	North Office Building	Basement	Ramp To East Garage	5	53	4' Vanity Wall Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Frosted	5	26	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.266	0.129	831	402
1863	North Office Building	Basement	Lamp Storage Closet	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.053	0.026	28	13
1864	North Office Building	Basement	Camera Equipment Storage Closet	4	30	2'x2' Troffer Surface Mounted Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	16	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	520	0.119	0.063	62	33
1865	North Office Building	Basement	Camera Equipment Storage Closet	1	53	1'x4' Troffer Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.053	0.026	28	13
1866	North Office Building	Basement	Emergency Equipment Storage Area	3	53	4' Vanity Wall Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Frosted	3	26	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.160	0.077	83	40
1867	North Office Building	Basement	Room B25	10	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	10	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.532	0.257	1,108	535
1868	North Office Building	Basement	Office A	4	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.213	0.103	443	214
1869	North Office Building	Basement	Office B	2	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
1870	North Office Building	Basement	Storage Room	2	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
1871	North Office Building	Basement	JC	1	12	Bare-Lamp Keyless Socket Surface Mounted Light Emitting Diode Lamp, Screw-in, (1) 14W lamp (No Diffuser)	1	12	Existing luminaire to remain as is No Retrofit. To remain as is.	1040	0.012	0.012	12	12
1872	North Office Building	Basement	Corridor	8	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	8	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.426	0.206	1,329	642
1873	North Office Building	Basement	Corridor	23	53	1'x4' Troffer Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	23	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	1.225	0.592	3,821	1,847
1874	North Office Building	Basement	Corridor	4	6	Fire Emergency Semi Recessed Compact Fluorescent, spiral, (1) 7W lamp Blue Glass Diffuser	4	5	Semi Recessed Install LED Screw-in PAR16 Lamp Light Emitting Diode Lamp, Screw-in, (1) 6W lamp	8760	0.025	0.022	221	189
1875	North Office Building	Basement	Corridor	6	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	6	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.017	0.017	148	148
1876	North Office Building	Basement	North Dock Receiving	12	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	12	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.639	0.309	1,994	964
1877	North Office Building	Basement	North Dock Receiving	1	53	4' Vanity Wall Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Frosted	1	26	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.053	0.026	166	80
1878	North Office Building	Basement	North Dock Receiving	2	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	2	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.006	0.006	49	49
1879	North Office Building	Basement	North Dock Receiving	1	6	Fire Emergency Semi Recessed Compact Fluorescent, spiral, (1) 7W lamp Blue Glass Diffuser	1	5	Semi Recessed Install LED Screw-in PAR16 Lamp Light Emitting Diode Lamp, Screw-in, (1) 6W lamp	8760	0.006	0.005	55	47
1880	North Office Building	Basement	Sprinkler Control Room	4	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	4	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.213	0.103	111	54
1881	North Office Building	Basement	Elevator Machine Room	1	65	4' Industrial Surface Mounted Fluorescent, (2) 48", ES lamp (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.065	0.026	13	5
1882	North Office Building	Stairwells	Stairway West	19	53	2'x4' Troffer Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	19	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	1.012	0.489	8,863	4,284
1883	North Office Building	Stairwells	Stairway East	16	53	2'x4' Troffer Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	16	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.852	0.412	7,463	3,608
1884	Tunnels & Parking Garage	Tunnels	Tunnel From Finance to North	2	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.106	0.051	933	451

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
1885	Tunnels & Parking Garage	Tunnels	Tunnel From Finance to North	7	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	7	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.373	0.180	3,265	1,578
1886	Tunnels & Parking Garage	Tunnels	Tunnel From Keystone to North	12	21	Recessed Can 6" Semi Recessed Compact Fluorescent, spiral, (1) 23W lamp Prismatic Acrylic Diffuser	12	8	Semi Recessed Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8760	0.249	0.097	2,182	851
1887	Tunnels & Parking Garage	Tunnels	Central Plant Tunnels	60	101	8' Vapor Proof Surface Mounted Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	60	51	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 13W Lamps	4380	6.065	3.089	26,564	13,529
1888	Tunnels & Parking Garage	Tunnels	Central Plant Tunnels	15	18	2' Vapor Proof Surface Mounted Fluorescent, (1) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	15	8	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (1) 8W Lamp	4380	0.271	0.119	1,186	520
1889	Tunnels & Parking Garage	Tunnels	Central Plant Tunnels	2	30	2' Vapor Proof Surface Mounted Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	16	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	4380	0.060	0.032	261	139
1890	Tunnels & Parking Garage	Tunnels	Central Plant Tunnels	1	53	4' Wraparound Wall Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	4380	0.053	0.026	233	113
1891	Tunnels & Parking Garage	Tunnels	Central Plant Tunnels	9	53	4' Vapor Proof Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	9	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	4380	0.479	0.232	2,099	1,015
1892	Tunnels & Parking Garage	Tunnels	Central Plant Tunnels	18	28	4' Vapor Proof Surface Mounted Fluorescent, (1) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	18	13	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 13W Lamp	4380	0.504	0.232	2,206	1,015
1893	Tunnels & Parking Garage	Tunnels	Electrical Vault	1	12	Jelly Jar Wall Mounted Compact Fluorescent, spiral, (1) 13W lamp Glass Jelly Jar	1	8	Wall Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	200	0.012	0.008	2	2
1894	Tunnels & Parking Garage	Tunnels	Central Plant Tunnels	1	101	4' Wraparound Surface Mounted Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	51	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 13W Lamps	4380	0.101	0.051	443	225
1895	Tunnels & Parking Garage	Tunnels	Chiller Control Room	3	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.160	0.077	332	161
1896	Tunnels & Parking Garage	Tunnels	Chiller Plant	11	211	4' Industrial Surface Mounted Fluorescent, (4) 48", STD HO T5 lamp (No Diffuser)	11	99	Surface Mounted T5 LED Retrofit Lamp with External Driver LED 4' T5 Lamp (4) 25W Lamp - HIGH	8760	2.323	1.089	20,350	9,540
1897	Tunnels & Parking Garage	Tunnels	Chiller Plant	7	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Wire Guard Cage	7	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.373	0.180	3,265	1,578
1898	Tunnels & Parking Garage	Tunnels	Chiller Plant	4	53	1'x4' Troffer Wall Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	26	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.213	0.103	1,866	902
1899	Tunnels & Parking Garage	Tunnels	Chiller Plant	2	158	4' Industrial Chain Mounted Fluorescent, (6) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	77	Chain Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (6) 13W Lamps	8760	0.316	0.154	2,767	1,353
1900	Tunnels & Parking Garage	Tunnels	Chiller Plant	27	101	4' Strip Chain Mounted Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	27	51	Chain Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 13W Lamps	8760	2.729	1.390	23,907	12,176
1901	Tunnels & Parking Garage	Tunnels	Chiller Plant	2	101	8' Strip Surface Mounted Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	51	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 13W Lamps	8760	0.202	0.103	1,771	902
1902	Tunnels & Parking Garage	Tunnels	Chiller Plant	4	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	4	3	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	0.011	0.011	99	99
1903	Tunnels & Parking Garage	Tunnels	Central Plant Lower Office	4	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	4	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.213	0.103	1,866	902
1904	Tunnels & Parking Garage	Tunnels	Exterior Cooling Tower	11	53	4' Vapor Proof Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	11	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.586	0.283	5,131	2,480
1905	Tunnels & Parking Garage	Tunnels	Central Plant Upper Restroom	1	30	2' Vanity Wall Mounted Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Frosted	1	16	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	8760	0.030	0.016	261	139
1906	Tunnels & Parking Garage	Tunnels	Tunnel From Keystone To Health & Welfare	6	21	Recessed Can 6" Semi Recessed Compact Fluorescent, spiral, (1) 23W lamp Prismatic Acrylic Diffuser	6	8	Semi Recessed Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8760	0.125	0.049	1,091	426
1907	Tunnels & Parking Garage	Tunnels	Tunnel From Health & Welfare to Labor & Industry	23	21	Drum Surface Mounted Compact Fluorescent, spiral, (1) 23W lamp Prismatic Acrylic Diffuser	23	9	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 10W lamp	8760	0.477	0.207	4,182	1,813
1908	Tunnels & Parking Garage	Tunnels	Tunnel From PJC to Finance	7	12	Recessed Can 6" Semi Recessed Compact Fluorescent, spiral, (1) 13W lamp Prismatic Acrylic Diffuser	7	8	Semi Recessed Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8760	0.082	0.057	719	497
1909	Tunnels & Parking Garage	Tunnels	Tunnel From PJC to Finance	1	21	Jelly Jar Wall Mounted Compact Fluorescent, spiral, (1) 23W lamp Glass Jelly Jar	1	8	Wall Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	8760	0.021	0.008	182	71
1910	Tunnels & Parking Garage	East Parking Garage & Level P2	Mezzanine Level	20	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	20	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	4380	1.065	0.515	4,664	2,255
1911	Tunnels & Parking Garage	East Parking Garage & Level P2	Storage Closet	1	65	4' Industrial Surface Mounted Fluorescent, (2) 48", ES lamp (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.065	0.026	34	13
1912	Tunnels & Parking Garage	East Parking Garage & Level P2	Elevator Machine Room	2	65	4' Industrial Surface Mounted Fluorescent, (2) 48", ES lamp (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.130	0.051	26	10
1913	Tunnels & Parking Garage	East Parking Garage & Level P2	P2 Storage/ Steam Tunnel	56	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	56	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	4380	2.982	1.441	13,061	6,314
1914	Tunnels & Parking Garage	East Parking Garage & Level P2	Sprinkler Control Room	1	65	4' Industrial Surface Mounted Fluorescent, (2) 48", ES lamp (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.065	0.026	34	13
1915	Tunnels & Parking Garage	East Parking Garage & Level P2	P2 Storage/ Steam Tunnel	12	101	8' Vapor Proof Surface Mounted Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	12	51	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 13W Lamps	4380	1.213	0.618	5,313	2,706
1916	Tunnels & Parking Garage	East Parking Garage & Level P2	P242E	1	65	4' Wraparound Surface Mounted Fluorescent, (2) 48", ES lamp Prismatic Acrylic Diffuser	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.065	0.026	34	13
1917	Tunnels & Parking Garage	East Parking Garage & Level P2	P240E	68	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	68	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	4380	3.621	1.750	15,859	7,666
1918	Tunnels & Parking Garage	East Parking Garage & Level P2	Air Handler Mechanical Space	22	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Ice Tray Diffuser	22	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	4380	1.171	0.566	5,131	2,480
1919	Tunnels & Parking Garage	East Parking Garage & Level P2	P2/ P1 Main Parking Deck	756	28	3'x3' Troffer Surface Mounted Fluorescent, (1) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	756	13	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 13W Lamp	8760	21.151	9.730	185,283	85,232
1920	Tunnels & Parking Garage	East Parking Garage & Level P2	P2/ P1 Main Parking Deck	652	28	3'x3' Troffer Recessed Flanged Fluorescent, (1) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	652	13	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 13W Lamp	8760	18.241	8.391	159,794	73,507
1921	Tunnels & Parking Garage	East Parking Garage & Level P2	Elevator Lobby A Level P 2	2	30	2' Wide-Footprint Wrap with Quick Disconnect Surface Mounted Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	16	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	8760	0.060	0.032	522	278
1922	Tunnels & Parking Garage	East Parking Garage & Level P2	Elevator Lobby B Level P2	4	53	4' Strip Cove Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	26	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.213	0.103	1,866	902
1923	Tunnels & Parking Garage	East Parking Garage & Level P2	Elevator Lobby B Level P2	8	42	3' Strip Cove Mounted Fluorescent, (2) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	8	24	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (2) 12W Lamps	8760	0.332	0.190	2,909	1,665
1924	Tunnels & Parking Garage	East Parking Garage & Level P2	Elevator Lobby B Level P2	12	30	2' Vapor Proof Surface Mounted Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	12	16	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	8760	0.357	0.190	3,131	1,665
1925	Tunnels & Parking Garage	East Parking Garage & Level P2	Elevator Lobby B Level P2	2	6	Fire Emergency Semi Recessed Compact Fluorescent, spiral, (1) 7W lamp Blue Glass Diffuser	2	5	Semi Recessed Install LED Screw-in PAR16 Lamp Light Emitting Diode Lamp, Screw-in, (1) 6W lamp	8760	0.013	0.011	111	95
1926	Tunnels & Parking Garage	East Parking Garage & Level P2	P237E Elevator Machine Room	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.053	0.026	11	5
1927	Tunnels & Parking Garage	East Parking Garage & Level P2	P238E Electrical Room	2	65	4' Industrial Surface Mounted Fluorescent, (2) 48", ES lamp (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.130	0.051	26	10
1928	Tunnels & Parking Garage	East Parking Garage & Level P2	Elevator Lobby C Level P2	12	53	4' Strip Cove Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	12	26	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.639	0.309	5,597	2,706
1929	Tunnels & Parking Garage	East Parking Garage & Level P2	Elevator Lobby C Level P2	6	42	3' Strip Cove Mounted Fluorescent, (2) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	24	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (2) 12W Lamps	8760	0.249	0.143	2,182	1,249
1930	Tunnels & Parking Garage	East Parking Garage & Level P2	Elevator Lobby C Level P2	16	30	2' Vapor Proof Surface Mounted Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	16	16	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	8760	0.477	0.253	4,174	2,220

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
1931	Tunnels & Parking Garage	East Parking Garage & Level P2	Elevator Lobby C Level P2	2	6	Fire Emergency Semi Recessed Compact Fluorescent, spiral, (1) 7W lamp Blue Glass Diffuser	2	5	Semi Recessed Install LED Screw-in PAR16 Lamp Light Emitting Diode Lamp, Screw-in, (1) 6W lamp	8760	0.013	0.011	111	95
1932	Tunnels & Parking Garage	East Parking Garage & Level P2	P232E Sprinkler Control Room	3	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	3	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.160	0.077	32	15
1933	Tunnels & Parking Garage	East Parking Garage & Level P2	P233E Elevator Machine Room	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.053	0.026	11	5
1934	Tunnels & Parking Garage	East Parking Garage & Level P2	Elevator Lobby D Level P2	12	53	4' Strip Cove Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	12	26	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.639	0.309	5,597	2,706
1935	Tunnels & Parking Garage	East Parking Garage & Level P2	Elevator Lobby D Level P2	6	42	3' Strip Cove Mounted Fluorescent, (2) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	24	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (2) 12W Lamps	8760	0.249	0.143	2,182	1,249
1936	Tunnels & Parking Garage	East Parking Garage & Level P2	Elevator Lobby D Level P2	16	30	2' Vapor Proof Surface Mounted Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	16	16	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	8760	0.477	0.253	4,174	2,220
1937	Tunnels & Parking Garage	East Parking Garage & Level P2	Elevator Lobby D Level P2	2	6	Fire Emergency Semi Recessed Compact Fluorescent, spiral, (1) 7W lamp Blue Glass Diffuser	2	5	Semi Recessed Install LED Screw-in PAR16 Lamp Light Emitting Diode Lamp, Screw-in, (1) 6W lamp	8760	0.013	0.011	111	95
1938	Tunnels & Parking Garage	East Parking Garage & Level P2	P209E Sprinkler Control Room	3	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	3	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.160	0.077	32	15
1939	Tunnels & Parking Garage	East Parking Garage & Level P2	P211E Elevator Machine Room	1	65	4' Industrial Surface Mounted Fluorescent, (2) 48", ES lamp (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.065	0.026	13	5
1940	Tunnels & Parking Garage	East Parking Garage & Level P2	Elevator Lobby A Level P2	4	53	4' Strip Cove Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	26	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.213	0.103	1,866	902
1941	Tunnels & Parking Garage	East Parking Garage & Level P2	Elevator Lobby A Level P2	8	42	3' Strip Cove Mounted Fluorescent, (2) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	8	24	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (2) 12W Lamps	8760	0.332	0.190	2,909	1,665
1942	Tunnels & Parking Garage	East Parking Garage & Level P2	Elevator Lobby A Level P2	12	30	2' Vapor Proof Surface Mounted Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	12	16	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	8760	0.357	0.190	3,131	1,665
1943	Tunnels & Parking Garage	East Parking Garage & Level P2	Elevator Lobby A Level P2	2	6	Fire Emergency Semi Recessed Compact Fluorescent, spiral, (1) 7W lamp Blue Glass Diffuser	2	5	Semi Recessed Install LED Screw-in PAR16 Lamp Light Emitting Diode Lamp, Screw-in, (1) 6W lamp	8760	0.013	0.011	111	95
1944	Tunnels & Parking Garage	East Parking Garage & Level P2	P214E Elevator Machine Room	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.053	0.026	11	5
1945	Tunnels & Parking Garage	East Parking Garage & Level P2	P139ESprinkler Control Room	2	65	4' Industrial Surface Mounted Fluorescent, (2) 48", ES lamp (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.130	0.051	26	10
1946	Tunnels & Parking Garage	East Parking Garage & Level P2	P225E Sprinkler Control Room	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.053	0.026	11	5
1947	Tunnels & Parking Garage	East Parking Garage & Level P2	P226E Elevator Machine Room	4	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	4	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.213	0.103	43	21
1948	Tunnels & Parking Garage	East Parking Garage & Level P2	P244E Locksmith Storage	2	65	4' Industrial Surface Mounted Fluorescent, (2) 48", ES lamp (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.130	0.051	26	10
1949	Tunnels & Parking Garage	East Parking Garage & Level P2	P245E	1	65	4' Industrial Surface Mounted Fluorescent, (2) 48", ES lamp (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.065	0.026	13	5
1950	Tunnels & Parking Garage	East Parking Garage & Level P2	P246E	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.106	0.051	21	10
1951	Tunnels & Parking Garage	East Parking Garage & Level P2	P247E Elevator Pit	1	21	Wall-Pack Wall Mounted Compact Fluorescent, spiral, (1) 23W lamp (No Diffuser)	1	8	Wall Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	200	0.021	0.008	4	2
1952	Tunnels & Parking Garage	East Parking Garage & Level P2	P248E Elevator Machine Room	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.053	0.026	11	5
1953	Tunnels & Parking Garage	East Parking Garage & Level P2	P249E Locksmith Storage	1	65	4' Industrial Surface Mounted Fluorescent, (2) 48", ES lamp (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.065	0.026	13	5
1954	Tunnels & Parking Garage	East Parking Garage & Level P2	P249Ea Electrical Room	2	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
1955	Tunnels & Parking Garage	East Parking Garage & Level P2	P252E Electrical Room	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.053	0.026	11	5
1956	Tunnels & Parking Garage	East Parking Garage & Level P2	P253E	2	65	4' Wraparound Pendant Mounted Fluorescent, (2) 48", ES lamp Frosted	2	26	Pendant Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.130	0.051	68	27
1957	Tunnels & Parking Garage	East Parking Garage & Level P2	P201E	2	65	4' Wraparound Pendant Mounted Fluorescent, (2) 48", ES lamp Frosted	2	26	Pendant Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.130	0.051	68	27
1958	Tunnels & Parking Garage	East Parking Garage & Level P2	P202E	1	28	3'x3' Troffer Surface Mounted Fluorescent, (1) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	13	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 13W Lamp	520	0.028	0.013	15	7
1959	Tunnels & Parking Garage	East Parking Garage & Level P2	P203E Storage Room	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.106	0.051	21	10
1960	Tunnels & Parking Garage	East Parking Garage & Level P2	P204E Storage Room	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.053	0.026	11	5
1961	Tunnels & Parking Garage	East Parking Garage & Level P2	P223E Storage Room	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.106	0.051	21	10
1962	Tunnels & Parking Garage	East Parking Garage & Level P2	P222E Lamp Storage	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.053	0.026	11	5
1963	Tunnels & Parking Garage	East Parking Garage & Level P2	Pipe Chase	2	65	4' Industrial Surface Mounted Fluorescent, (2) 48", ES lamp (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.130	0.051	26	10
1964	Tunnels & Parking Garage	East Parking Garage & Level P2	P239E Sprinkler Control Room	1	65	4' Industrial Surface Mounted Fluorescent, (2) 48", ES lamp (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.065	0.026	13	5
1965	Tunnels & Parking Garage	East Parking Garage & Level P2	P220E Mechanical Room	2	53	3'x3' Troffer Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
1966	Tunnels & Parking Garage	East Parking Garage & Level P2	P220E Mechanical Room	2	65	4' Wraparound Surface Mounted Fluorescent, (2) 48", ES lamp Prismatic Acrylic Diffuser	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.130	0.051	68	27
1967	Tunnels & Parking Garage	East Parking Garage & Level P2	P136E Sprinkler Control Room	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.053	0.026	11	5
1968	Tunnels & Parking Garage	East Parking Garage & Level P2	Elevator Lobby B Level P2	3	11	Universal Face Exit Sign Surface Mounted EXIT Compact Fluorescent, (1) 9W lamp (No Diffuser)	3	9	Surface Mounted Upgrade EXIT Sign LED Light Fixture. (1) 9W	8760	0.032	0.027	285	234
1969	Tunnels & Parking Garage	East Parking Garage & Level P2	Elevator Lobby D Level P2	3	11	Universal Face Exit Sign Surface Mounted EXIT Compact Fluorescent, (1) 9W lamp (No Diffuser)	3	9	Surface Mounted Upgrade EXIT Sign LED Light Fixture. (1) 9W	8760	0.032	0.027	285	234
1970	Tunnels & Parking Garage	East Parking Garage & Level P2	Elevator Lobby A Level P2	3	11	Universal Face Exit Sign Surface Mounted EXIT Compact Fluorescent, (1) 9W lamp (No Diffuser)	3	9	Surface Mounted Upgrade EXIT Sign LED Light Fixture. (1) 9W	8760	0.032	0.027	285	234
1971	Tunnels & Parking Garage	East Parking Garage & Level P2	Elevator Lobby C Level P2	3	11	Universal Face Exit Sign Surface Mounted EXIT Compact Fluorescent, (1) 9W lamp (No Diffuser)	3	9	Surface Mounted Upgrade EXIT Sign LED Light Fixture. (1) 9W	8760	0.032	0.027	285	234
1972	Tunnels & Parking Garage	East Parking Garage & Level P2	P2/ P1 Main Parking Deck	39	262	Globe Surface Mounted Mercury Vapor, (1) 250W lamp Frosted	39	262	Existing luminaire to remain as is No Retrofit. To remain as is.	8760	10.207	10.207	-	-
1973	Tunnels & Parking Garage	Level P1	Elevator Lobby B Level P1	2	53	4' Strip Cove Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	26	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.106	0.051	933	451
1974	Tunnels & Parking Garage	Level P1	Elevator Lobby B Level P1	6	42	3' Strip Cove Mounted Fluorescent, (2) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	24	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (2) 12W Lamps	8760	0.249	0.143	2,182	1,249
1975	Tunnels & Parking Garage	Level P1	Elevator Lobby B Level P1	4	42	3' Strip Cove Mounted Fluorescent, (2) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	24	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (2) 12W Lamps	8760	0.166	0.095	1,455	833
1976	Tunnels & Parking Garage	Level P1	Elevator Lobby B Level P1	10	53	4' Strip Cove Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	10	26	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.532	0.257	4,664	2,255

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
1977	Tunnels & Parking Garage	Level P1	Elevator Lobby B Level P1	12	30	2' Vapor Proof Surface Mounted Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	12	16	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	8760	0.357	0.190	3,131	1,665
1978	Tunnels & Parking Garage	Level P1	Elevator Lobby B Level P1	2	6	Fire Emergency Semi Recessed Compact Fluorescent, spiral, (1) 7W lamp Blue Glass Diffuser	2	5	Semi Recessed Install LED Screw-in PAR16 Lamp Light Emitting Diode Lamp, Screw-in, (1) 6W lamp	8760	0.013	0.011	111	95
1979	Tunnels & Parking Garage	Level P1	P139E Storage Room	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.053	0.026	11	5
1980	Tunnels & Parking Garage	Level P1	P138E Mechanical Room	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.106	0.051	21	10
1981	Tunnels & Parking Garage	Level P1	Elevator Lobby C Level P1	4	42	3' Strip Cove Mounted Fluorescent, (2) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	24	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (2) 12W Lamps	8760	0.166	0.095	1,455	833
1982	Tunnels & Parking Garage	Level P1	Elevator Lobby C Level P1	14	53	4' Strip Cove Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	14	26	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.745	0.360	6,530	3,157
1983	Tunnels & Parking Garage	Level P1	Elevator Lobby C Level P1	15	30	2' Vapor Proof Surface Mounted Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	15	16	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	8760	0.447	0.238	3,913	2,081
1984	Tunnels & Parking Garage	Level P1	Elevator Lobby C Level P1	2	6	Fire Emergency Semi Recessed Compact Fluorescent, spiral, (1) 7W lamp Blue Glass Diffuser	2	5	Semi Recessed Install LED Screw-in PAR16 Lamp Light Emitting Diode Lamp, Screw-in, (1) 6W lamp	8760	0.013	0.011	111	95
1985	Tunnels & Parking Garage	Level P1	P132E Fire Equipment	3	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	3	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.160	0.077	32	15
1986	Tunnels & Parking Garage	Level P1	P134E Storage Room	1	65	4' Industrial Surface Mounted Fluorescent, (2) 48", ES lamp (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.065	0.026	13	5
1987	Tunnels & Parking Garage	Level P1	Elevator Lobby D Level P1	4	42	3' Strip Cove Mounted Fluorescent, (2) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	24	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (2) 12W Lamps	8760	0.166	0.095	1,455	833
1988	Tunnels & Parking Garage	Level P1	Elevator Lobby D Level P1	12	53	4' Strip Cove Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	12	26	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.639	0.309	5,597	2,706
1989	Tunnels & Parking Garage	Level P1	Elevator Lobby D Level P1	16	30	2' Vapor Proof Surface Mounted Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	16	16	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	8760	0.477	0.253	4,174	2,220
1990	Tunnels & Parking Garage	Level P1	Elevator Lobby D Level P1	2	6	Fire Emergency Semi Recessed Compact Fluorescent, spiral, (1) 7W lamp Blue Glass Diffuser	2	5	Semi Recessed Install LED Screw-in PAR16 Lamp Light Emitting Diode Lamp, Screw-in, (1) 6W lamp	8760	0.013	0.011	111	95
1991	Tunnels & Parking Garage	Level P1	P109E Fire Equipment	3	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	3	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.160	0.077	32	15
1992	Tunnels & Parking Garage	Level P1	P111E Storage Room	1	65	4' Industrial Surface Mounted Fluorescent, (2) 48", ES lamp (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.065	0.026	13	5
1993	Tunnels & Parking Garage	Level P1	Elevator Lobby E Level P1	4	42	3' Strip Cove Mounted Fluorescent, (2) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	24	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (2) 12W Lamps	8760	0.166	0.095	1,455	833
1994	Tunnels & Parking Garage	Level P1	Elevator Lobby E Level P1	10	53	4' Strip Cove Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	10	26	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.532	0.257	4,664	2,255
1995	Tunnels & Parking Garage	Level P1	Elevator Lobby E Level P1	16	30	2' Vapor Proof Surface Mounted Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	16	16	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	8760	0.477	0.253	4,174	2,220
1996	Tunnels & Parking Garage	Level P1	Elevator Lobby E Level P1	2	6	Fire Emergency Semi Recessed Compact Fluorescent, spiral, (1) 7W lamp Blue Glass Diffuser	2	5	Semi Recessed Install LED Screw-in PAR16 Lamp Light Emitting Diode Lamp, Screw-in, (1) 6W lamp	8760	0.013	0.011	111	95
1997	Tunnels & Parking Garage	Level P1	P114E Storage Room	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.053	0.026	11	5
1998	Tunnels & Parking Garage	Level P1	P115E Storage Room	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.053	0.026	11	5
1999	Tunnels & Parking Garage	Level P1	P116E Fire Equipment	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.053	0.026	11	5
2000	Tunnels & Parking Garage	Level P1	P125E Storage Room	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.053	0.026	11	5
2001	Tunnels & Parking Garage	Level P1	P126E	4	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	4	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.213	0.103	443	214
2002	Tunnels & Parking Garage	Level P1	P140E Air Fan Room	3	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	3	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.160	0.077	32	15
2003	Tunnels & Parking Garage	Level P1	P141E JC Closet	1	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.053	0.026	11	5
2004	Tunnels & Parking Garage	Level P1	P143E	3	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	3	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.160	0.077	32	15
2005	Tunnels & Parking Garage	Level P1	Roll Up Door A	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.106	0.051	21	10
2006	Tunnels & Parking Garage	Level P1	Roll Up Door B	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.106	0.051	21	10
2007	Tunnels & Parking Garage	Level P1	P120E Mechanical Room	2	53	3'x3' Troffer Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
2008	Tunnels & Parking Garage	Level P1	Double Door	4	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	4	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.213	0.103	43	21
2009	Tunnels & Parking Garage	Level P1	Roll Up Door C	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.106	0.051	21	10
2010	Tunnels & Parking Garage	Level P1	Roll Up Door D	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.106	0.051	21	10
2011	Tunnels & Parking Garage	Level P1	P117E Electrical Room	4	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	4	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.213	0.103	43	21
2012	Tunnels & Parking Garage	Level P1	P123E Storage Room	3	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.160	0.077	32	15
2013	Tunnels & Parking Garage	Level P1	P122E Storage	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.053	0.026	11	5
2014	Tunnels & Parking Garage	Level P1	Main Drive from North to	86	106	4' Vapor Proof Wall Mounted Fluorescent, (2) 48", STD HO T5 lamp Prismatic Acrylic Diffuser	86	50	Wall Mounted T5 LED Retrofit Lamp with External Driver LED 4' T5 Lamp (2) 25W Lamp	8760	9.081	4.257	79,549	37,291
2015	Tunnels & Parking Garage	Level P1	Main Drive from North to	24	53	4' Vapor Proof Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	24	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	1.278	0.618	11,195	5,412
2016	Tunnels & Parking Garage	Level P1	Main Drive from North to	3	30	2' Vapor Proof Surface Mounted Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	16	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	8760	0.089	0.048	783	416
2017	Tunnels & Parking Garage	Level P1	P137E Storage Room	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.053	0.026	11	5
2018	Tunnels & Parking Garage	Level P1	P120E Mechanical Room	1	53	4' Vapor Proof Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.053	0.026	28	13
2019	Tunnels & Parking Garage	Level P1	P120E Mechanical Room	1	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.053	0.026	28	13
2020	Tunnels & Parking Garage	Level P1	P115E Storage Room	1	65	4' Industrial Surface Mounted Fluorescent, (2) 48", ES lamp (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.065	0.026	13	5
2021	Tunnels & Parking Garage	Level P1	Capitol Police Hallway	14	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	14	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.745	0.360	2,326	1,124
2022	Tunnels & Parking Garage	Level P1	Capitol Police Hallway	5	11	Universal Face Exit Sign Surface Mounted EXIT Compact Fluorescent, (1) 9W lamp (No Diffuser)	5	9	Surface Mounted Upgrade EXIT Sign LED Light Fixture. (1) 9W	8760	0.054	0.045	474	390

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
2023	Tunnels & Parking Garage	Level P1	Men's Locker Room	13	53	4' Vapor Proof Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	13	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3640	0.692	0.335	2,520	1,218
2024	Tunnels & Parking Garage	Level P1	Men's Locker Room	4	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3640	0.213	0.103	775	375
2025	Tunnels & Parking Garage	Level P1	Men's Locker Room	2	53	4' Strip Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	2	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3640	0.106	0.051	388	187
2026	Tunnels & Parking Garage	Level P1	Men's Locker Room	4	21	1'x1' Square Recessed Compact Fluorescent, spiral, (1) 23W lamp Prismatic Acrylic Diffuser	4	9	Recessed Retrofit Wall Sconce with Rectangular LED Kit LED Light Fixture. (1) 9W	3640	0.083	0.036	302	130
2027	Tunnels & Parking Garage	Level P1	Men's Locker Room	2	11	Universal Face Exit Sign Surface Mounted EXIT Compact Fluorescent, (1) 9W lamp (No Diffuser)	2	9	Surface Mounted Upgrade EXIT Sign LED Light Fixture. (1) 9W	8760	0.022	0.018	190	156
2028	Tunnels & Parking Garage	Level P1	Capitol Police Hallway	1	6	Fire Emergency Semi Recessed Compact Fluorescent, spiral, (1) 7W lamp Blue Glass Diffuser	1	5	Semi Recessed Install LED Screw-in PAR16 Lamp Light Emitting Diode Lamp, Screw-in, (1) 6W lamp	8760	0.006	0.005	55	47
2029	Tunnels & Parking Garage	Level P1	Women's Locker Room	3	53	4' Vapor Proof Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3640	0.160	0.077	581	281
2030	Tunnels & Parking Garage	Level P1	Women's Locker Room	2	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3640	0.106	0.051	388	187
2031	Tunnels & Parking Garage	Level P1	Women's Locker Room	3	53	4' Strip Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	3	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3640	0.160	0.077	581	281
2032	Tunnels & Parking Garage	Level P1	Women's Locker Room	2	21	1'x1' Square Recessed Compact Fluorescent, spiral, (1) 23W lamp Prismatic Acrylic Diffuser	2	9	Recessed Retrofit Wall Sconce with Rectangular LED Kit LED Light Fixture. (1) 9W	3640	0.042	0.018	151	65
2033	Tunnels & Parking Garage	Level P1	Women's Locker Room	2	11	Universal Face Exit Sign Surface Mounted EXIT Compact Fluorescent, (1) 9W lamp (No Diffuser)	2	9	Surface Mounted Upgrade EXIT Sign LED Light Fixture. (1) 9W	8760	0.022	0.018	190	156
2034	Tunnels & Parking Garage	Level P1	Hall / Open Office	4	53	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.213	0.103	443	214
2035	Tunnels & Parking Garage	Level P1	Hall / Open Office	15	53	1'x4' Troffer Wall Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	15	26	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.799	0.386	1,661	803
2036	Tunnels & Parking Garage	Level P1	Hall / Open Office	8	266	Cylinder Fixture Surface Mounted Metal Halide, (1) 250W lamp (No Diffuser)	8	49	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	1560	2.130	0.389	3,323	607
2037	Tunnels & Parking Garage	Level P1	Hall / Open Office	2	11	Universal Face Exit Sign Surface Mounted EXIT Compact Fluorescent, (1) 9W lamp (No Diffuser)	2	9	Surface Mounted Upgrade EXIT Sign LED Light Fixture. (1) 9W	8760	0.022	0.018	190	156
2038	Tunnels & Parking Garage	Level P1	Breakroom	4	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.213	0.103	665	321
2039	Tunnels & Parking Garage	Level P1	Kitchenette	2	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.106	0.051	332	161
2040	Tunnels & Parking Garage	Level P1	Sergeants Office	6	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	6	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.319	0.154	665	321
2041	Tunnels & Parking Garage	Level P1	Sergeants Office	6	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	6	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.319	0.154	665	321
2042	Tunnels & Parking Garage	Level P1	P172E Elevator Machine Room	1	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.053	0.026	28	13
2043	Tunnels & Parking Garage	Level P1	Electrical Closet	1	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.053	0.026	28	13
2044	Tunnels & Parking Garage	Level P1	Custodial Closet	1	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.053	0.026	55	27
2045	Tunnels & Parking Garage	Level P1	Interview Room	4	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.213	0.103	443	214
2046	Tunnels & Parking Garage	Level P1	Squad Room	9	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	9	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.479	0.232	997	482
2047	Tunnels & Parking Garage	Level P1	Equipment / Lockers	1	101	2'x4' Troffer Recessed Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	51	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 13W Lamps	2080	0.101	0.051	210	107
2048	Tunnels & Parking Garage	Level P1	Paint Shop	6	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	6	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.319	0.154	665	321
2049	Tunnels & Parking Garage	Level P1	DGS Painters Office	4	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	4	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.213	0.103	443	214
2050	Tunnels & Parking Garage	Level P1	DGS Painters Office	2	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
2051	Tunnels & Parking Garage	Level P1	Locksmiths Shop	12	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	12	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.639	0.309	1,329	642
2052	Tunnels & Parking Garage	Level P1	Locksmiths Shop	4	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	4	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.213	0.103	443	214
2053	Tunnels & Parking Garage	Level P1	General Shop Vestibule	2	53	4' Vapor Proof Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.106	0.051	332	161
2054	Tunnels & Parking Garage	Level P1	Paint Shop Ladder Closet	1	65	4' Wraparound Pendant Mounted Fluorescent, (2) 48", ES lamp Frosted	1	26	Pendant Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.065	0.026	34	13
2055	Tunnels & Parking Garage	Level P1	General Shop Second Vestibule	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.053	0.026	166	80
2056	Tunnels & Parking Garage	Level P1	Mechanical Room (AHU)	13	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	13	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	4380	0.692	0.335	3,032	1,466
2057	Tunnels & Parking Garage	Level P1	Transformer Room	5	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	5	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	4380	0.266	0.129	1,166	564
2058	Tunnels & Parking Garage	Level P1	Plumbing Parts Storage	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	4380	0.053	0.026	233	113
2059	Tunnels & Parking Garage	Level P1	Large Pipe Chase (Sponaugle Area)	6	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	6	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.319	0.154	2,799	1,353
2060	Tunnels & Parking Garage	Level P1	Large Pipe Chase (Sponaugle Area)	1	53	2'x4' Troffer Chain Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Chain Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.053	0.026	466	225
2061	Tunnels & Parking Garage	Level P1	Plumbing Shop	19	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	19	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	1.012	0.489	2,104	1,017
2062	Tunnels & Parking Garage	Level P1	Plumbing Shop	1	53	4' Wraparound Chain Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Chain Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.053	0.026	111	54
2063	Tunnels & Parking Garage	Level P1	Equipment Closet	1	18	2' Vanity Wall Mounted Fluorescent, (1) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	8	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (1) 8W Lamp	520	0.018	0.008	9	4
2064	Tunnels & Parking Garage	Level P1	Equipment Closet	1	18	2' Vanity Wall Mounted Fluorescent, (1) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	8	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (1) 8W Lamp	520	0.018	0.008	9	4
2065	Tunnels & Parking Garage	Level P1	Plumbing Shop Restroom Vestibule	3	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.160	0.077	498	241
2066	Tunnels & Parking Garage	Level P1	Plumbing Shop Restroom Vestibule	1	11	Universal Face Exit Sign Surface Mounted EXIT Compact Fluorescent, (1) 9W lamp (No Diffuser)	1	9	Surface Mounted Upgrade EXIT Sign LED Light Fixture. (1) 9W	8760	0.011	0.009	95	78
2067	Tunnels & Parking Garage	Level P1	Telephone Closet	1	18	2' Vanity Wall Mounted Fluorescent, (1) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	8	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (1) 8W Lamp	200	0.018	0.008	4	2
2068	Tunnels & Parking Garage	Level P1	Plumbing Locker Room / Restroom	6	53	4' Vapor Proof Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	6	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3640	0.319	0.154	1,163	562

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
2069	Tunnels & Parking Garage	Level P1	Plumbing Locker Room / Restroom	2	21	1'x1' Square Recessed Compact Fluorescent, spiral, (1) 23W lamp Prismatic Acrylic Diffuser	2	9	Recessed Retrofit Wall Sconce with Rectangular LED Kit LED Light Fixture. (1) 9W	520	0.042	0.018	22	9
2070	Tunnels & Parking Garage	Level P1	Plumbing Locker Room / Restroom	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3640	0.053	0.026	194	94
2071	Tunnels & Parking Garage	Level P1	Plumbing Office	2	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
2072	Tunnels & Parking Garage	Level P1	Plumbing Shop Locker Room / Restroom	5	53	4' Vapor Proof Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	5	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3640	0.266	0.129	969	468
2073	Tunnels & Parking Garage	Level P1	Plumbing Shop Locker Room / Restroom	1	21	1'x1' Square Recessed Compact Fluorescent, spiral, (1) 23W lamp Prismatic Acrylic Diffuser	1	9	Recessed Retrofit Wall Sconce with Rectangular LED Kit LED Light Fixture. (1) 9W	520	0.021	0.009	11	5
2074	Tunnels & Parking Garage	Level P1	Equipment Closet	1	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.053	0.026	28	13
2075	Tunnels & Parking Garage	Level P1	Tool Room	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1560	0.106	0.051	166	80
2076	Tunnels & Parking Garage	Level P1	Plumbing Shop Office	2	30	2'x2' Troffer Recessed Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	16	Recessed T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	2080	0.060	0.032	124	66
2077	Tunnels & Parking Garage	Level P1	Plumbing Shop Electrical Room	6	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	6	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.319	0.154	665	321
2078	Tunnels & Parking Garage	Level P1	Large High Voltage Room	16	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Ice Tray Diffuser	16	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps - HIGH	4380	0.852	0.412	3,732	1,804
2079	Tunnels & Parking Garage	Level P1	Large High Voltage Room	12	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Ice Tray Diffuser	12	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	4380	0.639	0.309	2,799	1,353
2080	Tunnels & Parking Garage	Level P1	Large High Voltage Room	4	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	4	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	4380	0.213	0.103	933	451
2081	Tunnels & Parking Garage	Level P1	Large High Voltage Room	1	53	8' Strip Wall Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	8760	0.053	0.026	466	225
2082	Tunnels & Parking Garage	Level P1	Large High Voltage Room	9	158	4' Industrial Wall Mounted Fluorescent, (6) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	9	77	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (6) 13W Lamps - HIGH	4380	1.421	0.695	6,226	3,044
2083	Tunnels & Parking Garage	Level P1	Large High Voltage Room	2	3	Universal Face Exit Sign Surface Mounted EXIT C172Light Emitting Diode, (2) 1.5W lamp, Dual Sided (No Diffuser)	2	3	Surface Mounted No Retrofit. To remain as is.	8760	0.006	0.006	49	49
2084	Tunnels & Parking Garage	Level P1	East Dock Service Corridor	25	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	25	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	4380	1.331	0.644	5,831	2,819
2085	Tunnels & Parking Garage	Level P1	East Dock Service Corridor	1	11	Universal Face Exit Sign Surface Mounted EXIT Compact Fluorescent, (1) 9W lamp (No Diffuser)	1	9	Surface Mounted Upgrade EXIT Sign LED Light Fixture. (1) 9W	8760	0.011	0.009	95	78
2086	Tunnels & Parking Garage	Level P1	East Dock Service Corridor	2	19	Universal Face Exit Sign Surface Mounted EXIT Incandescent, (2) 10W lamp (No Diffuser)	2	1	Surface Mounted Universal Face Exit Sign; Black EXIT Light Emitting Diode, (2) 0.5W lamp, Dual Sided	8760	0.038	0.002	333	17
2087	Tunnels & Parking Garage	Level P1	Restroom	1	53	4' Vanity Wall Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.053	0.026	55	27
2088	Tunnels & Parking Garage	Level P1	Custodial Supply Room	3	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	3	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.160	0.077	166	80
2089	Tunnels & Parking Garage	Level P1	Storage Room	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.053	0.026	11	5
2090	Tunnels & Parking Garage	Level P1	East Dock Receiving / Garbage	17	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	17	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	4380	0.905	0.438	3,965	1,917
2091	Tunnels & Parking Garage	Level P1	House Storage	20	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	20	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	1.065	0.515	554	268
2092	Tunnels & Parking Garage	Level P1	Senate Receiving	29	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	29	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	1.544	0.746	3,212	1,553
2093	Tunnels & Parking Garage	Level P1	Senate Receiving	14	266	Low-Bay Hook/Cord/Plug Metal Halide, (1) 250W lamp Prismatic Acrylic Diffuser	14	77	Hook/Cord/Plug High-Bay LED Light Fixture. (1) 78W - HIGH	2080	3.727	1.081	7,753	2,249
2094	Tunnels & Parking Garage	Level P1	Senate Receiving Office	4	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.213	0.103	443	214
2095	Tunnels & Parking Garage	Level P1	Senate Receiving Office	10	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	10	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.532	0.257	1,108	535
2096	Tunnels & Parking Garage	Level P1	Senate Receiving Shop	4	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1560	0.213	0.103	332	161
2097	Tunnels & Parking Garage	Level P1	Freight Elevator	1	65	4' Industrial Surface Mounted Fluorescent, (2) 48", ES lamp (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.065	0.026	34	13
2098	Tunnels & Parking Garage	Level P1	Elevator Lobby B Level P1	3	11	Universal Face Exit Sign Surface Mounted EXIT Compact Fluorescent, (1) 9W lamp (No Diffuser)	3	9	Surface Mounted Upgrade EXIT Sign LED Light Fixture. (1) 9W	8760	0.032	0.027	285	234
2099	Tunnels & Parking Garage	Level P1	Elevator Lobby C Level P1	3	11	Universal Face Exit Sign Surface Mounted EXIT Compact Fluorescent, (1) 9W lamp (No Diffuser)	3	9	Surface Mounted Upgrade EXIT Sign LED Light Fixture. (1) 9W	8760	0.032	0.027	285	234
2100	Tunnels & Parking Garage	Level P1	Elevator Lobby D Level P1	3	11	Universal Face Exit Sign Surface Mounted EXIT Compact Fluorescent, (1) 9W lamp (No Diffuser)	3	9	Surface Mounted Upgrade EXIT Sign LED Light Fixture. (1) 9W	8760	0.032	0.027	285	234
2101	Tunnels & Parking Garage	Level P1	Elevator Lobby E Level P1	3	11	Universal Face Exit Sign Surface Mounted EXIT Compact Fluorescent, (1) 9W lamp (No Diffuser)	3	9	Surface Mounted Upgrade EXIT Sign LED Light Fixture. (1) 9W	8760	0.032	0.027	285	234
2102	East Office Building	1st Floor	Main Corridor	66	52	Decorative Drum Surface Mounted Fluorescent, Circline, (1) 22W/32W lamp, preheat ballast Frosted	66	16	Surface Mounted Retrofit Existing Drum with 8" LED Kit LED Light Fixture. (1) 16W	3120	3.455	1.045	10,779	3,262
2103	East Office Building	1st Floor	Main Corridor	41	23	Recessed Can 8" Recessed LED Light Fixture. (1) 24W (No Diffuser)	41	23	Recessed No Retrofit. To remain as is.	3120	0.925	0.925	2,887	2,887
2104	East Office Building	1st Floor	Main Corridor	16	9	Universal Face Exit Sign Surface Mounted LED Light Fixture. (1) 10W (No Diffuser)	16	9	Surface Mounted Upgrade EXIT Sign LED Light Fixture. (1) 9W	8760	0.150	0.143	1,318	1,249
2105	East Office Building	1st Floor	Main Corridor	8	6	Fire Emergency Semi Recessed Compact Fluorescent, spiral, (1) 7W lamp Blue Glass Diffuser	8	5	Semi Recessed Install LED Screw-in PAR16 Lamp Light Emitting Diode Lamp, Screw-in, (1) 6W lamp	8760	0.051	0.043	443	378
2106	East Office Building	1st Floor	Escalator Open Area	7	262	Cylinder Fixture Surface Mounted Mercury Vapor, (1) 250W lamp (No Diffuser)	7	49	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp - HIGH	3120	1.832	0.340	5,716	1,061
2107	East Office Building	1st Floor	Escalator Open Area	8	262	Cylinder Fixture Surface Mounted Mercury Vapor, (1) 250W lamp (No Diffuser)	8	49	Surface Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp - HIGH	3120	2.094	0.389	6,533	1,213
2108	East Office Building	1st Floor	East Wing Rear Vestibule	10	53	4' Strip Cove Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Metal Louvre Diffuser	10	26	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.532	0.257	1,661	803
2109	East Office Building	1st Floor	East Wing Rear Vestibule	6	42	3' Strip Cove Mounted Fluorescent, (2) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Metal Louvre Diffuser	6	24	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (2) 12W Lamps	3120	0.249	0.143	777	445
2110	East Office Building	1st Floor	East Wing Rear Vestibule	1	9	Universal Face Exit Sign Surface Mounted LED Light Fixture. (1) 10W (No Diffuser)	1	9	Surface Mounted Upgrade EXIT Sign LED Light Fixture. (1) 9W	8760	0.009	0.009	82	78
2111	East Office Building	1st Floor	East Wing Rear Vestibule	1	6	Fire Emergency Semi Recessed Compact Fluorescent, spiral, (1) 7W lamp Blue Glass Diffuser	1	5	Semi Recessed Install LED Screw-in PAR16 Lamp Light Emitting Diode Lamp, Screw-in, (1) 6W lamp	8760	0.006	0.005	55	47
2112	East Office Building	1st Floor	East Wing Front Vestibule	4	53	4' Strip Cove Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Metal Louvre Diffuser	4	26	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.213	0.103	665	321
2113	East Office Building	1st Floor	East Wing Front Vestibule	14	42	3' Strip Cove Mounted Fluorescent, (2) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Metal Louvre Diffuser	14	24	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (2) 12W Lamps	3120	0.581	0.333	1,813	1,038
2114	East Office Building	1st Floor	East Wing Front Vestibule	1	9	Universal Face Exit Sign Surface Mounted LED Light Fixture. (1) 10W (No Diffuser)	1	9	Surface Mounted Upgrade EXIT Sign LED Light Fixture. (1) 9W	8760	0.009	0.009	82	78

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
2115	East Office Building	1st Floor	East Wing Front Vestibule	2	30	2' Strip Cove Mounted Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Metal Louvre Diffuser	2	16	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	3120	0.060	0.032	186	99
2116	East Office Building	1st Floor	West Wing Front Vestibule	4	53	4' Strip Cove Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Metal Louvre Diffuser	4	26	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.213	0.103	665	321
2117	East Office Building	1st Floor	West Wing Front Vestibule	14	42	3' Strip Cove Mounted Fluorescent, (2) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Metal Louvre Diffuser	14	24	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (2) 12W Lamps	3120	0.581	0.333	1,813	1,038
2118	East Office Building	1st Floor	West Wing Front Vestibule	1	9	Universal Face Exit Sign Surface Mounted LED Light Fixture. (1) 10W (No Diffuser)	1	9	Surface Mounted Upgrade EXIT Sign LED Light Fixture. (1) 9W	8760	0.009	0.009	82	78
2119	East Office Building	1st Floor	West Wing Front Vestibule	2	30	2' Strip Cove Mounted Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Metal Louvre Diffuser	2	16	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	3120	0.060	0.032	186	99
2120	East Office Building	1st Floor	West Wing Rear Vestibule	8	53	4' Strip Cove Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Metal Louvre Diffuser	8	26	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.426	0.206	1,329	642
2121	East Office Building	1st Floor	West Wing Rear Vestibule	10	42	3' Strip Cove Mounted Fluorescent, (2) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Metal Louvre Diffuser	10	24	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (2) 12W Lamps	3120	0.415	0.238	1,295	741
2122	East Office Building	1st Floor	West Wing Rear Vestibule	1	9	Universal Face Exit Sign Surface Mounted LED Light Fixture. (1) 10W (No Diffuser)	1	9	Surface Mounted Upgrade EXIT Sign LED Light Fixture. (1) 9W	8760	0.009	0.009	82	78
2123	East Office Building	1st Floor	West Wing Rear Vestibule	1	6	Fire Emergency Semi Recessed Compact Fluorescent, spiral, (1) 7W lamp Blue Glass Diffuser	1	5	Semi Recessed Install LED Screw-in PAR16 Lamp Light Emitting Diode Lamp, Screw-in, (1) 6W lamp	8760	0.006	0.005	55	47
2124	East Office Building	1st Floor	101E	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.065	0.194	2,215	404
2125	East Office Building	1st Floor	102E	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.065	0.194	2,215	404
2126	East Office Building	1st Floor	102E	2	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	2	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.114	0.016	237	34
2127	East Office Building	1st Floor	101E	2	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	2	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.114	0.016	237	34
2128	East Office Building	1st Floor	101E	2	35	Table Lamp Surface Mounted Compact Fluorescent, spiral, (3) 13W lamp Lamp Shade	2	24	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (3) 9W lamp	2080	0.070	0.049	146	101
2129	East Office Building	1st Floor	102E	2	35	Table Lamp Surface Mounted Compact Fluorescent, spiral, (3) 13W lamp Lamp Shade	2	24	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (3) 9W lamp	2080	0.070	0.049	146	101
2130	East Office Building	1st Floor	103E	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.065	0.194	2,215	404
2131	East Office Building	1st Floor	103E	2	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	2	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.114	0.016	237	34
2132	East Office Building	1st Floor	103E	2	35	Table Lamp Surface Mounted Compact Fluorescent, spiral, (3) 13W lamp Lamp Shade	2	24	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (3) 9W lamp	2080	0.070	0.049	146	101
2133	East Office Building	1st Floor	104E	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.065	0.194	2,215	404
2134	East Office Building	1st Floor	105E	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.065	0.194	2,215	404
2135	East Office Building	1st Floor	106E	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.065	0.194	2,215	404
2136	East Office Building	1st Floor	104E	2	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	2	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.114	0.016	237	34
2137	East Office Building	1st Floor	104E	2	35	Table Lamp Surface Mounted Compact Fluorescent, spiral, (3) 13W lamp Lamp Shade	2	24	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (3) 9W lamp	2080	0.070	0.049	146	101
2138	East Office Building	1st Floor	105E	2	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	2	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.114	0.016	237	34
2139	East Office Building	1st Floor	105E	2	35	Table Lamp Surface Mounted Compact Fluorescent, spiral, (3) 13W lamp Lamp Shade	2	24	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (3) 9W lamp	2080	0.070	0.049	146	101
2140	East Office Building	1st Floor	106E	2	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	2	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.114	0.016	237	34
2141	East Office Building	1st Floor	106E	2	35	Table Lamp Surface Mounted Compact Fluorescent, spiral, (3) 13W lamp Lamp Shade	2	24	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (3) 9W lamp	2080	0.070	0.049	146	101
2142	East Office Building	1st Floor	M102E Conference Room	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Fisheye Lens Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1560	0.160	0.077	249	120
2143	East Office Building	1st Floor	Storage 103E	3	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Fisheye Lens Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.160	0.077	83	40
2144	East Office Building	1st Floor	Electrical Mechanical	1	65	4' Wraparound Surface Mounted Fluorescent, (2) 48", ES lamp Prismatic Acrylic Diffuser	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.065	0.026	34	13
2145	East Office Building	1st Floor	Kitchenette	2	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.106	0.051	332	161
2146	East Office Building	1st Floor	107E	3	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	3	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	0.799	0.146	1,661	303
2147	East Office Building	1st Floor	107E	1	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	1	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.057	0.008	119	17
2148	East Office Building	1st Floor	107E	1	35	Table Lamp Surface Mounted Compact Fluorescent, spiral, (3) 13W lamp Lamp Shade	1	24	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (3) 9W lamp	2080	0.035	0.024	73	51
2149	East Office Building	1st Floor	M105E IT Room	1	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	260	0.053	0.026	14	7
2150	East Office Building	1st Floor	109E	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.065	0.194	2,215	404
2151	East Office Building	1st Floor	109E	2	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	2	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.114	0.016	237	34
2152	East Office Building	1st Floor	109E	2	35	Table Lamp Surface Mounted Compact Fluorescent, spiral, (3) 13W lamp Lamp Shade	2	24	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (3) 9W lamp	2080	0.070	0.049	146	101
2153	East Office Building	1st Floor	111E	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.065	0.194	2,215	404
2154	East Office Building	1st Floor	113E	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.065	0.194	2,215	404
2155	East Office Building	1st Floor	115E	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.065	0.194	2,215	404
2156	East Office Building	1st Floor	111E	2	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	2	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.114	0.016	237	34
2157	East Office Building	1st Floor	111E	2	35	Table Lamp Surface Mounted Compact Fluorescent, spiral, (3) 13W lamp Lamp Shade	2	24	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (3) 9W lamp	2080	0.070	0.049	146	101
2158	East Office Building	1st Floor	113E	2	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	2	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.114	0.016	237	34
2159	East Office Building	1st Floor	113E	2	35	Table Lamp Surface Mounted Compact Fluorescent, spiral, (3) 13W lamp Lamp Shade	2	24	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (3) 9W lamp	2080	0.070	0.049	146	101
2160	East Office Building	1st Floor	115E	2	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	2	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.114	0.016	237	34

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
2161	East Office Building	1st Floor	115E	2	35	Table Lamp Surface Mounted Compact Fluorescent, spiral, (3) 13W lamp Lamp Shade	2	24	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (3) 9W lamp	2080	0.070	0.049	146	101
2162	East Office Building	1st Floor	117E	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.065	0.194	2,215	404
2163	East Office Building	1st Floor	117E	2	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	2	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.114	0.016	237	34
2164	East Office Building	1st Floor	117E	2	35	Table Lamp Surface Mounted Compact Fluorescent, spiral, (3) 13W lamp Lamp Shade	2	24	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (3) 9W lamp	2080	0.070	0.049	146	101
2165	East Office Building	1st Floor	116E	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.065	0.194	2,215	404
2166	East Office Building	1st Floor	116E	2	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	2	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.114	0.016	237	34
2167	East Office Building	1st Floor	116E	2	35	Table Lamp Surface Mounted Compact Fluorescent, spiral, (3) 13W lamp Lamp Shade	2	24	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (3) 9W lamp	2080	0.070	0.049	146	101
2168	East Office Building	1st Floor	Roof Access Hatch	1	53	4' Strip Wall Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.053	0.026	11	5
2169	East Office Building	1st Floor	Upper Mechanical Room	17	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	17	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.905	0.438	471	228
2170	East Office Building	1st Floor	M112E IT	1	65	4' Wraparound Surface Mounted Fluorescent, (2) 48", ES lamp Prismatic Acrylic Diffuser	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	260	0.065	0.026	17	7
2171	East Office Building	1st Floor	121E	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.065	0.194	2,215	404
2172	East Office Building	1st Floor	123E	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.065	0.194	2,215	404
2173	East Office Building	1st Floor	125E	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.065	0.194	2,215	404
2174	East Office Building	1st Floor	121E	2	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	2	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.114	0.016	237	34
2175	East Office Building	1st Floor	121E	2	35	Table Lamp Surface Mounted Compact Fluorescent, spiral, (3) 13W lamp Lamp Shade	2	24	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (3) 9W lamp	2080	0.070	0.049	146	101
2176	East Office Building	1st Floor	123E	2	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	2	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.114	0.016	237	34
2177	East Office Building	1st Floor	123E	2	35	Table Lamp Surface Mounted Compact Fluorescent, spiral, (3) 13W lamp Lamp Shade	2	24	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (3) 9W lamp	2080	0.070	0.049	146	101
2178	East Office Building	1st Floor	125E	2	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	2	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.114	0.016	237	34
2179	East Office Building	1st Floor	125E	2	35	Table Lamp Surface Mounted Compact Fluorescent, spiral, (3) 13W lamp Lamp Shade	2	24	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (3) 9W lamp	2080	0.070	0.049	146	101
2180	East Office Building	1st Floor	141W	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.065	0.194	2,215	404
2181	East Office Building	1st Floor	141W	2	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	2	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.114	0.016	237	34
2182	East Office Building	1st Floor	141W	2	35	Table Lamp Surface Mounted Compact Fluorescent, spiral, (3) 13W lamp Lamp Shade	2	24	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (3) 9W lamp	2080	0.070	0.049	146	101
2183	East Office Building	1st Floor	143W	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.065	0.194	2,215	404
2184	East Office Building	1st Floor	145W	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.065	0.194	2,215	404
2185	East Office Building	1st Floor	143W	2	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	2	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.114	0.016	237	34
2186	East Office Building	1st Floor	143W	2	35	Table Lamp Surface Mounted Compact Fluorescent, spiral, (3) 13W lamp Lamp Shade	2	24	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (3) 9W lamp	2080	0.070	0.049	146	101
2187	East Office Building	1st Floor	145W	2	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	2	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.114	0.016	237	34
2188	East Office Building	1st Floor	145W	2	35	Table Lamp Surface Mounted Compact Fluorescent, spiral, (3) 13W lamp Lamp Shade	2	24	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (3) 9W lamp	2080	0.070	0.049	146	101
2189	East Office Building	1st Floor	M133W IT	1	65	4' Wraparound Surface Mounted Fluorescent, (2) 48", ES lamp Prismatic Acrylic Diffuser	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	260	0.065	0.026	17	7
2190	East Office Building	1st Floor	147W	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.065	0.194	2,215	404
2191	East Office Building	1st Floor	149W	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.065	0.194	2,215	404
2192	East Office Building	1st Floor	151W	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.065	0.194	2,215	404
2193	East Office Building	1st Floor	153W	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.065	0.194	2,215	404
2194	East Office Building	1st Floor	147W	2	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	2	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.114	0.016	237	34
2195	East Office Building	1st Floor	147W	2	35	Table Lamp Surface Mounted Compact Fluorescent, spiral, (3) 13W lamp Lamp Shade	2	24	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (3) 9W lamp	2080	0.070	0.049	146	101
2196	East Office Building	1st Floor	149W	2	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	2	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.114	0.016	237	34
2197	East Office Building	1st Floor	149W	2	35	Table Lamp Surface Mounted Compact Fluorescent, spiral, (3) 13W lamp Lamp Shade	2	24	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (3) 9W lamp	2080	0.070	0.049	146	101
2198	East Office Building	1st Floor	151W	2	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	2	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.114	0.016	237	34
2199	East Office Building	1st Floor	151W	2	35	Table Lamp Surface Mounted Compact Fluorescent, spiral, (3) 13W lamp Lamp Shade	2	24	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (3) 9W lamp	2080	0.070	0.049	146	101
2200	East Office Building	1st Floor	153W	2	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	2	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.114	0.016	237	34
2201	East Office Building	1st Floor	153W	2	35	Table Lamp Surface Mounted Compact Fluorescent, spiral, (3) 13W lamp Lamp Shade	2	24	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (3) 9W lamp	2080	0.070	0.049	146	101
2202	East Office Building	1st Floor	155W	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.065	0.194	2,215	404
2203	East Office Building	1st Floor	155W	2	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	2	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.114	0.016	237	34
2204	East Office Building	1st Floor	155W	2	35	Table Lamp Surface Mounted Compact Fluorescent, spiral, (3) 13W lamp Lamp Shade	2	24	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (3) 9W lamp	2080	0.070	0.049	146	101
2205	East Office Building	1st Floor	150W	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.065	0.194	2,215	404
2206	East Office Building	1st Floor	150W	2	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	2	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.114	0.016	237	34

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
2207	East Office Building	1st Floor	150W	2	35	Table Lamp Surface Mounted Compact Fluorescent, spiral, (3) 13W lamp Lamp Shade	2	24	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (3) 9W lamp	2080	0.070	0.049	146	101
2208	East Office Building	1st Floor	Roof Access Hatch	1	53	4' Strip Wall Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.053	0.026	11	5
2209	East Office Building	1st Floor	Upper Mechanical Room	17	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	17	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.905	0.438	471	228
2210	East Office Building	1st Floor	Men's Room Vestibule West	1	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	1	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.053	0.026	166	80
2211	East Office Building	1st Floor	JC	2	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.106	0.051	111	54
2212	East Office Building	1st Floor	Men's Room	3	53	4' Strip Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	3	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.160	0.077	498	241
2213	East Office Building	1st Floor	Men's Room	2	30	2' Strip Recessed Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	2	16	Recessed T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	3120	0.060	0.032	186	99
2214	East Office Building	1st Floor	Women's Room Vestibule	1	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	1	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.053	0.026	166	80
2215	East Office Building	1st Floor	Women's Room	4	53	4' Strip Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	4	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.213	0.103	665	321
2216	East Office Building	1st Floor	Kitchenette	2	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.106	0.051	332	161
2217	East Office Building	1st Floor	155W	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.065	0.194	2,215	404
2218	East Office Building	1st Floor	155W	1	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	1	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.057	0.008	119	17
2219	East Office Building	1st Floor	155W	1	35	Table Lamp Surface Mounted Compact Fluorescent, spiral, (3) 13W lamp Lamp Shade	1	24	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (3) 9W lamp	2080	0.035	0.024	73	51
2220	East Office Building	1st Floor	Pipe Case	1	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.053	0.026	11	5
2221	East Office Building	1st Floor	M143E IT	1	65	4' Wraparound Surface Mounted Fluorescent, (2) 48", ES lamp Prismatic Acrylic Diffuser	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	260	0.065	0.026	17	7
2222	East Office Building	1st Floor	M145E Electrical Room	1	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.053	0.026	28	13
2223	East Office Building	1st Floor	M142E	3	65	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", ES lamp Fisheye Lens Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.195	0.077	101	40
2224	East Office Building	1st Floor	M141E	3	65	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", ES lamp Fisheye Lens Diffuser	3	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.195	0.077	101	40
2225	East Office Building	1st Floor	159W	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.065	0.194	2,215	404
2226	East Office Building	1st Floor	160W	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.065	0.194	2,215	404
2227	East Office Building	1st Floor	162W	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.065	0.194	2,215	404
2228	East Office Building	1st Floor	161W	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.065	0.194	2,215	404
2229	East Office Building	1st Floor	163W	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.065	0.194	2,215	404
2230	East Office Building	1st Floor	164W	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.065	0.194	2,215	404
2231	East Office Building	1st Floor	159W	2	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	2	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.114	0.016	237	34
2232	East Office Building	1st Floor	159W	2	35	Table Lamp Surface Mounted Compact Fluorescent, spiral, (3) 13W lamp Lamp Shade	2	24	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (3) 9W lamp	2080	0.070	0.049	146	101
2233	East Office Building	1st Floor	160W	2	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	2	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.114	0.016	237	34
2234	East Office Building	1st Floor	160W	2	35	Table Lamp Surface Mounted Compact Fluorescent, spiral, (3) 13W lamp Lamp Shade	2	24	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (3) 9W lamp	2080	0.070	0.049	146	101
2235	East Office Building	1st Floor	162W	2	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	2	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.114	0.016	237	34
2236	East Office Building	1st Floor	162W	2	35	Table Lamp Surface Mounted Compact Fluorescent, spiral, (3) 13W lamp Lamp Shade	2	24	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (3) 9W lamp	2080	0.070	0.049	146	101
2237	East Office Building	1st Floor	161W	2	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	2	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.114	0.016	237	34
2238	East Office Building	1st Floor	161W	2	35	Table Lamp Surface Mounted Compact Fluorescent, spiral, (3) 13W lamp Lamp Shade	2	24	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (3) 9W lamp	2080	0.070	0.049	146	101
2239	East Office Building	1st Floor	163W	2	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	2	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.114	0.016	237	34
2240	East Office Building	1st Floor	163W	2	35	Table Lamp Surface Mounted Compact Fluorescent, spiral, (3) 13W lamp Lamp Shade	2	24	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (3) 9W lamp	2080	0.070	0.049	146	101
2241	East Office Building	1st Floor	164W	2	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	2	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.114	0.016	237	34
2242	East Office Building	1st Floor	164W	2	35	Table Lamp Surface Mounted Compact Fluorescent, spiral, (3) 13W lamp Lamp Shade	2	24	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (3) 9W lamp	2080	0.070	0.049	146	101
2243	East Office Building	1st Floor	Men's Room Vestibule West	1	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	1	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.053	0.026	166	80
2244	East Office Building	1st Floor	JC	2	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.106	0.051	111	54
2245	East Office Building	1st Floor	Men's Room	3	53	4' Strip Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	3	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.160	0.077	498	241
2246	East Office Building	1st Floor	Men's Room	2	30	2' Strip Recessed Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	2	16	Recessed T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	3120	0.060	0.032	186	99
2247	East Office Building	1st Floor	Women's Room Vestibule	1	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	1	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.053	0.026	166	80
2248	East Office Building	1st Floor	Women's Room	4	53	4' Strip Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	4	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.213	0.103	665	321
2249	East Office Building	Concourse Level	41-49EW Open Office	385	28	4' Strip Cove Mounted Fluorescent, (1) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	385	13	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 13W Lamp	2080	10.771	4.955	22,404	10,306
2250	East Office Building	Concourse Level	41 bE	40	23	3' Strip Cove Mounted Fluorescent, (1) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	40	12	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	2080	0.939	0.475	1,952	988
2251	East Office Building	Concourse Level	41-49EW Open Office	12	23	3' Strip Cove Mounted Fluorescent, (1) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	12	12	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	2080	0.282	0.143	586	297
2252	East Office Building	Concourse Level	41 aE	40	23	3' Strip Cove Mounted Fluorescent, (1) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	40	12	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	2080	0.939	0.475	1,952	988

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
2253	East Office Building	Concourse Level	43 aE	40	23	3' Strip Cove Mounted Fluorescent, (1) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	40	12	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	2080	0.939	0.475	1,952	988
2254	East Office Building	Concourse Level	45 aE	40	23	3' Strip Cove Mounted Fluorescent, (1) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	40	12	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	2080	0.939	0.475	1,952	988
2255	East Office Building	Concourse Level	47 aE	40	23	3' Strip Cove Mounted Fluorescent, (1) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	40	12	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	2080	0.939	0.475	1,952	988
2256	East Office Building	Concourse Level	49 aE	39	23	3' Strip Cove Mounted Fluorescent, (1) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	39	12	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	2080	0.915	0.463	1,903	964
2257	East Office Building	Concourse Level	41-49EW Open Office	5	18	2' Strip Cove Mounted Fluorescent, (1) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	5	16	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	2080	0.090	0.079	188	165
2258	East Office Building	Concourse Level	M91aE Electrical Closet	1	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.053	0.026	28	13
2259	East Office Building	Concourse Level	M92E Open Office	12	52	Decorative Drum Surface Mounted Fluorescent, Circline, (1) 22W/32W lamp, preheat ballast Frosted	12	16	Surface Mounted Retrofit Existing Drum with 8" LED Kit LED Light Fixture. (1) 16W	2080	0.628	0.190	1,307	395
2260	East Office Building	Concourse Level	M92E Open Office	2	9	Universal Face Exit Sign Surface Mounted LED Light Fixture. (1) 10W (No Diffuser)	2	9	Surface Mounted Upgrade EXIT Sign LED Light Fixture. (1) 9W	8760	0.019	0.018	165	156
2261	East Office Building	Concourse Level	M92E Open Office	1	6	Fire Emergency Semi Recessed Compact Fluorescent, spiral, (1) 7W lamp Blue Glass Diffuser	1	5	Semi Recessed Install LED Screw-in PAR16 Lamp Light Emitting Diode Lamp, Screw-in, (1) 6W lamp	8760	0.006	0.005	55	47
2262	East Office Building	Concourse Level	Women's Room Vestibule	1	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Fisheye Lens Diffuser	1	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.053	0.026	166	80
2263	East Office Building	Concourse Level	Men's Room Vestibule	1	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Fisheye Lens Diffuser	1	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.053	0.026	166	80
2264	East Office Building	Concourse Level	JC	1	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.053	0.026	55	27
2265	East Office Building	Concourse Level	Men's Room	2	42	3' Strip Recessed Fluorescent, (2) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	2	24	Recessed T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (2) 12W Lamps	3120	0.083	0.048	259	148
2266	East Office Building	Concourse Level	Men's Room	2	53	4' Strip Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	2	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.106	0.051	332	161
2267	East Office Building	Concourse Level	Women's Room	2	42	3' Strip Recessed Fluorescent, (2) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	2	24	Recessed T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (2) 12W Lamps	3120	0.083	0.048	259	148
2268	East Office Building	Concourse Level	Women's Room	2	53	4' Strip Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	2	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.106	0.051	332	161
2269	East Office Building	Concourse Level	Storage Closet	1	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.053	0.026	28	13
2270	East Office Building	Concourse Level	51EW	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.065	0.194	2,215	404
2271	East Office Building	Concourse Level	51EW	2	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	2	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.114	0.016	237	34
2272	East Office Building	Concourse Level	51EW	2	35	Table Lamp Surface Mounted Compact Fluorescent, spiral, (3) 13W lamp Lamp Shade	2	24	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (3) 9W lamp	2080	0.070	0.049	146	101
2273	East Office Building	Concourse Level	52EW	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.065	0.194	2,215	404
2274	East Office Building	Concourse Level	52EW	2	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	2	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.114	0.016	237	34
2275	East Office Building	Concourse Level	52EW	2	35	Table Lamp Surface Mounted Compact Fluorescent, spiral, (3) 13W lamp Lamp Shade	2	24	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (3) 9W lamp	2080	0.070	0.049	146	101
2276	East Office Building	Concourse Level	53EW	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.065	0.194	2,215	404
2277	East Office Building	Concourse Level	53EW	2	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	2	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.114	0.016	237	34
2278	East Office Building	Concourse Level	53EW	2	35	Table Lamp Surface Mounted Compact Fluorescent, spiral, (3) 13W lamp Lamp Shade	2	24	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (3) 9W lamp	2080	0.070	0.049	146	101
2279	East Office Building	Concourse Level	54EW	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.065	0.194	2,215	404
2280	East Office Building	Concourse Level	54EW	2	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	2	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.114	0.016	237	34
2281	East Office Building	Concourse Level	54EW	2	35	Table Lamp Surface Mounted Compact Fluorescent, spiral, (3) 13W lamp Lamp Shade	2	24	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (3) 9W lamp	2080	0.070	0.049	146	101
2282	East Office Building	Concourse Level	M98 Electrical Room	3	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	3	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	260	0.160	0.077	42	20
2283	East Office Building	Concourse Level	M99aE Mechanical Room	13	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	13	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.692	0.335	360	174
2284	East Office Building	Concourse Level	M99 IT	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	260	0.106	0.051	28	13
2285	East Office Building	Concourse Level	Kitchenette	3	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.160	0.077	498	241
2286	East Office Building	Concourse Level	M92E Open Office	1	53	4' Vanity Wall Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.053	0.026	166	80
2287	East Office Building	Concourse Level	55EW Open Office	36	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	36	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	2080	3.444	2.031	7,163	4,225
2288	East Office Building	Concourse Level	Office A	4	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	2080	0.383	0.226	796	469
2289	East Office Building	Concourse Level	Conference Room	4	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	1560	0.383	0.226	597	352
2290	East Office Building	Concourse Level	Conference Room	11	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	11	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	1560	1.052	0.621	1,642	968
2291	East Office Building	Concourse Level	Radio Room 55E	2	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	2080	0.191	0.113	398	235
2292	East Office Building	Concourse Level	IT Room (est)	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	260	0.053	0.026	14	7
2293	East Office Building	Concourse Level	Office B	3	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	2080	0.287	0.169	597	352
2294	East Office Building	Concourse Level	Office B	1	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	1	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.057	0.008	119	17
2295	East Office Building	Concourse Level	56EW Open Office Area	34	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	34	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	2080	3.253	1.919	6,765	3,991
2296	East Office Building	Concourse Level	Office A	3	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	2080	0.287	0.169	597	352
2297	East Office Building	Concourse Level	Office B	3	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	2080	0.287	0.169	597	352
2298	East Office Building	Concourse Level	Welcome Center	20	60	Recessed Can 8" Recessed Compact Fluorescent, quad, (2) 26W lamp (No Diffuser)	20	27	Recessed Recessed Can 8" LED Light Fixture. (1) 27W	3120	1.191	0.535	3,717	1,668

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
2299	East Office Building	Concourse Level	89EW Open Office Area	7	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	7	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	2080	0.670	0.395	1,393	822
2300	East Office Building	Concourse Level	Chief Clerk	2	46	Chandelier Chain Mounted Light Emitting Diode Lamp, Screw-in, (6) 9W lamp Frosted	2	49	Chain Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (6) 9W lamp	2080	0.092	0.097	192	202
2301	East Office Building	Concourse Level	Chief Clerk	1	228	Table Lamp Surface Mounted Incandescent, (4) 60W lamp Lamp Shade	1	32	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (4) 9W lamp	2080	0.228	0.032	474	67
2302	East Office Building	Concourse Level	Chief Clerk	1	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	1	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.057	0.008	119	17
2303	East Office Building	Concourse Level	Conference Room	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.161	0.077	251	120
2304	East Office Building	Concourse Level	89EW Open Office Area	1	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.080	0.039	167	80
2305	East Office Building	Concourse Level	Personal Division	12	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	12	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	2080	1.148	0.677	2,388	1,408
2306	East Office Building	Concourse Level	Copy Room	2	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	3120	0.191	0.113	597	352
2307	East Office Building	Concourse Level	Kitchenette	2	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	3120	0.191	0.113	597	352
2308	East Office Building	Concourse Level	Accounting Division	15	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	15	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	2080	1.435	0.846	2,985	1,761
2309	East Office Building	Concourse Level	M88E Mechanical Room	3	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.160	0.077	83	40
2310	East Office Building	Concourse Level	M87E	19	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	19	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	1.012	0.489	526	254
2311	East Office Building	Concourse Level	M85E Electrical Closet	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
2312	East Office Building	Concourse Level	M84E Senate Controlled Area	4	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	4	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.213	0.103	111	54
2313	East Office Building	Concourse Level	64E Vestibule	4	60	Recessed Can 8" Recessed Compact Fluorescent, quad, (2) 26W lamp Deep Cell Parabolic Diffuser	4	27	Recessed Recessed Can 8" LED Light Fixture. (1) 27W	3120	0.238	0.107	743	334
2314	East Office Building	Concourse Level	64E Vestibule	1	9	Universal Face Exit Sign Surface Mounted LED Light Fixture. (1) 10W (No Diffuser)	1	9	Surface Mounted Upgrade EXIT Sign LED Light Fixture. (1) 9W	8760	0.009	0.009	82	78
2315	East Office Building	Concourse Level	Women's Locker Room	8	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	8	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3640	0.426	0.206	1,551	750
2316	East Office Building	Concourse Level	Women's Locker Room	2	53	4' Vanity Wall Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Metal Louvre Diffuser	2	26	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3640	0.106	0.051	388	187
2317	East Office Building	Concourse Level	Women's Locker Room	2	21	1'x1' Square Recessed Compact Fluorescent, spiral, (1) 23W lamp Prismatic Acrylic Diffuser	2	9	Recessed Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 10W lamp	3640	0.042	0.018	151	66
2318	East Office Building	Concourse Level	Women's Locker Room	1	41	Recessed Can 6" Recessed Compact Fluorescent, quad, (2) 18W lamp (No Diffuser)	1	13	Recessed Recessed Can 6" LED Light Fixture. (1) 13W	3640	0.041	0.013	148	47
2319	East Office Building	Concourse Level	Women's Locker Room	1	60	Recessed Can 8" Recessed Compact Fluorescent, quad, (2) 26W lamp Deep Cell Parabolic Diffuser	1	27	Recessed Recessed Can 8" LED Light Fixture. (1) 27W	200	0.060	0.027	12	5
2320	East Office Building	Concourse Level	Locker Room	14	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	14	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3640	0.745	0.360	2,713	1,312
2321	East Office Building	Concourse Level	Locker Room	2	53	4' Vanity Wall Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Metal Louvre Diffuser	2	26	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3640	0.106	0.051	388	187
2322	East Office Building	Concourse Level	Locker Room	4	21	1'x1' Square Recessed Compact Fluorescent, spiral, (1) 23W lamp Prismatic Acrylic Diffuser	4	9	Recessed Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 10W lamp	3640	0.083	0.036	302	131
2323	East Office Building	Concourse Level	Locker Room	3	60	Recessed Can 8" Recessed Compact Fluorescent, quad, (2) 26W lamp Deep Cell Parabolic Diffuser	3	27	Recessed Recessed Can 8" LED Light Fixture. (1) 27W	200	0.179	0.080	36	16
2324	East Office Building	Concourse Level	Locker Room	1	9	Universal Face Exit Sign Surface Mounted LED Light Fixture. (1) 10W (No Diffuser)	1	9	Surface Mounted Upgrade EXIT Sign LED Light Fixture. (1) 9W	8760	0.009	0.009	82	78
2325	East Office Building	Concourse Level	Senate Gym	5	30	2'x2' Troffer Recessed Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	5	16	Recessed T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	3640	0.149	0.079	542	288
2326	East Office Building	Concourse Level	Senate Gym	10	60	Recessed Can 8" Recessed Compact Fluorescent, quad, (2) 26W lamp Deep Cell Parabolic Diffuser	10	27	Recessed Recessed Can 8" LED Light Fixture. (1) 27W	3640	0.596	0.267	2,168	973
2327	East Office Building	Concourse Level	Senate Gym	24	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	24	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3640	1.278	0.618	4,652	2,249
2328	East Office Building	Concourse Level	Senate Gym	1	9	Universal Face Exit Sign Surface Mounted LED Light Fixture. (1) 10W (No Diffuser)	1	9	Surface Mounted Upgrade EXIT Sign LED Light Fixture. (1) 9W	8760	0.009	0.009	82	78
2329	East Office Building	Concourse Level	Senate Gym	1	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3640	0.053	0.026	194	94
2330	East Office Building	Concourse Level	65E Health Office Lobby	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
2331	East Office Building	Concourse Level	65 E Health Office	14	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	14	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	1.125	0.541	2,339	1,124
2332	East Office Building	Concourse Level	Kitchenette	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
2333	East Office Building	Concourse Level	Restroom	1	46	2' Vanity Wall Mounted Fluorescent, (2) 24", STD lamp Microcell Diffuser	1	16	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	1040	0.046	0.016	48	16
2334	East Office Building	Concourse Level	Office A	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
2335	East Office Building	Concourse Level	Office B	1	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.080	0.039	167	80
2336	East Office Building	Concourse Level	Office C	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
2337	East Office Building	Concourse Level	70E Capital Police Vestibule	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.241	0.116	752	361
2338	East Office Building	Concourse Level	Corridor/ Open Office	14	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	14	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.745	0.360	2,326	1,124
2339	East Office Building	Concourse Level	Corridor/ Open Office	4	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.213	0.103	665	321
2340	East Office Building	Concourse Level	Corridor/ Open Office	3	9	Universal Face Exit Sign Surface Mounted LED Light Fixture. (1) 10W (No Diffuser)	3	9	Surface Mounted Upgrade EXIT Sign LED Light Fixture. (1) 9W	8760	0.028	0.027	247	234
2341	East Office Building	Concourse Level	Ticket Office (est)	4	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
2342	East Office Building	Concourse Level	Evidence Room	3	104	2'x4' Troffer Recessed Fluorescent, (3) 48", ES lamp Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.311	0.116	648	241
2343	East Office Building	Concourse Level	Arms Room	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	520	0.241	0.116	125	60
2344	East Office Building	Concourse Level	M65E Mechanical	16	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	16	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.852	0.412	443	214

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
2345	East Office Building	Concourse Level	Investigations Office	8	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	8	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.426	0.206	886	428
2346	East Office Building	Concourse Level	Investigations Sargent Office	2	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
2347	East Office Building	Concourse Level	Conference Room	6	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1560	0.319	0.154	498	241
2348	East Office Building	Concourse Level	M68E IT	2	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	260	0.106	0.051	28	13
2349	East Office Building	Concourse Level	Procurement Officer	6	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.319	0.154	665	321
2350	East Office Building	Concourse Level	M69aE Mechanical Room	1	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.053	0.026	28	13
2351	East Office Building	Concourse Level	Open Office	10	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	10	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.532	0.257	1,108	535
2352	East Office Building	Concourse Level	Training Office	6	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.319	0.154	665	321
2353	East Office Building	Concourse Level	Supply Office	1	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.053	0.026	28	13
2354	East Office Building	Concourse Level	Admin Lieutenant Office	2	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
2355	East Office Building	Concourse Level	Kitchenette	2	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.106	0.051	332	161
2356	East Office Building	Concourse Level	Men's Room	6	53	4' Strip Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	6	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.319	0.154	997	482
2357	East Office Building	Concourse Level	Men's Room	1	30	2' Strip Recessed Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	1	16	Recessed T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	3120	0.030	0.016	93	49
2358	East Office Building	Concourse Level	Pipe Chase	1	57	Wall-Pack Wall Mounted Incandescent, (1) 60W lamp Frosted	1	8	Wall Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	200	0.057	0.008	11	2
2359	East Office Building	Concourse Level	Women's Room	6	53	4' Strip Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	6	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.319	0.154	997	482
2360	East Office Building	Concourse Level	Women's Room	1	30	2' Strip Recessed Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	1	16	Recessed T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	3120	0.030	0.016	93	49
2361	East Office Building	Concourse Level	Professional Responsibility Office	2	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
2362	East Office Building	Concourse Level	Accreditation Office	2	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
2363	East Office Building	Concourse Level	Deputy Superintendent Office	6	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.319	0.154	665	321
2364	East Office Building	Concourse Level	Superintendent Office	4	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.213	0.103	443	214
2365	East Office Building	Concourse Level	62a Internal Control Center	11	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	11	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	3120	1.052	0.621	3,283	1,937
2366	East Office Building	Concourse Level	Restroom	1	57	Bathroom Light with Fan Recessed Incandescent, (1) 60W lamp Frosted	1	8	Recessed Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	1040	0.057	0.008	59	8
2367	East Office Building	Concourse Level	IT Room	1	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	3120	0.096	0.056	298	176
2368	East Office Building	Concourse Level	Storage (est)	3	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	520	0.287	0.169	149	88
2369	East Office Building	Concourse Level	Platoon Commander Office	6	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	2080	0.574	0.339	1,194	704
2370	East Office Building	Concourse Level	M64E Mechanical Room	2	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
2371	East Office Building	Concourse Level	M64E Mechanical Room	4	65	4' Industrial Surface Mounted Fluorescent, (2) 48", ES lamp (No Diffuser)	4	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.260	0.103	135	54
2372	East Office Building	Concourse Level	Fire Line Pipe Chase	1	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.053	0.026	11	5
2373	East Office Building	Concourse Level	Control Room Open Office	53	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	53	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	2080	5.070	2.991	10,546	6,221
2374	East Office Building	Concourse Level	Locker Room	6	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	3640	0.574	0.339	2,089	1,232
2375	East Office Building	Concourse Level	IT Room	2	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	260	0.191	0.113	50	29
2376	East Office Building	Concourse Level	M63E Mechanical Room (est)	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
2377	East Office Building	Concourse Level	M62cE Server Room	2	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	520	0.191	0.113	99	59
2378	East Office Building	Concourse Level	M62aE (est)	2	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	520	0.191	0.113	99	59
2379	East Office Building	Concourse Level	Locker Room	1	9	Universal Face Exit Sign Surface Mounted LED Light Fixture. (1) 10W (No Diffuser)	1	9	Surface Mounted Upgrade EXIT Sign LED Light Fixture. (1) 9W	8760	0.009	0.009	82	78
2380	East Office Building	Concourse Level	ICC Vestibule	2	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	3120	0.191	0.113	597	352
2381	East Office Building	Concourse Level	M61bE JC	2	65	4' Industrial Surface Mounted Fluorescent, (2) 48", ES lamp (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.130	0.051	135	54
2382	East Office Building	Concourse Level	M61 aE (est)	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.106	0.051	21	10
2383	East Office Building	Concourse Level	Senator Anthony Williams Suite	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.065	0.194	2,215	404
2384	East Office Building	Concourse Level	Senator Anthony Williams Suite	9	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	9	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.513	0.073	1,067	152
2385	East Office Building	Concourse Level	Conference Room	1	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	1	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	1560	0.266	0.049	415	76
2386	East Office Building	Concourse Level	Senators Office	1	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	1	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	0.266	0.049	554	101
2387	East Office Building	Concourse Level	Senators Office	4	14	Recessed Can 6" Recessed Compact Fluorescent, spiral, (1) 15W lamp (No Diffuser)	4	13	Recessed Recessed Can 6" LED Light Fixture. (1) 13W	2080	0.054	0.051	113	107
2388	East Office Building	Concourse Level	14E-17E Hallway	7	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	7	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	3120	1.864	0.340	5,815	1,061
2389	East Office Building	Concourse Level	14E-17E Hallway	4	9	Universal Face Exit Sign Surface Mounted LED Light Fixture. (1) 10W (No Diffuser)	4	9	Surface Mounted Upgrade EXIT Sign LED Light Fixture. (1) 9W	8760	0.038	0.036	330	312
2390	East Office Building	Concourse Level	14EW Conference Room	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	1560	1.065	0.194	1,661	303

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
2391	East Office Building	Concourse Level	Senator Aument's Suite 15EW	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.065	0.194	2,215	404
2392	East Office Building	Concourse Level	Senator Aument's Suite 15EW	7	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	7	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.399	0.057	830	118
2393	East Office Building	Concourse Level	Senator Aument's Suite 15EW	1	228	Table Lamp Surface Mounted Incandescent, (4) 60W lamp Lamp Shade	1	32	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (4) 9W lamp	2080	0.228	0.032	474	67
2394	East Office Building	Concourse Level	Office	1	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	1	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	0.266	0.049	554	101
2395	East Office Building	Concourse Level	Office	3	12	Table Lamp Surface Mounted Compact Fluorescent, spiral, (1) 13W lamp Lamp Shade	3	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.035	0.024	73	51
2396	East Office Building	Concourse Level	Senators Office	1	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	1	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	0.266	0.049	554	101
2397	East Office Building	Concourse Level	Senators Office	4	14	Recessed Can 6" Recessed Compact Fluorescent, spiral, (1) 15W lamp (No Diffuser)	4	13	Recessed Recessed Can 6" LED Light Fixture. (1) 13W	2080	0.054	0.051	113	107
2398	East Office Building	Concourse Level	Senator Mensch Suite 16EW	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.065	0.194	2,215	404
2399	East Office Building	Concourse Level	Senator Mensch Suite 16EW	7	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	7	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.399	0.057	830	118
2400	East Office Building	Concourse Level	Senator Mensch Suite 16EW	1	228	Table Lamp Surface Mounted Incandescent, (4) 60W lamp Lamp Shade	1	32	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (4) 9W lamp	2080	0.228	0.032	474	67
2401	East Office Building	Concourse Level	Office	1	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	1	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	0.266	0.049	554	101
2402	East Office Building	Concourse Level	Office	3	12	Table Lamp Surface Mounted Compact Fluorescent, spiral, (1) 13W lamp Lamp Shade	3	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.035	0.024	73	51
2403	East Office Building	Concourse Level	Senators Office	1	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	1	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	0.266	0.049	554	101
2404	East Office Building	Concourse Level	Senators Office	4	14	Recessed Can 6" Recessed Compact Fluorescent, spiral, (1) 15W lamp (No Diffuser)	4	13	Recessed Recessed Can 6" LED Light Fixture. (1) 13W	2080	0.054	0.051	113	107
2405	East Office Building	Concourse Level	JC	1	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.053	0.026	55	27
2406	East Office Building	Concourse Level	Senator Blake Suite 17EW	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.065	0.194	2,215	404
2407	East Office Building	Concourse Level	Senator Blake Suite 17EW	7	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	7	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.399	0.057	830	118
2408	East Office Building	Concourse Level	Senator Blake Suite 17EW	1	228	Table Lamp Surface Mounted Incandescent, (4) 60W lamp Lamp Shade	1	32	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (4) 9W lamp	2080	0.228	0.032	474	67
2409	East Office Building	Concourse Level	Office	1	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	1	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	0.266	0.049	554	101
2410	East Office Building	Concourse Level	Office	3	12	Table Lamp Surface Mounted Compact Fluorescent, spiral, (1) 13W lamp Lamp Shade	3	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.035	0.024	73	51
2411	East Office Building	Concourse Level	Senators Office	1	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	1	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	0.266	0.049	554	101
2412	East Office Building	Concourse Level	Senators Office	4	14	Recessed Can 6" Recessed Compact Fluorescent, spiral, (1) 15W lamp (No Diffuser)	4	13	Recessed Recessed Can 6" LED Light Fixture. (1) 13W	2080	0.054	0.051	113	107
2413	East Office Building	Concourse Level	54 Senate Controlled Area	6	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	520	0.574	0.339	298	176
2414	East Office Building	Concourse Level	EM5 Training Room	6	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	6	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.319	0.154	166	80
2415	East Office Building	Concourse Level	07E (est)	6	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	2080	0.574	0.339	1,194	704
2416	East Office Building	Concourse Level	Senator Haywood Suite 10EW	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.065	0.194	2,215	404
2417	East Office Building	Concourse Level	Senator Haywood Suite 10EW	7	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	7	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.399	0.057	830	118
2418	East Office Building	Concourse Level	Senator Haywood Suite 10EW	1	228	Table Lamp Surface Mounted Incandescent, (4) 60W lamp Lamp Shade	1	32	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (4) 9W lamp	2080	0.228	0.032	474	67
2419	East Office Building	Concourse Level	Office	1	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	1	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	0.266	0.049	554	101
2420	East Office Building	Concourse Level	Office	3	12	Table Lamp Surface Mounted Compact Fluorescent, spiral, (1) 13W lamp Lamp Shade	3	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.035	0.024	73	51
2421	East Office Building	Concourse Level	Senators Office	1	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	1	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	0.266	0.049	554	101
2422	East Office Building	Concourse Level	Senators Office	4	14	Recessed Can 6" Recessed Compact Fluorescent, spiral, (1) 15W lamp (No Diffuser)	4	13	Recessed Recessed Can 6" LED Light Fixture. (1) 13W	2080	0.054	0.051	113	107
2423	East Office Building	Concourse Level	Senator Wagner Suite 9EW	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.065	0.194	2,215	404
2424	East Office Building	Concourse Level	Senator Wagner Suite 9EW	7	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	7	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.399	0.057	830	118
2425	East Office Building	Concourse Level	Senator Wagner Suite 9EW	1	228	Table Lamp Surface Mounted Incandescent, (4) 60W lamp Lamp Shade	1	32	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (4) 9W lamp	2080	0.228	0.032	474	67
2426	East Office Building	Concourse Level	Office	1	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	1	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	0.266	0.049	554	101
2427	East Office Building	Concourse Level	Office	3	12	Table Lamp Surface Mounted Compact Fluorescent, spiral, (1) 13W lamp Lamp Shade	3	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.035	0.024	73	51
2428	East Office Building	Concourse Level	Senators Office	1	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	1	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	0.266	0.049	554	101
2429	East Office Building	Concourse Level	Senators Office	4	14	Recessed Can 6" Recessed Compact Fluorescent, spiral, (1) 15W lamp (No Diffuser)	4	13	Recessed Recessed Can 6" LED Light Fixture. (1) 13W	2080	0.054	0.051	113	107
2430	East Office Building	Concourse Level	8-A/B EW Senate Hearing Room	26	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	26	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	1560	2.487	1.467	3,880	2,289
2431	East Office Building	Concourse Level	8-A/B EW Senate Hearing Room	48	101	Flood Light Surface Mounted Compact Fluorescent, Biax, (2) 55W lamp Perforated Metal Diffuser	48	101	Surface Mounted No Retrofit. To remain as is.	1560	4.852	4.852	7,569	7,569
2432	East Office Building	Concourse Level	8-A/B EW Senate Hearing Room	5	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	5	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.402	0.193	627	301
2433	East Office Building	Concourse Level	Rep Grove Suite	5	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	5	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	2080	0.478	0.282	995	587
2434	East Office Building	Concourse Level	Rep Grove Suite	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
2435	East Office Building	Concourse Level	Rep Grove Suite	3	228	Table Lamp Surface Mounted Incandescent, (4) 60W lamp Lamp Shade	3	32	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (4) 9W lamp	2080	0.684	0.097	1,423	202
2436	East Office Building	Concourse Level	Reps Office	2	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	2080	0.191	0.113	398	235

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
2437	East Office Building	Concourse Level	Reps Office	1	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.080	0.039	167	80
2438	East Office Building	Concourse Level	Reps Office	1	35	Table Lamp Surface Mounted Compact Fluorescent, spiral, (3) 13W lamp Lamp Shade	1	24	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (3) 9W lamp	2080	0.035	0.024	73	51
2439	East Office Building	Concourse Level	Conference Room	3	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	1560	0.287	0.169	448	264
2440	East Office Building	Concourse Level	Rep Maloney Suite	5	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	5	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	2080	0.478	0.282	995	587
2441	East Office Building	Concourse Level	Rep Maloney Suite	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
2442	East Office Building	Concourse Level	Rep Maloney Suite	3	228	Table Lamp Surface Mounted Incandescent, (4) 60W lamp Lamp Shade	3	32	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (4) 9W lamp	2080	0.684	0.097	1,423	202
2443	East Office Building	Concourse Level	Reps Office	2	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	2080	0.191	0.113	398	235
2444	East Office Building	Concourse Level	Reps Office	1	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.080	0.039	167	80
2445	East Office Building	Concourse Level	Reps Office	1	35	Table Lamp Surface Mounted Compact Fluorescent, spiral, (3) 13W lamp Lamp Shade	1	24	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (3) 9W lamp	2080	0.035	0.024	73	51
2446	East Office Building	Concourse Level	Conference Room	3	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	1560	0.287	0.169	448	264
2447	East Office Building	Concourse Level	Reps Office Entry 4EW	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.161	0.077	501	241
2448	East Office Building	Concourse Level	Conference Room	7	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	7	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	1560	0.670	0.395	1,045	616
2449	East Office Building	Concourse Level	Rep. Stephen & Rep. Tobash Open Office	8	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	8	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	2080	0.765	0.451	1,592	939
2450	East Office Building	Concourse Level	Office	4	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	2080	0.383	0.226	796	469
2451	East Office Building	Concourse Level	Office	4	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	2080	0.383	0.226	796	469
2452	East Office Building	Concourse Level	Mechanical Room	9	65	4' Industrial Surface Mounted Fluorescent, (2) 48", ES lamp (No Diffuser)	9	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.585	0.232	304	120
2453	East Office Building	Concourse Level	Open Office	9	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	9	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	2080	0.861	0.508	1,791	1,056
2454	East Office Building	Concourse Level	Office	6	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	2080	0.574	0.339	1,194	704
2455	East Office Building	Concourse Level	Democratic Messengers (not in use)	7	104	2'x4' Troffer Recessed Fluorescent, (3) 48", ES lamp Deep Cell Parabolic Diffuser	7	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	200	0.727	0.270	145	54
2456	East Office Building	Concourse Level	M13E Storage Room	8	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	8	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	200	0.426	0.206	85	41
2457	East Office Building	Concourse Level	Men's Restroom	4	53	4' Strip Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	4	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.213	0.103	665	321
2458	East Office Building	Concourse Level	Men's Restroom	1	21	Recessed Can 6" Recessed Compact Fluorescent, spiral, (1) 23W lamp (No Diffuser)	1	13	Recessed Recessed Can 6" LED Light Fixture. (1) 13W	3120	0.021	0.013	65	40
2459	East Office Building	Concourse Level	JC	1	57	Wall-Pack Wall Mounted Incandescent, (1) 60W lamp Frosted	1	8	Wall Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	1040	0.057	0.008	59	8
2460	East Office Building	Concourse Level	Women's Restroom	4	53	4' Strip Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	4	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.213	0.103	665	321
2461	East Office Building	Concourse Level	Women's Restroom	1	21	Recessed Can 6" Recessed Compact Fluorescent, spiral, (1) 23W lamp (No Diffuser)	1	13	Recessed Recessed Can 6" LED Light Fixture. (1) 13W	3120	0.021	0.013	65	40
2462	East Office Building	Concourse Level	Capitol Media Center Vestibule	4	53	4' Wraparound Pendant Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	26	Pendant Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.213	0.103	665	321
2463	East Office Building	Concourse Level	Capitol Media Center Vestibule	4	42	3' Wraparound Pendant Mounted Fluorescent, (2) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	24	Pendant Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (2) 12W Lamps	3120	0.166	0.095	518	297
2464	East Office Building	Concourse Level	Capitol Media Center Vestibule	1	6	Fire Emergency Semi Recessed Compact Fluorescent, spiral, (1) 7W lamp Blue Glass Diffuser	1	5	Semi Recessed Install LED Screw-in PAR16 Lamp Light Emitting Diode Lamp, Screw-in, (1) 6W lamp	8760	0.006	0.005	55	47
2465	East Office Building	Concourse Level	Capitol Media Center Vestibule	1	9	Universal Face Exit Sign Surface Mounted LED Light Fixture. (1) 10W (No Diffuser)	1	9	Surface Mounted Upgrade EXIT Sign LED Light Fixture. (1) 9W	8760	0.009	0.009	82	78
2466	East Office Building	Concourse Level	Capitol Media Center	20	53	4' Strip Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Metal Louvre Diffuser	20	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1560	1.065	0.515	1,661	803
2467	East Office Building	Concourse Level	Capitol Media Center	10	12	Recessed Can 6" Recessed Compact Fluorescent, spiral, (1) 13W lamp (No Diffuser)	10	13	Recessed Recessed Can 6" LED Light Fixture. (1) 13W	1560	0.117	0.129	183	201
2468	East Office Building	Concourse Level	Capitol Media Center	12	53	4' Wraparound Pendant Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	12	26	Pendant Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1560	0.639	0.309	997	482
2469	East Office Building	Concourse Level	Capitol Media Center	4	42	3' Wraparound Pendant Mounted Fluorescent, (2) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	24	Pendant Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (2) 12W Lamps	1560	0.166	0.095	259	148
2470	East Office Building	Concourse Level	Capitol Media Center	2	9	Universal Face Exit Sign Surface Mounted LED Light Fixture. (1) 10W (No Diffuser)	2	9	Surface Mounted Upgrade EXIT Sign LED Light Fixture. (1) 9W	8760	0.019	0.018	165	156
2471	East Office Building	Concourse Level	Portrait Studio	4	57	Recessed Can 6" Recessed Incandescent, (1) 60W lamp (No Diffuser)	4	13	Recessed Recessed Can 6" LED Light Fixture. (1) 13W	1560	0.228	0.051	356	80
2472	East Office Building	Concourse Level	Restroom	1	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.053	0.026	55	27
2473	East Office Building	Concourse Level	Back Hallway (to green room)	2	42	3' Strip Cove Mounted Fluorescent, (2) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Metal Louvre Diffuser	2	24	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (2) 12W Lamps	3120	0.083	0.048	259	148
2474	East Office Building	Concourse Level	Back Hallway (to green room)	1	14	Recessed Can 6" Recessed Compact Fluorescent, spiral, (1) 15W lamp (No Diffuser)	1	13	Recessed Recessed Can 6" LED Light Fixture. (1) 13W	3120	0.014	0.013	42	40
2475	East Office Building	Concourse Level	Back Hallway (to green room)	4	80	2'x4' Troffer Recessed Flanged Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.321	0.154	1,002	482
2476	East Office Building	Concourse Level	Green Room	3	80	2'x4' Troffer Recessed Flanged Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
2477	East Office Building	Concourse Level	Office / Open Office	13	80	2'x4' Troffer Recessed Flanged Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	13	39	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	1.044	0.502	2,172	1,044
2478	East Office Building	Concourse Level	Electrical Closet	2	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
2479	East Office Building	Concourse Level	Media Control Room	5	80	2'x4' Troffer Recessed Flanged Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	5	39	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.402	0.193	627	301
2480	East Office Building	Concourse Level	Ramp Exit Hall (media exit)	5	80	2'x4' Troffer Recessed Flanged Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	5	39	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	200	0.402	0.193	80	39
2481	East Office Building	Concourse Level	Ramp Exit Hall (media exit)	2	9	Universal Face Exit Sign Surface Mounted LED Light Fixture. (1) 10W (No Diffuser)	2	9	Surface Mounted Upgrade EXIT Sign LED Light Fixture. (1) 9W	8760	0.019	0.018	165	156
2482	East Office Building	Concourse Level	M12 Custodial Supply	4	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.213	0.103	222	107

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
2483	East Office Building	Concourse Level	3EW-5EW Rep Evankovich Irvin Bernstine Suite	20	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	20	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	2080	1.913	1.129	3,980	2,347
2484	East Office Building	Concourse Level	Office	6	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	2080	0.574	0.339	1,194	704
2485	East Office Building	Concourse Level	Office	1	35	Table Lamp Surface Mounted Compact Fluorescent, spiral, (3) 13W lamp Lamp Shade	1	24	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (3) 9W lamp	2080	0.035	0.024	73	51
2486	East Office Building	Concourse Level	Office	1	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	1	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.057	0.008	119	17
2487	East Office Building	Concourse Level	3EW-5EW Rep Evankovich Irvin Bernstine Suite	1	80	2'x4' Troffer Recessed Flanged Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	39	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.080	0.039	167	80
2488	East Office Building	Concourse Level	Office	3	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	2080	0.287	0.169	597	352
2489	East Office Building	Concourse Level	Office	1	35	Table Lamp Surface Mounted Compact Fluorescent, spiral, (3) 13W lamp Lamp Shade	1	24	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (3) 9W lamp	2080	0.035	0.024	73	51
2490	East Office Building	Concourse Level	Office	2	12	Table Lamp Surface Mounted Compact Fluorescent, spiral, (1) 13W lamp Lamp Shade	2	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.023	0.016	49	34
2491	East Office Building	Concourse Level	Office	3	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	2080	0.287	0.169	597	352
2492	East Office Building	Concourse Level	Office	1	35	Table Lamp Surface Mounted Compact Fluorescent, spiral, (3) 13W lamp Lamp Shade	1	24	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (3) 9W lamp	2080	0.035	0.024	73	51
2493	East Office Building	Concourse Level	Office	1	12	Table Lamp Surface Mounted Compact Fluorescent, spiral, (1) 13W lamp Lamp Shade	1	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.012	0.008	24	17
2494	East Office Building	Concourse Level	Office	5	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	5	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	2080	0.478	0.282	995	587
2495	East Office Building	Concourse Level	Office	1	35	Table Lamp Surface Mounted Compact Fluorescent, spiral, (3) 13W lamp Lamp Shade	1	24	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (3) 9W lamp	2080	0.035	0.024	73	51
2496	East Office Building	Concourse Level	18EW Open	10	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	10	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	2080	0.957	0.564	1,990	1,174
2497	East Office Building	Concourse Level	Office	5	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	5	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	2080	0.478	0.282	995	587
2498	East Office Building	Concourse Level	Conference Room	6	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	1560	0.574	0.339	895	528
2499	East Office Building	Concourse Level	M21E House Radio Services	7	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	7	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	2080	0.670	0.395	1,393	822
2500	East Office Building	Concourse Level	M21E House Radio Services	2	101	4' Wraparound Surface Mounted Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	51	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 13W Lamps	2080	0.202	0.103	420	214
2501	East Office Building	Concourse Level	M22E Electrical Closet	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.053	0.026	28	13
2502	East Office Building	Concourse Level	M23E Mechanical Room	19	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	19	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	1.012	0.489	526	254
2503	East Office Building	Concourse Level	Senator Greenleaf Suite 19EW	5	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	5	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.331	0.243	2,769	505
2504	East Office Building	Concourse Level	Senator Greenleaf Suite 19EW	10	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	10	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.570	0.081	1,186	168
2505	East Office Building	Concourse Level	Senator Office	1	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	1	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	0.266	0.049	554	101
2506	East Office Building	Concourse Level	Senator Office	4	14	Recessed Can 6" Recessed Compact Fluorescent, spiral, (1) 15W lamp (No Diffuser)	4	13	Recessed Recessed Can 6" LED Light Fixture. (1) 13W	2080	0.054	0.051	113	107
2507	East Office Building	Concourse Level	Office	1	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	1	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	0.266	0.049	554	101
2508	East Office Building	Concourse Level	Office	1	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	1	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.057	0.008	119	17
2509	East Office Building	Concourse Level	Senator Office	3	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	3	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.171	0.024	356	51
2510	East Office Building	Concourse Level	M48E Lamp Storage	3	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	3	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.160	0.077	83	40
2511	East Office Building	Concourse Level	21EW Suite	35	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	35	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	2080	3.348	1.975	6,964	4,108
2512	East Office Building	Concourse Level	Office A	3	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	2080	0.287	0.169	597	352
2513	East Office Building	Concourse Level	Office A	1	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.080	0.039	167	80
2514	East Office Building	Concourse Level	Office B	3	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	2080	0.287	0.169	597	352
2515	East Office Building	Concourse Level	Copy Room	2	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	3120	0.191	0.113	597	352
2516	East Office Building	Concourse Level	Office C	2	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	2080	0.191	0.113	398	235
2517	East Office Building	Concourse Level	Women's Room Vestibule	1	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	1	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.053	0.026	166	80
2518	East Office Building	Concourse Level	Women's Restroom	2	30	2' Strip Recessed Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	2	16	Recessed T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	3120	0.060	0.032	186	99
2519	East Office Building	Concourse Level	Women's Restroom	6	53	4' Strip Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	6	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.319	0.154	997	482
2520	East Office Building	Concourse Level	Men's Room Vestibule	1	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	1	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.053	0.026	166	80
2521	East Office Building	Concourse Level	JC	1	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.053	0.026	55	27
2522	East Office Building	Concourse Level	Men's Restroom	2	30	2' Strip Recessed Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	2	16	Recessed T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	3120	0.060	0.032	186	99
2523	East Office Building	Concourse Level	Men's Restroom	6	53	4' Strip Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	6	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.319	0.154	997	482
2524	East Office Building	Concourse Level	M43E Elevator Vestibule	10	53	4' Strip Cove Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Metal Louvre Diffuser	10	26	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.532	0.257	1,661	803
2525	East Office Building	Concourse Level	M43E Elevator Vestibule	3	42	3' Strip Cove Mounted Fluorescent, (2) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Metal Louvre Diffuser	3	24	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (2) 12W Lamps	3120	0.125	0.071	389	222
2526	East Office Building	Concourse Level	M43E Elevator Vestibule	1	9	Universal Face Exit Sign Surface Mounted LED Light Fixture. (1) 10W (No Diffuser)	1	9	Surface Mounted Upgrade EXIT Sign LED Light Fixture. (1) 9W	8760	0.009	0.009	82	78
2527	East Office Building	Concourse Level	M43aE	1	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.053	0.026	28	13
2528	East Office Building	Concourse Level	Senate Controlled Area	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
2529	East Office Building	Concourse Level	M43 Mechanical Room	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
2530	East Office Building	Concourse Level	20EW Senator Rafferty Suite	6	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	6	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.597	0.292	3,323	607
2531	East Office Building	Concourse Level	20EW Senator Rafferty Suite	6	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	6	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.342	0.049	711	101
2532	East Office Building	Concourse Level	Office	1	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	1	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	0.266	0.049	554	101
2533	East Office Building	Concourse Level	Office	1	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	1	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.057	0.008	119	17
2534	East Office Building	Concourse Level	Senator Office	1	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	1	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	0.266	0.049	554	101
2535	East Office Building	Concourse Level	Senator Office	4	14	Recessed Can 6" Recessed Compact Fluorescent, spiral, (1) 15W lamp (No Diffuser)	4	13	Recessed Recessed Can 6" LED Light Fixture. (1) 13W	2080	0.054	0.051	113	107
2536	East Office Building	Concourse Level	22EW Senate Republican Communications Open Office Area	28	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	28	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	2080	2.679	1.580	5,572	3,286
2537	East Office Building	Concourse Level	22EW Senate Republican Communications Open Office Area	4	80	2'x4' Troffer Recessed Flanged Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	4	39	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.321	0.154	668	321
2538	East Office Building	Concourse Level	Office A	1	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	2080	0.096	0.056	199	117
2539	East Office Building	Concourse Level	Office A	1	80	2'x4' Troffer Recessed Flanged Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	39	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.080	0.039	167	80
2540	East Office Building	Concourse Level	Kitchenette	2	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	2080	0.191	0.113	398	235
2541	East Office Building	Concourse Level	Kitchenette	3	80	2'x4' Troffer Recessed Flanged Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.241	0.116	501	241
2542	East Office Building	Concourse Level	Office B	3	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	2080	0.287	0.169	597	352
2543	East Office Building	Concourse Level	Office B	2	80	2'x4' Troffer Recessed Flanged Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
2544	East Office Building	Concourse Level	Printing Office	5	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	5	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	2080	0.478	0.282	995	587
2545	East Office Building	Concourse Level	Printing Office	2	80	2'x4' Troffer Recessed Flanged Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
2546	East Office Building	Concourse Level	Printing Office	1	80	2'x4' Troffer Recessed Flanged Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	39	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.080	0.039	167	80
2547	East Office Building	Concourse Level	Office A	2	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	2080	0.191	0.113	398	235
2548	East Office Building	Concourse Level	23EW Senate Video Facility Open Office Area	2	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	2080	0.191	0.113	398	235
2549	East Office Building	Concourse Level	23EW Senate Video Facility Open Office Area	2	80	2'x4' Troffer Recessed Flanged Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
2550	East Office Building	Concourse Level	23EW Senate Video Facility Open Office Area	3	38	Recessed Can 8" Recessed Compact Fluorescent, quad, (1) 42W lamp (No Diffuser)	3	27	Recessed Recessed Can 8" LED Light Fixture. (1) 27W	2080	0.114	0.080	237	167
2551	East Office Building	Concourse Level	Equipment Room	4	71	Recessed Can 8" Recessed Incandescent, (1) 75W lamp (No Diffuser)	4	27	Recessed Recessed Can 8" LED Light Fixture. (1) 27W	200	0.285	0.107	57	21
2552	East Office Building	Concourse Level	Office A	5	53	2'x2' Troffer Recessed Fluorescent, (2) U-Tube, T-8 lamp, Instant Start Ballast Deep Cell Parabolic Diffuser	5	24	Recessed Install 2x2 3-Lamp White Reflector Kit LED 2' T8 Lamp (3) 8W Lamps	2080	0.266	0.119	554	247
2553	East Office Building	Concourse Level	Equipment Storage	2	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	520	0.191	0.113	99	59
2554	East Office Building	Concourse Level	Green Room	9	130	2'x4' Troffer Recessed Fluorescent, (4) 48", ES lamp Prismatic Acrylic Diffuser	9	51	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (4) 13W Lamps	1560	1.170	0.463	1,825	723
2555	East Office Building	Concourse Level	Corridor	3	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.241	0.116	752	361
2556	East Office Building	Concourse Level	Corridor	2	9	Universal Face Exit Sign Surface Mounted LED Light Fixture. (1) 10W (No Diffuser)	2	9	Surface Mounted Upgrade EXIT Sign LED Light Fixture. (1) 9W	8760	0.019	0.018	165	156
2557	East Office Building	Concourse Level	Control Room	11	38	Recessed Can 8" Recessed Compact Fluorescent, quad, (1) 42W lamp (No Diffuser)	11	27	Recessed Recessed Can 8" LED Light Fixture. (1) 27W	3120	0.417	0.294	1,301	917
2558	East Office Building	Concourse Level	23gE Server Room	4	53	2'x2' Troffer Recessed Fluorescent, (2) U-Tube, T-8 lamp, Instant Start Ballast Deep Cell Parabolic Diffuser	4	24	Recessed Install 2x2 3-Lamp White Reflector Kit LED 2' T8 Lamp (3) 8W Lamps	260	0.213	0.095	55	25
2559	East Office Building	Concourse Level	Control Room 2	5	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	5	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	2080	0.478	0.282	995	587
2560	East Office Building	Concourse Level	Equipment Storage	2	71	Recessed Can 8" Recessed Incandescent, (1) 75W lamp (No Diffuser)	2	27	Recessed Recessed Can 8" LED Light Fixture. (1) 27W	200	0.143	0.053	29	11
2561	East Office Building	Concourse Level	Men's Room Vestibule	1	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Fisheye Lens Diffuser	1	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.053	0.026	166	80
2562	East Office Building	Concourse Level	JC	1	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.053	0.026	55	27
2563	East Office Building	Concourse Level	Men's Restroom	2	30	2' Strip Recessed Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	2	16	Recessed T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	3120	0.060	0.032	186	99
2564	East Office Building	Concourse Level	Men's Restroom	6	53	4' Strip Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	6	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.319	0.154	997	482
2565	East Office Building	Concourse Level	Women's Room Vestibule	1	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Fisheye Lens Diffuser	1	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.053	0.026	166	80
2566	East Office Building	Concourse Level	Women's Restroom	2	30	2' Strip Recessed Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	2	16	Recessed T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	3120	0.060	0.032	186	99
2567	East Office Building	Concourse Level	Women's Restroom	6	53	4' Strip Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	6	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.319	0.154	997	482
2568	East Office Building	Concourse Level	Conference Room 60E	66	42	3' Wraparound Pendant Mounted Fluorescent, (2) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	66	24	Pendant Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (2) 12W Lamps	2080	2.740	1.568	5,699	3,262
2569	East Office Building	Concourse Level	M76bE Mechanical Room	3	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	3	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.160	0.077	83	40
2570	East Office Building	Concourse Level	Elevator Lobby	10	53	4' Strip Cove Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Metal Louvre Diffuser	10	26	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.532	0.257	1,661	803
2571	East Office Building	Concourse Level	M76cE Electrical Closet	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
2572	East Office Building	Concourse Level	Cafe Atrium Seating Area	8	975	Cylinder Fixture Surface Mounted Metal Halide, (1) 1000W lamp (No Diffuser)	8	198	Surface Mounted High-Bay LED Light Fixture. (1) 200W - HIGH	3120	7.798	1.584	24,329	4,942
2573	East Office Building	Concourse Level	Cafe Atrium Seating Area	6	188	Cylinder Fixture Surface Mounted LED Light Fixture. (1) 200W (No Diffuser)	6	198	Surface Mounted High-Bay LED Light Fixture. (1) 200W - HIGH	3120	1.129	1.188	3,521	3,707
2574	East Office Building	Concourse Level	Cafe Atrium Seating Area	18	48	Decorative Wall Sconce Wall Mounted LED Light Fixture. (1) 51W Styled/Custom Diffuser	18	48	Wall Mounted No Retrofit. To remain as is.	3120	0.863	0.863	2,694	2,694

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
2575	East Office Building	Concourse Level	Cafeteria Seating Area	32	42	3' Wraparound Pendant Mounted Fluorescent, (2) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	32	24	Pendant Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (2) 12W Lamps	3120	1.328	0.760	4,145	2,372
2576	East Office Building	Concourse Level	Men's Locker Room	2	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3640	0.106	0.051	388	187
2577	East Office Building	Concourse Level	Cafeteria Seating Area	80	53	4' Wraparound Pendant Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	80	26	Pendant Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	4.260	2.059	13,291	6,425
2578	East Office Building	Concourse Level	Cafeteria Serving Area	22	53	1'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	22	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	1.171	0.566	3,655	1,767
2579	East Office Building	Concourse Level	Kitchen JC	1	42	Drum Surface Mounted Fluorescent, Circline, (1) 44W lamp, preheat ballast Frosted	1	15	Surface Mounted Drum LED Light Fixture. (1) 15W	3120	0.042	0.015	130	46
2580	East Office Building	Concourse Level	Kitchen	57	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	57	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	3.035	1.467	9,470	4,578
2581	East Office Building	Concourse Level	Cafeteria Serving Area	6	53	2'x4' Troffer Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	6	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.319	0.154	997	482
2582	East Office Building	Concourse Level	Cafeteria Serving Area	11	13	Recessed Can 6" Recessed LED Light Fixture. (1) 14W (No Diffuser)	11	13	Recessed No Retrofit. To remain as is.	3120	0.145	0.145	452	452
2583	East Office Building	Concourse Level	Cafeteria Serving Area	38	6	Spot Light Pendant Mounted Light Emitting Diode Lamp, Screw-in, (1) 7W lamp (No Diffuser)	38	6	Pendant Mounted No Retrofit. To remain as is.	3120	0.227	0.227	710	710
2584	East Office Building	Concourse Level	Cafeteria Serving Area	8	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	8	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.426	0.206	1,329	642
2585	East Office Building	Concourse Level	Kitchen	4	30	1'x2' Troffer Recessed Flanged Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	4	16	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	3120	0.119	0.063	372	198
2586	East Office Building	Concourse Level	Kitchen	2	80	2'x4' Troffer Recessed Flanged Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	39	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.161	0.077	501	241
2587	East Office Building	Concourse Level	Kitchen	3	104	2'x4' Troffer Recessed Flanged Fluorescent, (3) 48", ES lamp Fisheye Lens Diffuser	3	39	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	3120	0.311	0.116	971	361
2588	East Office Building	Concourse Level	Kitchen	8	53	1'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	8	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.426	0.206	1,329	642
2589	East Office Building	Concourse Level	Kitchen	14	57	Jelly Jar Surface Mounted Incandescent, (1) 60W lamp Glass Jelly Jar	14	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	3120	0.798	0.113	2,490	354
2590	East Office Building	Concourse Level	Men's Locker Room	1	53	4' Vanity Wall Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Metal Louvre Diffuser	1	26	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3640	0.053	0.026	194	94
2591	East Office Building	Concourse Level	Dry Storage	10	65	4' Wraparound Surface Mounted Fluorescent, (2) 48", ES lamp Prismatic Acrylic Diffuser	10	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.650	0.257	2,027	803
2592	East Office Building	Concourse Level	Container Storage	2	65	4' Wraparound Surface Mounted Fluorescent, (2) 48", ES lamp Prismatic Acrylic Diffuser	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.130	0.051	405	161
2593	East Office Building	Concourse Level	Trash Storage	1	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.053	0.026	166	80
2594	East Office Building	Concourse Level	Kitchen Office 2	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Fisheye Lens Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
2595	East Office Building	Concourse Level	Kitchen Office	2	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Fisheye Lens Diffuser	2	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.106	0.051	222	107
2596	East Office Building	Concourse Level	Womens Locker Room	2	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3640	0.106	0.051	388	187
2597	East Office Building	Concourse Level	Womens Locker Room	1	53	4' Vanity Wall Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Metal Louvre Diffuser	1	26	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3640	0.053	0.026	194	94
2598	East Office Building	Concourse Level	Elevator Lobby	3	42	3' Strip Cove Mounted Fluorescent, (2) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Metal Louvre Diffuser	3	24	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (2) 12W Lamps	3120	0.125	0.071	389	222
2599	East Office Building	Concourse Level	Elevator Lobby	1	9	Universal Face Exit Sign Surface Mounted LED Light Fixture. (1) 10W (No Diffuser)	1	9	Surface Mounted Upgrade EXIT Sign LED Light Fixture. (1) 9W	8760	0.009	0.009	82	78
2600	East Office Building	Concourse Level	Conference Room	1	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	1560	0.080	0.039	125	60
2601	East Office Building	Concourse Level	18EW Open	2	80	2'x4' Troffer Recessed Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	39	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.161	0.077	334	161
2602	East Office Building	Concourse Level	M25E Senate Analyst	31	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	31	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	260	2.966	1.749	771	455
2603	East Office Building	Concourse Level	M26E	3	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	3	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	2080	0.287	0.169	597	352
2604	East Office Building	Concourse Level	M26E	12	38	Recessed Can 8" Recessed Compact Fluorescent, quad, (1) 42W lamp (No Diffuser)	12	27	Recessed Recessed Can 8" LED Light Fixture. (1) 27W	2080	0.455	0.321	946	667
2605	East Office Building	Concourse Level	M26E	1	80	2'x4' Troffer Recessed Flanged Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	39	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	2080	0.080	0.039	167	80
2606	East Office Building	Concourse Level	Office B	1	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	260	0.096	0.056	25	15
2607	East Office Building	Concourse Level	Office B	1	80	2'x4' Troffer Recessed Flanged Fluorescent, (3) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	1	39	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (3) 13W Lamps	260	0.080	0.039	21	10
2608	East Office Building	Concourse Level	Office A	6	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	6	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	260	0.574	0.339	149	88
2609	East Office Building	Concourse Level	Office C (est)	2	96	2'x5' Troffer Recessed Fluorescent, (3) 60", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Deep Cell Parabolic Diffuser	2	56	Recessed Relamp with Linear LED Tube (Bypass Ballast); Add New Sockets LED 5' T8 Lamp (3) 19W Lamps	260	0.191	0.113	50	29
2610	East Office Building	Concourse Level	M30E Suite Open Office Area	12	52	Decorative Drum Surface Mounted Fluorescent, Circline, (1) 22W/32W lamp, preheat ballast Frosted	12	16	Surface Mounted Retrofit Existing Drum with 8" LED Kit LED Light Fixture. (1) 16W	2080	0.628	0.190	1,307	395
2611	East Office Building	Concourse Level	M30E Suite Open Office Area	2	9	Universal Face Exit Sign Surface Mounted LED Light Fixture. (1) 10W (No Diffuser)	2	9	Surface Mounted Upgrade EXIT Sign LED Light Fixture. (1) 9W	8760	0.019	0.018	165	156
2612	East Office Building	Concourse Level	M30E Suite Open Office Area	1	53	4' Vanity Wall Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	2080	0.053	0.026	111	54
2613	East Office Building	Concourse Level	M30E Suite Open Office Area	1	6	Fire Emergency Semi Recessed Compact Fluorescent, spiral, (1) 7W lamp Blue Glass Diffuser	1	5	Semi Recessed Install LED Screw-in PAR16 Lamp Light Emitting Diode Lamp, Screw-in, (1) 6W lamp	8760	0.006	0.005	55	47
2614	East Office Building	Concourse Level	Women's Room Vestible	1	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	1	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.053	0.026	166	80
2615	East Office Building	Concourse Level	Women's Room	2	53	4' Strip Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	2	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.106	0.051	332	161
2616	East Office Building	Concourse Level	Women's Room	2	42	3' Strip Recessed Fluorescent, (2) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	2	24	Recessed T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (2) 12W Lamps	3120	0.083	0.048	259	148
2617	East Office Building	Concourse Level	Men's Room Vestibule	1	53	2'x4' Troffer Recessed Flanged Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	1	26	Recessed Flanged T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.053	0.026	166	80
2618	East Office Building	Concourse Level	JC	1	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	1040	0.053	0.026	55	27
2619	East Office Building	Concourse Level	Men's room Room	2	53	4' Strip Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	2	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.106	0.051	332	161
2620	East Office Building	Concourse Level	Men's room Room	2	42	3' Strip Recessed Fluorescent, (2) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Microcell Diffuser	2	24	Recessed T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (2) 12W Lamps	3120	0.083	0.048	259	148

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
2621	East Office Building	Concourse Level	M29 Mechanical Room	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.106	0.051	55	27
2622	East Office Building	Concourse Level	M27E Mechanical Room	18	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	18	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.958	0.463	498	241
2623	East Office Building	Concourse Level	Kitchenette	2	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.106	0.051	332	161
2624	East Office Building	Concourse Level	IT Room	2	53	4' Industrial Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	2	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	260	0.106	0.051	28	13
2625	East Office Building	Concourse Level	25EW Rep Comita & Fitzgerald	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.065	0.194	2,215	404
2626	East Office Building	Concourse Level	25EW Rep Comita & Fitzgerald	6	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	6	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.342	0.049	711	101
2627	East Office Building	Concourse Level	26EW Rep Dawkins & McCarter Suite	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.065	0.194	2,215	404
2628	East Office Building	Concourse Level	27EW Rep Driscoll & Warren Suite	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.065	0.194	2,215	404
2629	East Office Building	Concourse Level	28EW Rep Evans & Madden Suite	4	266	Indirect Chandelier Pendant Mounted Metal Halide, (1) 250W lamp (No Diffuser)	4	49	Pendant Mounted Chip On Board (COB) Type Screw-in / Bypass Existing Ballast Light Emitting Diode Lamp, Screw-in, (1) 54W lamp	2080	1.065	0.194	2,215	404
2630	East Office Building	Concourse Level	26EW Rep Dawkins & McCarter Suite	6	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	6	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.342	0.049	711	101
2631	East Office Building	Concourse Level	27EW Rep Driscoll & Warren Suite	6	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	6	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.342	0.049	711	101
2632	East Office Building	Concourse Level	28EW Rep Evans & Madden Suite	6	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	6	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	0.342	0.049	711	101
2633	East Office Building	Concourse Level	M4E Storage (est)	1	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.053	0.026	28	13
2634	East Office Building	Concourse Level	Pipe Chase	1	57	Wall-Pack Wall Mounted Incandescent, (1) 60W lamp Frosted	1	8	Wall Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	200	0.057	0.008	11	2
2635	East Office Building	Concourse Level	M37E Mechanical Closet	1	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.053	0.026	28	13
2636	East Office Building	Concourse Level	Elevator Lobby	18	53	4' Strip Cove Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Metal Louvre Diffuser	18	26	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.958	0.463	2,990	1,446
2637	East Office Building	Concourse Level	Elevator Lobby	5	42	3' Strip Cove Mounted Fluorescent, (2) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Metal Louvre Diffuser	5	24	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (2) 12W Lamps	3120	0.208	0.119	648	371
2638	East Office Building	Concourse Level	Elevator Lobby	1	9	Universal Face Exit Sign Surface Mounted LED Light Fixture. (1) 10W (No Diffuser)	1	9	Surface Mounted Upgrade EXIT Sign LED Light Fixture. (1) 9W	8760	0.009	0.009	82	78
2639	East Office Building	Concourse Level	M35aE Mechanical Room	1	65	4' Industrial Surface Mounted Fluorescent, (2) 48", ES lamp (No Diffuser)	1	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.065	0.026	34	13
2640	East Office Building	Concourse Level	30EW - 38EW Suite	385	28	4' Strip Cove Mounted Fluorescent, (1) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	385	13	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 13W Lamp	3120	10.771	4.955	33,607	15,459
2641	East Office Building	Concourse Level	30EW - 38EW Suite	12	23	3' Strip Cove Mounted Fluorescent, (1) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	12	12	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	3120	0.282	0.143	879	445
2642	East Office Building	Concourse Level	30EW - 38EW Suite	5	28	4' Strip Cove Mounted Fluorescent, (1) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	5	13	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 13W Lamp	3120	0.140	0.064	436	201
2643	East Office Building	Concourse Level	30aE Office	40	23	3' Strip Cove Mounted Fluorescent, (1) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	40	12	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	2080	0.939	0.475	1,952	988
2644	East Office Building	Concourse Level	32aE Office	40	23	3' Strip Cove Mounted Fluorescent, (1) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	40	12	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	2080	0.939	0.475	1,952	988
2645	East Office Building	Concourse Level	34aE Office	40	23	3' Strip Cove Mounted Fluorescent, (1) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	40	12	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	2080	0.939	0.475	1,952	988
2646	East Office Building	Concourse Level	36aE Office	40	23	3' Strip Cove Mounted Fluorescent, (1) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	40	12	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	2080	0.939	0.475	1,952	988
2647	East Office Building	Concourse Level	38aE Office	40	23	3' Strip Cove Mounted Fluorescent, (1) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	40	12	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	2080	0.939	0.475	1,952	988
2648	East Office Building	Concourse Level	38bE Office	40	23	3' Strip Cove Mounted Fluorescent, (1) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	40	12	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	2080	0.939	0.475	1,952	988
2649	East Office Building	Concourse Level	41-49EW Open Office	42	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	42	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	2.394	0.340	4,980	708
2650	East Office Building	Concourse Level	30EW - 38EW Suite	42	57	Table Lamp Surface Mounted Incandescent, (1) 60W lamp Lamp Shade	42	8	Surface Mounted Install LED Screw-in A-Style Lamp Light Emitting Diode Lamp, Screw-in, (1) 9W lamp	2080	2.394	0.340	4,980	708
2651	East Office Building	Concourse Level	Room Under Escalator	1	53	4' Vanity Wall Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Frosted	1	26	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	520	0.053	0.026	28	13
2652	East Office Building	Concourse Level	East Wing Scan Point	22	28	4' Strip Cove Mounted Fluorescent, (1) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	22	13	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 13W Lamp	3120	0.616	0.283	1,920	883
2653	East Office Building	Concourse Level	East Wing Scan Point	18	23	3' Strip Cove Mounted Fluorescent, (1) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	18	12	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	3120	0.422	0.214	1,318	667
2654	East Office Building	Concourse Level	39E Conference Room	22	28	4' Strip Cove Mounted Fluorescent, (1) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	22	13	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (1) 13W Lamp	1560	0.616	0.283	960	442
2655	East Office Building	Concourse Level	39E Conference Room	18	23	3' Strip Cove Mounted Fluorescent, (1) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	18	12	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (1) 12W Lamp	1560	0.422	0.214	659	334
2656	East Office Building	Concourse Level	East Wing Scan Point	4	18	2' Strip Cove Mounted Fluorescent, (1) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	4	16	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	3120	0.072	0.063	225	198
2657	East Office Building	Concourse Level	39E Conference Room	4	18	2' Strip Cove Mounted Fluorescent, (1) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	4	16	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	1560	0.072	0.063	113	99
2658	East Office Building	Concourse Level	Corridor/ Common Spaces	106	52	Decorative Drum Surface Mounted Fluorescent, Circline, (1) 22W/32W lamp, preheat ballast Frosted	106	16	Surface Mounted Retrofit Existing Drum with 8" LED Kit LED Light Fixture. (1) 16W	3120	5.549	1.679	17,312	5,239
2659	East Office Building	Concourse Level	Corridor/ Common Spaces	12	53	4' Strip Recessed Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Metal Louvre Diffuser	12	26	Recessed T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.639	0.309	1,994	964
2660	East Office Building	Concourse Level	Corridor/ Common Spaces	66	23	Recessed Can 8" Recessed LED Light Fixture. (1) 24W (No Diffuser)	66	23	Recessed No Retrofit. To remain as is.	3120	1.490	1.490	4,648	4,648
2661	East Office Building	Concourse Level	Corridor/ Common Spaces	14	13	Recessed Can 6" Recessed LED Light Fixture. (1) 14W (No Diffuser)	14	13	Recessed No Retrofit. To remain as is.	3120	0.184	0.184	575	575
2662	East Office Building	Concourse Level	Corridor/ Common Spaces	20	42	3' Strip Cove Mounted Fluorescent, (2) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Metal Louvre Diffuser	20	24	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (2) 12W Lamps	3120	0.830	0.475	2,591	1,483
2663	East Office Building	Concourse Level	Corridor/ Common Spaces	8	30	2' Strip Cove Mounted Fluorescent, (2) 24", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Metal Louvre Diffuser	8	16	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 2' T8 Lamp (2) 8W Lamps	3120	0.238	0.127	743	395
2664	East Office Building	Concourse Level	Corridor/ Common Spaces	16	53	4' Strip Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) (No Diffuser)	16	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.852	0.412	2,658	1,285
2665	East Office Building	Concourse Level	Corridor/ Common Spaces	8	48	Decorative Wall Sconce Wall Mounted LED Light Fixture. (1) 51W Styled/Custom Diffuser	8	48	Wall Mounted No Retrofit. To remain as is.	3120	0.384	0.384	1,197	1,197
2666	East Office Building	Concourse Level	Corridor/ Common Spaces	20	194	Recessed Can 10" Recessed Metal Halide, (1) 175W lamp (No Diffuser)	20	53	Recessed Recessed Can 8" with 10" Trim Ring LED Light Fixture. (1) 54W	3120	3.881	1.069	12,108	3,336

Line #	Facility	Area	Space	Pre Fixture Qty	Pre Watts/ Fixt	Pre Description	Post Fixture Qty	Post Watt/ Fixt	Post Description	Hours Post	Base kW	Proposed kW	Base kWh	Proposed kWh
2667	East Office Building	Concourse Level	Corridor/ Common Spaces	6	6	Fire Emergency Semi Recessed Compact Fluorescent, spiral, (1) 7W lamp Blue Glass Diffuser	6	5	Semi Recessed Install LED Screw-in PAR16 Lamp Light Emitting Diode Lamp, Screw-in, (1) 6W lamp	8760	0.038	0.032	332	284
2668	East Office Building	Concourse Level	Corridor/ Common Spaces	66	53	4' Wraparound Pendant Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	66	26	Pendant Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	3.514	1.699	10,965	5,300
2669	East Office Building	Concourse Level	Corridor/ Common Spaces	5	53	4' Wraparound Surface Mounted Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	5	26	Surface Mounted T8 LED Retrofit Lamp with External Driver LED 4' T8 Lamp (2) 13W Lamps	3120	0.266	0.129	831	402
2670	East Office Building	Concourse Level	Corridor/ Common Spaces	26	9	Universal Face Exit Sign Surface Mounted LED Light Fixture. (1) 10W (No Diffuser)	26	9	Surface Mounted Upgrade EXIT Sign LED Light Fixture. (1) 9W	8760	0.245	0.232	2,142	2,029
2671	East Office Building	Concourse Level	Fountain Atrium	18	48	Decorative Wall Sconce Wall Mounted LED Light Fixture. (1) 51W Styled/Custom Diffuser	18	48	Wall Mounted No Retrofit. To remain as is.	3120	0.863	0.863	2,694	2,694
2672	East Office Building	Concourse Level	Fountain Atrium	6	188	Cylinder Fixture Surface Mounted LED Light Fixture. (1) 200W (No Diffuser)	6	198	Surface Mounted High-Bay LED Light Fixture. (1) 200W - HIGH	3120	1.129	1.188	3,521	3,707
2673	East Office Building	Concourse Level	Fountain Atrium	4	975	Cylinder Fixture Surface Mounted Metal Halide, (1) 1000W lamp (No Diffuser)	4	198	Surface Mounted High-Bay LED Light Fixture. (1) 200W - HIGH	3120	3.899	0.792	12,164	2,471
2674	East Office Building	Stairwells	Rotunda Staircase (1st Level - P2 Parking)	33	9	Decorative Wall Sconce Wall Mounted Compact Fluorescent, twin, (1) 7W lamp Frosted	33	9	Wall Mounted No Retrofit. To remain as is.	3120	0.298	0.298	929	929
2675	East Office Building	Stairwells	Stairway 3	22	42	3' Strip Cove Mounted Fluorescent, (2) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Metal Louvre Diffuser	22	24	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (2) 12W Lamps	8760	0.913	0.523	8,001	4,579
2676	East Office Building	Stairwells	Stairway 4	14	42	3' Strip Cove Mounted Fluorescent, (2) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Metal Louvre Diffuser	14	24	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (2) 12W Lamps	8760	0.581	0.333	5,091	2,914
2677	East Office Building	Stairwells	Stairway 2	14	42	3' Strip Cove Mounted Fluorescent, (2) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Metal Louvre Diffuser	14	24	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (2) 12W Lamps	8760	0.581	0.333	5,091	2,914
2678	East Office Building	Stairwells	Stairway 1	22	42	3' Strip Cove Mounted Fluorescent, (2) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Metal Louvre Diffuser	22	24	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (2) 12W Lamps	8760	0.913	0.523	8,001	4,579
2679	East Office Building	Stairwells	Stairway 7	2	42	3' Strip Wall Mounted Fluorescent, (2) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Metal Louvre Diffuser	2	24	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (2) 12W Lamps	8760	0.083	0.048	727	416
2680	East Office Building	Stairwells	Stairway 5	26	42	3' Strip Cove Mounted Fluorescent, (2) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Metal Louvre Diffuser	26	24	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (2) 12W Lamps	8760	1.079	0.618	9,455	5,412
2681	East Office Building	Stairwells	Stairway 7	2	42	3' Strip Cove Mounted Fluorescent, (2) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Metal Louvre Diffuser	2	24	Cove Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (2) 12W Lamps	8760	0.083	0.048	727	416
2682	East Office Building	Stairwells	Stairway 7	7	42	3' Vanity Wall Mounted Fluorescent, (2) 36", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95) Prismatic Acrylic Diffuser	7	24	Wall Mounted T8 LED Retrofit Lamp with External Driver LED 3' T8 Lamp (2) 12W Lamps	8760	0.291	0.166	2,546	1,457
2683	East Office Building	Stairwells	Stairway 7	1	9	Universal Face Exit Sign Surface Mounted LED Light Fixture. (1) 10W (No Diffuser)	1	9	Surface Mounted Upgrade EXIT Sign LED Light Fixture. (1) 9W	8760	0.009	0.009	82	78
2684	Capitol Complex Campus Lighting	Exterior	Campus Lighitng	354	49	Post Top Fixture Pole Mounted LED Light Fixture. (1) 52W Flat Glass Lens	354	30	Pole Mounted Retrofit Existing Post Top with Luminaire Upgrade Kit LED Light Fixture. (1) 30W	4380	17.313	10.514	75,830	46,050

APPENDIX B

Chiller Replacement and Optimization Savings Analysis
Condenser Water Loop Upgrade to Variable Volume Savings Analysis

True Optimization® Starts Here

Engineering Site Analysis
OptimumLOOP™

Pennsylvania Capitol Complex
Harrisburg, PA

4/23/2018

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EXECUTIVE SUMMARY

The Optimum Energy (Optimum) engineering team recently conducted an Engineering Site Analysis (ESA) of the PA capitol central chilled water plant, located in Harrisburg, PA for the purpose of implementing an intelligent energy solution uniquely suited to meeting Pennsylvania Capitol's objectives for the chiller plant optimization project. The benefits of chiller plant optimization include lowering energy consumption, reducing chiller plant operating and maintenance costs, and exceeding Pennsylvania Capitol's corporate energy and sustainability goals.

Optimum proposes to convert the chiller plant at The PA capitol central chilled water plant and implement a chiller plant optimization solution powered by OptimumLOOP™. This retrofit, and optimization is projected to improve the chiller plant's efficiency from 0.726 kW/ton to 0.503 kW/ton. The resulting savings are shown in Table 1. and Figure 1 shows the current chiller plant efficiency and the projected efficiency with all recommended retrofits and OptimumLOOP installed.

Table 1: Optimization Utility Savings

OPTIMIZATION UTILITY SAVINGS	
Electrical Energy Savings	3,679,569 kWh/year
Electrical Demand Reduction	191 kW
Cooling Tower Water Savings	1,432,647 gal/year
CO_2 Emission Reduction	5,946,615 lbs/year
Utility Cost Savings	$301,558 / year

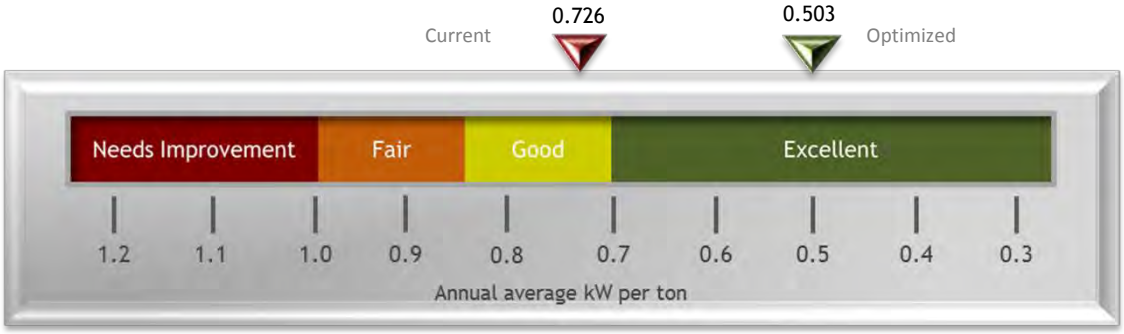

Figure 1: Chiller plant efficiency scale: current The PA capitol central chilled water plant chiller plant efficiency vs. optimized chiller plant efficiency

The retrofits Proposes include:

- Demolish and remove the following chiller:
  - CH3 – 2500-Ton OM York Chiller
  - CH4 – 1250-Ton Trane Chiller
- Install three (3) new variable speed 1200-ton Smardt Chillers.
- Install modulating valves to the evaporator and condenser for all new and existing chillers.
- Install chilled water flow meters for all new and existing chillers.
- Replace two (2) 4160 V motors on the condenser pumps to 460V.
- Install three (3) VSDs on the condenser water pumps.
- Install power meters on the chilled water pumps.
- Install differential pressure sensor at the chilled water entrance to the Keystone building.

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- Implement Optimum Energy's software and control platform "OptimumLOOP".

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SECTION 1: ESA OVERVIEW

Thank you for choosing Optimum as your partner and subject matter expert in chiller plant efficiency. Optimum is committed to using integrated software and cloud computing technology to optimize The PA capitol central chilled water plant to deliver sustained energy reductions automatically and continuously. Optimum stands ready to design an optimization solution that is engineered to meet Pennsylvania Capitol's specific efficiency requirements and goals, year after year.

THE ESA PROCESS

The ESA conducted at The PA capitol central chilled water plant consisted of five core steps from initial data collection through presentation of the results found in the ESA Report (see Figure 2). Throughout the process, Optimum engineering experts used leading-edge software algorithms and modeling techniques to model chiller plant operation and conduct a comparative predictive analysis. Optimum's engineering team used this comprehensive dataset to compare the chiller plant's operations against the Optimum database of aggregate operating analytics to determine how best to optimize the facility's chiller plant.

ESA REPORT

The ESA Report provides Pennsylvania Capitol with the expected utility cost savings for the facility, any mechanical upgrades that may be required, and the information needed to implement the Optimum solution seamlessly, including the framework to deliver Real-Time Dynamic Commissioning (TM) (RTDC).

Figure 2: ESA core steps.

The completed ESA Report contains the following:

- Chiller Plant Analysis and Assumptions: A summary description of the facility and current chiller plant, including chiller plant equipment, an analysis of current chiller plant operations, and a variety of trend analysis graphs and charts.
- Scope of Work: A description of mechanical, electrical, and control upgrades required to implement the Optimum optimization solution, as well as a list of owner responsibilities. Section 3 "Pennsylvania Capitol Project Scope of Work" is intended to aid Pennsylvania Capitol in soliciting bids from contractors for implementing the OptimumLOOP solution for The PA capitol central chilled water plant.
- Controls Diagrams: Schematic drawing of the chiller plant piping layout, equipment, and significant sensors.

OPTIMUM ESA FOR PENNSYLVANIA CAPITOL

Pennsylvania Capitol purchased an Optimum ESA for The PA capitol central chilled water plant to gain a deeper understanding of their chiller plant operation and performance, the issues that impact energy and financial savings, and how to correct those issues so that the chiller plant can operate at optimum efficiency. The benefits of implementing OptimumLOOP include:

- Streamlining facility operations
- Improving chiller plant efficiency
- Improving occupant comfort
- Cutting energy consumption
- Lowering carbon emissions
- Meeting social responsibility and environmental sustainability goals
- Meeting regulatory requirements of the State of PA
- Understanding the operational issues currently impacting energy and financial savings goals
- Developing an optimization project plan and budget

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THE OPTIMUM SOLUTION

As experts in delivering integrated software and cloud computing services for optimizing facilities-based mechanical systems, the Optimum team is prepared to design a solution uniquely suited to delivering the sustained energy-reduction goals Pennsylvania Capitol wishes to achieve.

Optimum's holistic optimization platform design delivers continuous RTDC year after year with minimum effort. Because operating chiller plant components at variable speeds instead of fixed speeds can deliver significant energy savings, Optimum deploys the optimization software within the chiller plant via a networked application that acts as a gateway between the BAS and the cloud-based management platform. This holistic approach to chiller plant optimization lays the framework for keeping the chiller plant operating at maximum efficiency.

The chiller plant optimization platform comprises two software applications that work together to deliver Real-Time Dynamic Commissioning:

OptimumLOOP is patented, state-of-the-art configurable software that provides continuous, system-level optimization of centrifugal chiller plants. Its relational control algorithms automatically calculate the most efficient operation of the chilled water system to minimize total system kW/ton.

The OptiCx™ platform is a cloud-based offering that integrates operational modules, machine learning, web, and mobile applications as well as Optimum's world-class support services. The OptiCx platform provides customizable views of chiller plant operations, key performance indicators (KPIs) for chiller plant operational efficiency and alarming, and acts as a continuous feedback loop to provide operators with detailed real-time and historical performance data. The data and accompanying analytics allow operators to quickly detect, diagnose, and resolve HVAC system faults as they occur. With information from OptiCx platform web and mobile apps, energy engineers, efficiency managers, facilities management, and facility operators can manage to best-in-class KPIs and prevent system performance degradation, helping to ensure sustainable long-term savings.

NEXT STEPS

To begin the implementation phase of the optimization project for The PA capitol central chilled water plant, Optimum has prepared the final optimization project proposal, which includes Optimum's Statements of Work, pricing, contract terms, and licensing agreements. Once the contract is finalized, Optimum can begin implementation.

Optimum's straightforward implementation process has proven successful on multiple projects similar to the one proposed for The PA capitol central chilled water plant. Throughout this final phase, Optimum works closely with mechanical, electrical, and controls contractors to ensure that installation, integration, testing, and commissioning are consistent with Pennsylvania Capitol policies and practices. Once all mechanical, electrical, and controls work have been completed and the OptimumLOOP application is installed and integrated, Optimum will conduct intensive testing to ensure proper operation. After functional testing is completed, Optimum will provide training and remain an on-going part of the optimization support team for the life of the installation.

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SECTION 2: THE PA CAPITOL CENTRAL CHILLED WATER PLANT

FACILITY DESCRIPTION

The PA capitol central chilled water plant□ is a distributed cooling system that serves various government buildings throughout the capitol complex. The facility loads require cooling year-round from the central plant.

Optimum generated the information in this analysis by reviewing facility utility data, on-site monitoring, TMY3 weather data, spot readings, spreadsheet simulations, and accepted engineering calculations.

CHILLER PLANT DESCRIPTION

The existing PA capitol central chilled water plant consists of the following operational equipment:

- Four (4) centrifugal chillers: Two (2) 2500-ton variable speed York chillers, One (1) 2500-ton constant speed York chiller, and one (1) 1250-ton constant speed Trane chiller.
- Three (3) variable speed chilled water primary pumps: 288 hp at 3330 gpm design flow.
- Three (3) constant speed condenser water pumps: 200 hp at 7410 gpm design flow.
- Three (3) variable speed cooling towers: 150 hp fans and 7410 gpm design flow per cell.
- JCI Metasys Building Automation System (BAS)

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8760 ANALYSIS OVERVIEW

The 8760 report is an hourly simulation of the chiller plant's performance against existing weather data and load profile for a full year. As part of the ESA, Optimum simulated the chiller plant's energy use using the full report. Table 3 provides a summary of the simulation on a monthly basis as well as the totals based on TMY3 weather data from the Harrisburg Capitol City Airport weather station. This compares the existing chiller plant operation versus how the chiller plant will operate with the mechanical upgrades and optimization and the total projected energy and cost savings on an annual basis.

Table 3 savings summary below is based on the implementation of the base scope of work detailed in Section 3 (ECMs 2B, 3A, 3B, & 3C as identified within TEN's full Investment Grade Audit report).

Table 2: 8760 Report Summary (ECMs 2B, 3A, 3B, 3C)

PA Capitol Optimization - Savings Summary by Month - ECMs (2B, 3A, 3B, & 3C)

	Existing CWP Plant				Upgraded and Optimized CWP Plant				L&I Chiller Plant (New CH & Pump)		
Month	Ton-Hours	Plant kWh	Plant kW/ton	Water Gallons	Ton-Hours	Plant kWh	Plant kW/ton	Water Gallons	Ton-Hours	Plant kWh	Plant kW/ton
January	383,375	337,858	0.881	810,629	383,375	123,288	0.322	715,184	0	0	0.000
February	623,279	416,089	0.668	1,265,093	623,279	200,990	0.322	1,163,052	0	0	0.000
March	755,757	499,205	0.661	1,528,611	755,757	253,767	0.336	1,414,765	0	0	0.000
April	1,198,314	789,901	0.659	2,400,437	1,198,314	527,736	0.440	2,297,834	0	0	0.000
May	1,434,299	905,775	0.632	2,853,988	1,434,299	645,142	0.450	2,755,680	0	0	0.000
June	2,192,046	1,548,621	0.706	4,411,194	2,192,046	1,260,959	0.575	4,332,065	0	0	0.000
July	2,721,555	2,194,288	0.806	5,605,663	2,721,555	1,705,977	0.627	5,440,419	0	0	0.000
August	2,513,955	2,154,261	0.857	5,239,195	2,513,955	1,522,509	0.606	5,001,907	0	0	0.000
September	1,905,305	1,333,743	0.700	3,833,988	1,905,305	1,011,809	0.531	3,728,398	0	0	0.000
October	1,263,689	816,740	0.646	2,527,285	1,263,689	548,386	0.434	2,419,379	0	0	0.000
November	847,400	539,247	0.636	1,702,213	847,400	293,740	0.347	1,590,240	0	0	0.000
December	668,903	452,216	0.676	1,360,736	668,903	214,072	0.320	1,247,462	0	0	0.000
Total	16,507,877	11,987,944	0.726	33,539,033	16,507,877	8,308,375	0.503	32,106,385	0	0	0.000

* Energy costs calculated at $0.075546/kWh blended and $9.46 per kgal of tower make-up water water, and $7 per kgal of tower make-up for chemical treatment.

* Savings is based on 100% of time operating within "LOOP MODE" for Post scenario with all equipment available for control (except for 12 days of shutdown in January)

Table 3: 8760 Savings Summary (ECMs 2B, 3A, 3B, 3C)

	Savings of ECMs (2B, 3A, 3B, & 3C)					
Month	Ton-Hours Saved	kWh saved	Water Saved	Electric Cost Saved	Water Cost Saved	Total Cost Saved
January	0	214,570	95,445	$16,210	$1,571	$17,781
February	0	215,099	102,040	$16,250	$1,680	$17,929
March	0	245,438	113,846	$18,542	$1,874	$20,416
April	0	262,165	102,603	$19,806	$1,689	$21,494
May	0	260,633	98,308	$19,690	$1,618	$21,308
June	0	287,662	79,129	$21,732	$1,302	$23,034
July	0	488,311	165,245	$36,890	$2,720	$39,610
August	0	631,752	237,287	$47,726	$3,906	$51,632
September	0	321,935	105,590	$24,321	$1,738	$26,059
October	0	268,354	107,906	$20,273	$1,776	$22,049
November	0	245,507	111,973	$18,547	$1,843	$20,390
December	0	238,144	113,274	$17,991	$1,864	$19,855
Total	0	3,679,569	1,432,647	$277,977	$23,581	$301,558

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Figure 3 shows a side by side comparison of the simulated energy consumption of the central plant (cooling system only) based on TYM3 weather data and the measured utility energy consumption of the entire central plant from July 2016 through June 2017. Discrepancies between the billed consumption and the simulated consumption will exist and can be attributed to differences in the weather profile and non-cooling system equipment in the central plant (for example heating hot water pumps, lighting, AHU fan energy, etc.)

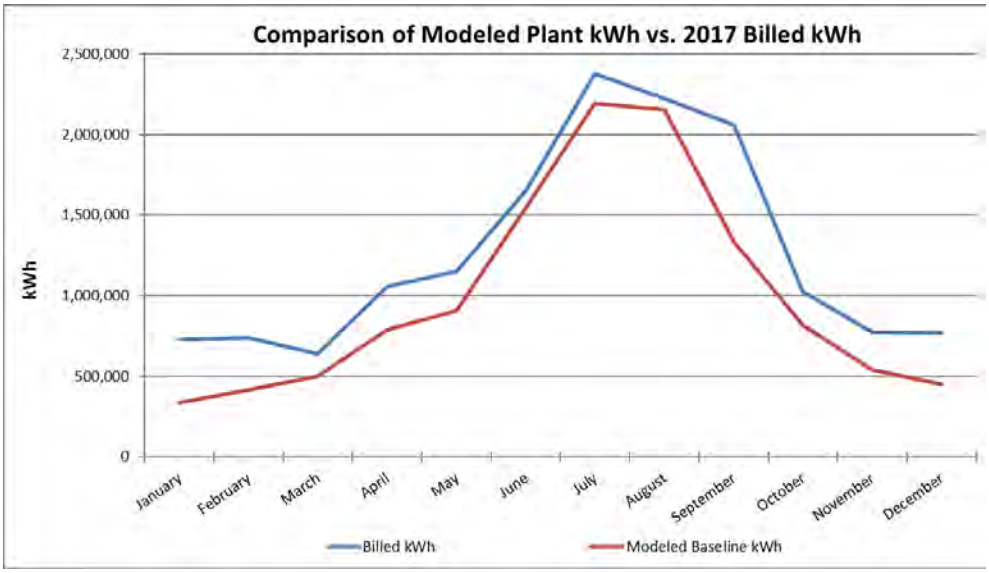

Figure 3: Monthly energy consumption comparison (simulation and utility bills)

Figure 4 shows a side by side comparison of the TYM3 average dry bulb weather by month used for the 8760 simulation and the measured average dry bulb weather by month provided by the utility. The 2016 – 2017 weather data is for reference only and not used as part of the plant energy simulation.

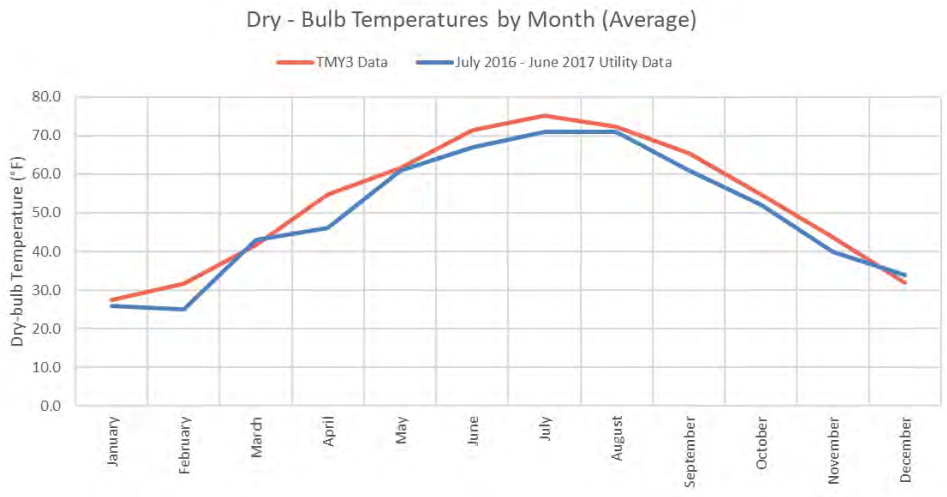

Figure 4: Monthly average weather dry bulb temperature comparison (simulation and utility bills)

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LOAD PROFILE

The following figures shows the estimated occupied hours and unoccupied hours plant tonnage versus outside wet bulb temperature (OAWB). The outside air temperatures within the simulation are based on TYM3 weather data for Harrisburg Capitol City Airport generated from Bin Pro software.

The loads are based on chiller logs provided by the site. Occupied hours of operation are based 6AM through 6PM Monday through Friday. All other hours are unoccupied. The simulated loads are calculated for each hour of the 8760 analysis by the curve fits below and the occupied and unoccupied periods.

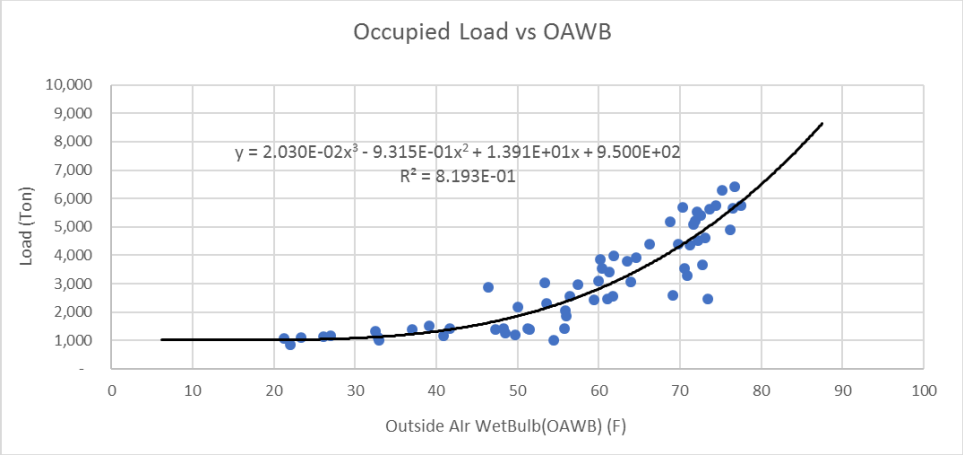

Figure 5: Estimated occupied tonnage based on outside air wet bulb temperature

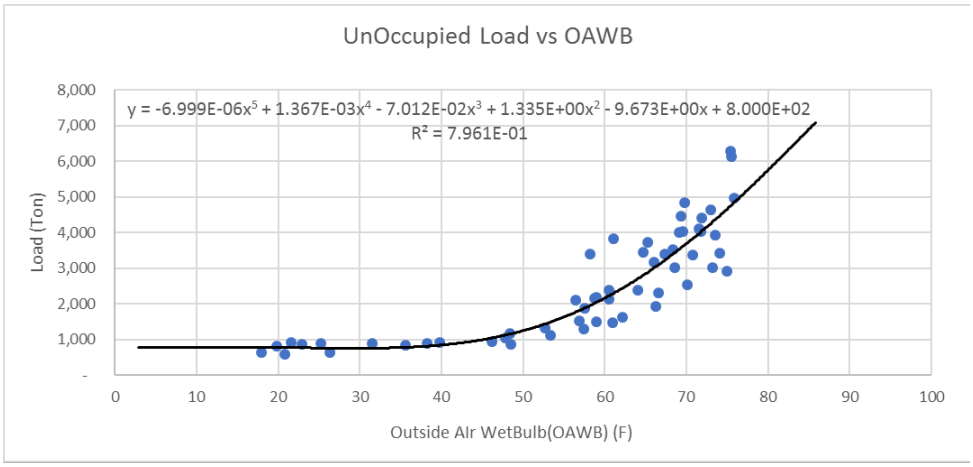

Figure 6: Estimated unoccupied tonnage based on outside air wet bulb temperature

The following figures shows the estimated occupied hours and unoccupied hours plant tonnage versus outside dry bulb temperature (OADB). These load profiles are show for reference only and not utilized in the analysis since the curve fits showed less correlation as compared to the wet bulb trend analysis.

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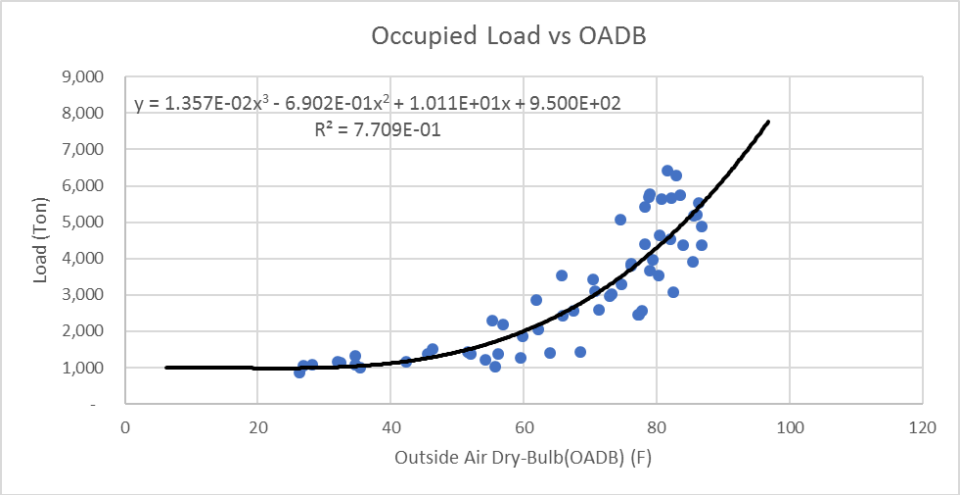

Figure 7 Estimated occupied tonnage based on outside air dry bulb temperature

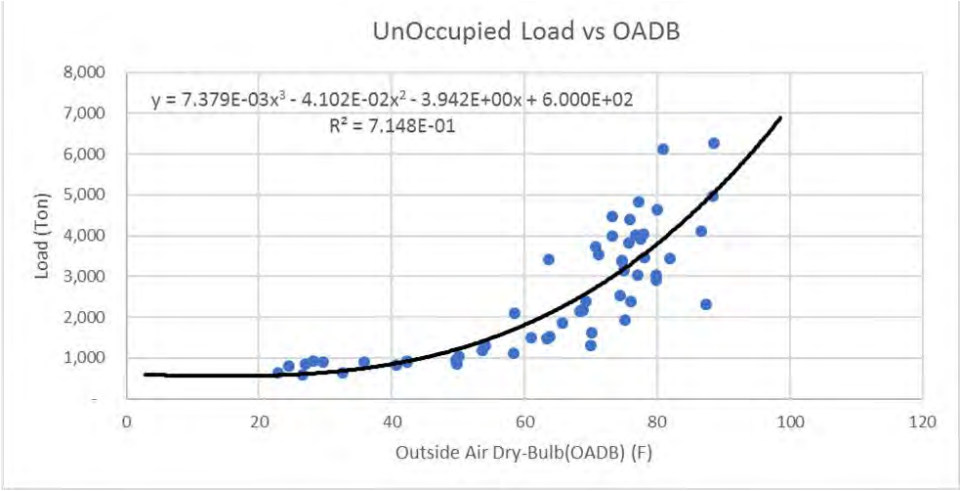

Figure 8 Estimated unoccupied tonnage based on outside air dry bulb temperature

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DELTA T

Figure 9 shows the difference between the central plant chilled water supply and return temperature as the % of plant total load varies. The data set is based on chiller logs provided by the site for the entering and leaving temperatures to the chillers. The chilled water DT shows a distinct decreasing correlation as loads and outside air temperatures increase.

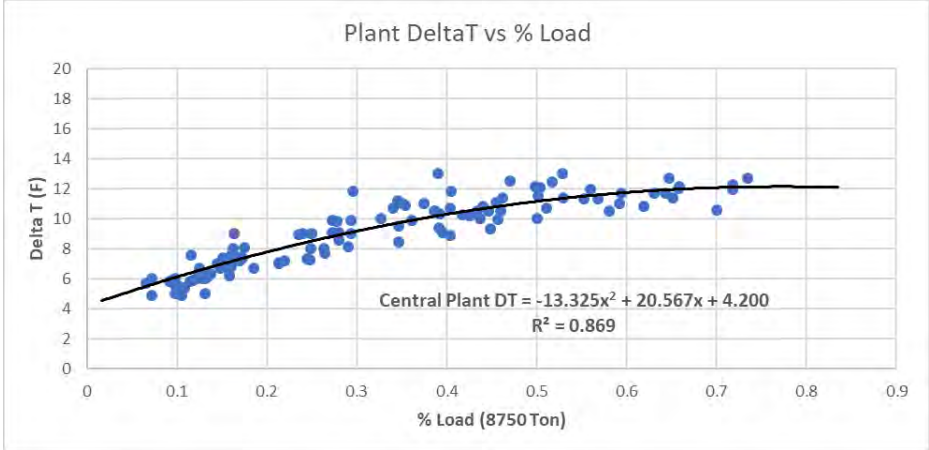

Figure 9 Difference between the chilled water return and chilled water supply temperature versus %Load (actual ton/8750 ton)

Figure 10 shows the same central plant chilled water difference (DT) as compared to the measured campus DT as the % of plant total load varies. The data set for both the campus DT and central plant DT is based on chiller logs provided by the site. The major distinction between the two DT curves highlights a flow discrepancy between the chillers and the water leaving the plant on the main distribution piping to the campus. This discrepancy can be attributed to the flow bypassing from supply to return within the central plant which was identified as the existing bearing cooling circuit flow path. Once the bypass flow is eliminated, the higher DT can be expected to account for a proportional reduction in chilled water flow required by the central plant chilled water pumps in the post analysis.

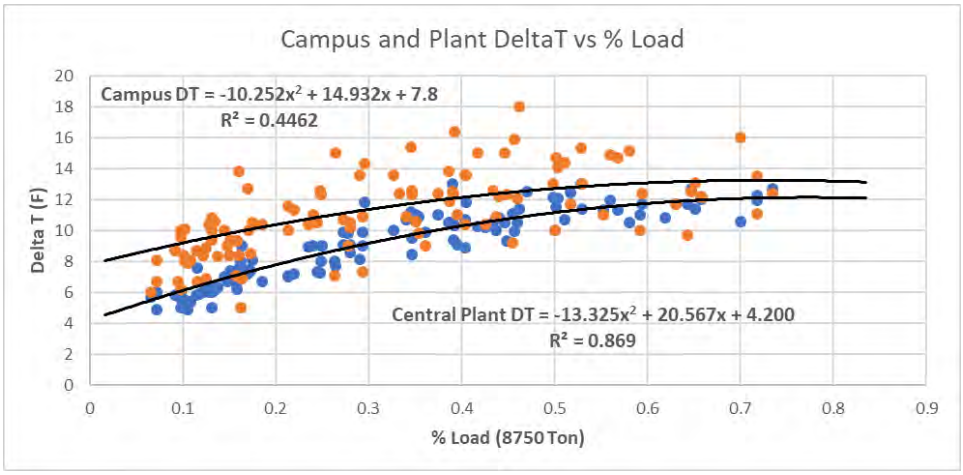

Figure 10 Difference between the chilled water return and chilled water supply temperature versus %Load for both the central plant Delta T and campus Delta T (actual ton/8750 ton)

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CHILLER CURVES

Figures 11 and 12 below shows chiller curves for the three (3) existing chillers: two (2) 2500-Ton York YK and one (1) 2500-Ton York OM. The curves represent the efficiency of the chiller at a different entering condensing water and constant 42 F chilled water supply temperature. The manufacturer's performance data was utilized through a regression analysis based on lift and % loading conditions to establish the following performance curves.

Figure 11. YK York Chiller kW/ton based on the chiller load with different condensing entering water.

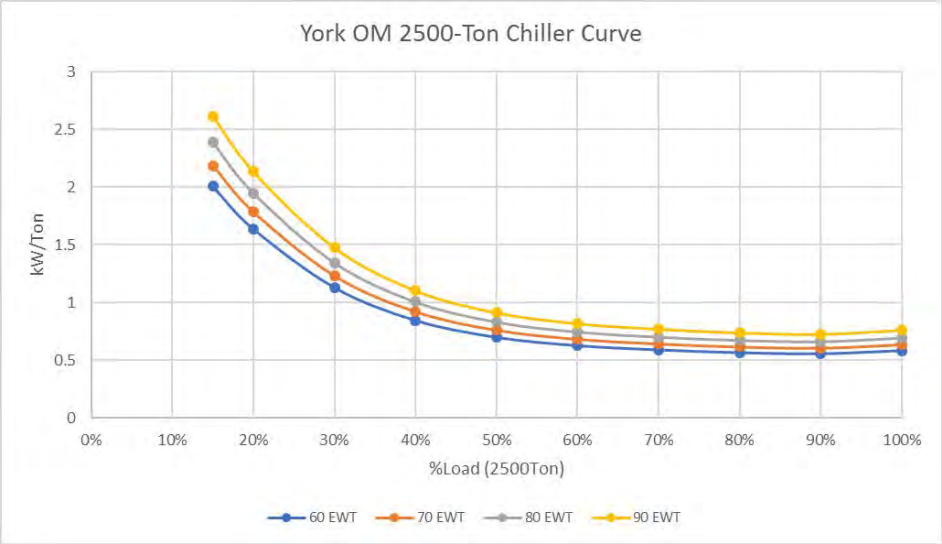

Figure 12 OM York Chiller kW/ton based on the chiller load with different condensing entering water.

Figures 13 below shows chiller curves for the three (3) new chillers: 1200-Ton Smardt Chillers. Each curve represents the efficiency of the chiller at a different entering condensing water and constant 42 F chilled water supply temperature. The manufacturer's performance data was utilized through a regression analysis based on lift and % loading conditions to establish the following performance curves.

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Figure 13 Smardt Chiller kW/ton based on the chiller load with different condensing entering water.

CHILLER PLANT SEQUENCING

The baseline model simulated equipment sequencing based on interview of the facility staff data obtained from the chiller operating logs. Existing operations manually sequence chillers on and off as needed to meet the capitol complex loads. The Following sequences were utilized to simulate equipment staging.

Fall through Spring Chiller Sequencing:

For all outside air conditions from September 4th through July 15th and for outside air conditions when the dry bulb is below 75°F and the wet bulb is below 63.5°F from July 15th through September 4th, the 2500-ton York YK chillers are the lead chillers and the York OM chiller (CH3) is the stage 3 lag machine. Under these conditions staging between equipment is simulated based on load as follows:

Loads	Chillers	Condenser Water Pumps	Cooling Towers	Chilled Water Pumps
Winter Shutdown (0 Tons)	0 Chillers	0 pumps	0 Tower Cells	1 Pump @ 100% Speed
0 – 2125 Tons (up to 85% CH load)	1 – 2500-ton York YK	1 Pump	3 Tower Cells	1 or 2 Pumps to meet flow
2125 - 4500 Tons (up to 90% CH load)	2 – 2500-ton York YK	2 Pump	3 Tower Cells	2 or 3 Pumps to meet flow
Above 4500 Tons	2 – 2500-ton York YK 1 – 2500-ton York OM	3 Pump	3 Tower Cells	3 Pumps to meet flow

Summer Chiller Sequencing:

For outside air conditions when the dry bulb above 75°F or the wet bulb is above 63.5°F from July 15th through September 4th, the 2500-ton York OM chiller (CH3) is the lead chiller with the York YK chillers as the stage 2 and stage 3 lag machines. This simulation results in 1360 hours of CH3 operation. Under these conditions staging between equipment is simulated based on load as follows:

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Loads	Chillers	Condenser Water Pumps	Cooling Towers	Chilled Water Pumps
0 – 2375 Tons (up to 95% CH load)	1 – 2500-ton York OM	1 Pump	3 Tower Cells	1 or 2 Pumps to meet flow
2375 - 4750 Tons (up to 95% CH load)	1 – 2500-ton York OM 1 – 2500-ton York YK	2 Pump	3 Tower Cells	2 or 3 Pumps to meet flow
Above 4750 Tons	1 – 2500-ton York OM 2 – 2500-ton York YK	3 Pump	3 Tower Cells	3 Pumps to meet flow

Simulation set points associated with the baseline simulation are as follows:

- The cooling tower temperature set point is 65°F year round
- Chillers chilled water temperature set point is 42°F year round
- Chilled water pumps are simulated to meet flow requirement but not less than 40 PSI chilled water differential pressure set point.

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CHILLER PLANT EFFICIENCY SIMULATION RESULTS

Figure 14 shows a monthly view of the The PA capitol central chilled water plant chiller plant pre-retrofit and post-retrofit efficiency and the average outside air temperature for each month.

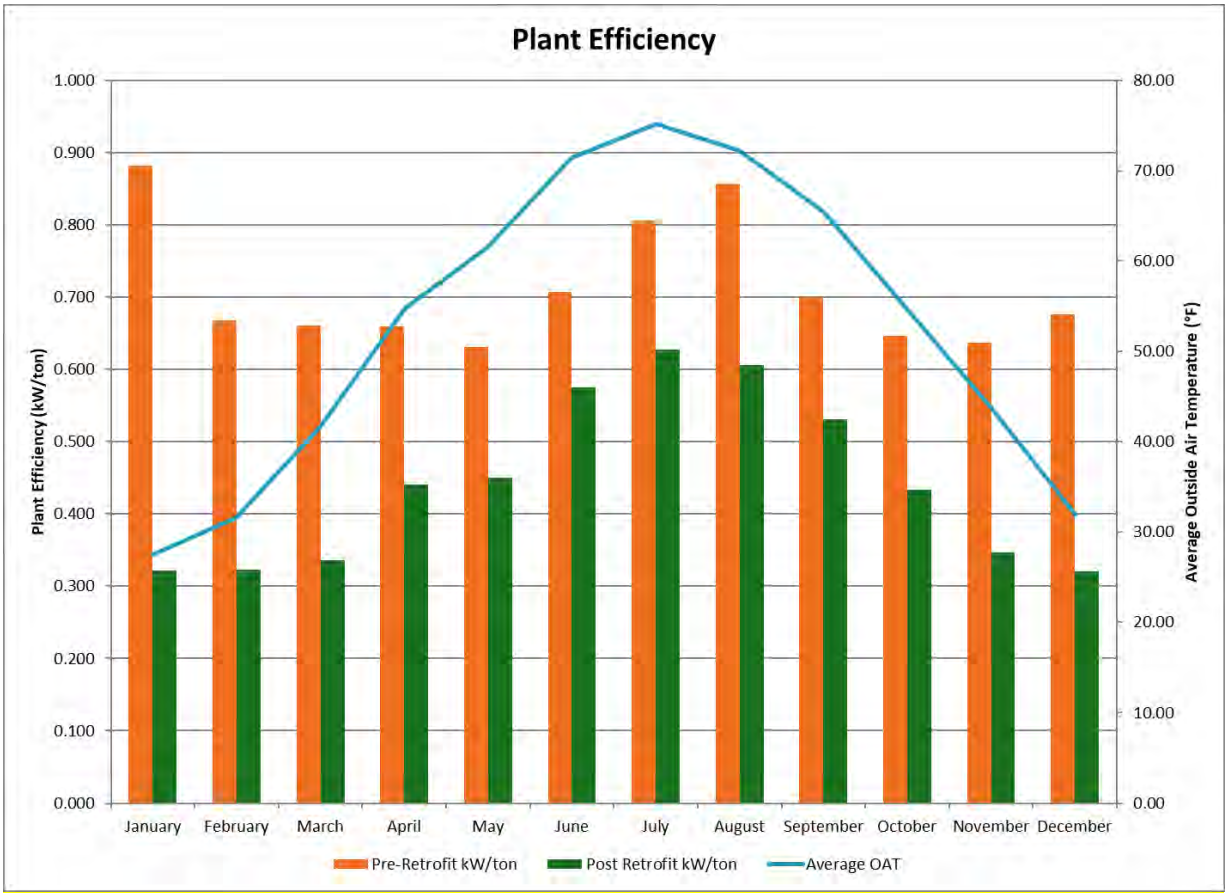

Figure 14: Average chiller plant kW/ton per month and average monthly outside air temperature

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MONTHLY COST SIMULATION RESULTS

Figure 15 shows the monthly pre-retrofit and post-retrofit utility cost for operating the chiller plant.

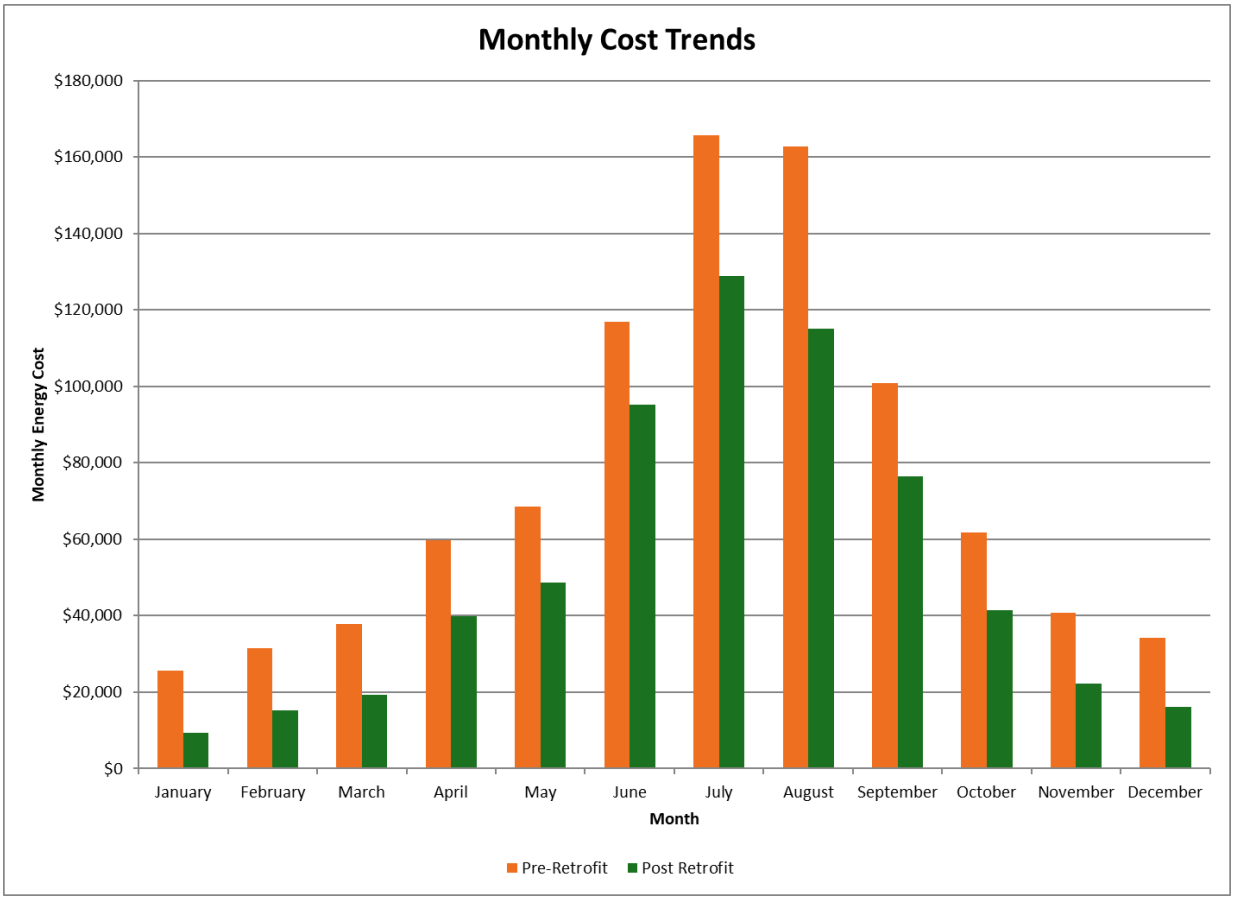

Figure 15: Monthly chiller plant utility cost, pre-retrofit and post-retrofit

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CO_2 EMISSION PRE-RETROFIT AND POST-RETROFIT PERFORMANCE SIMULATION RESULTS

Figure 16 shows the monthly pre-retrofit and post-retrofit carbon dioxide emissions generated by operating the chiller plant.

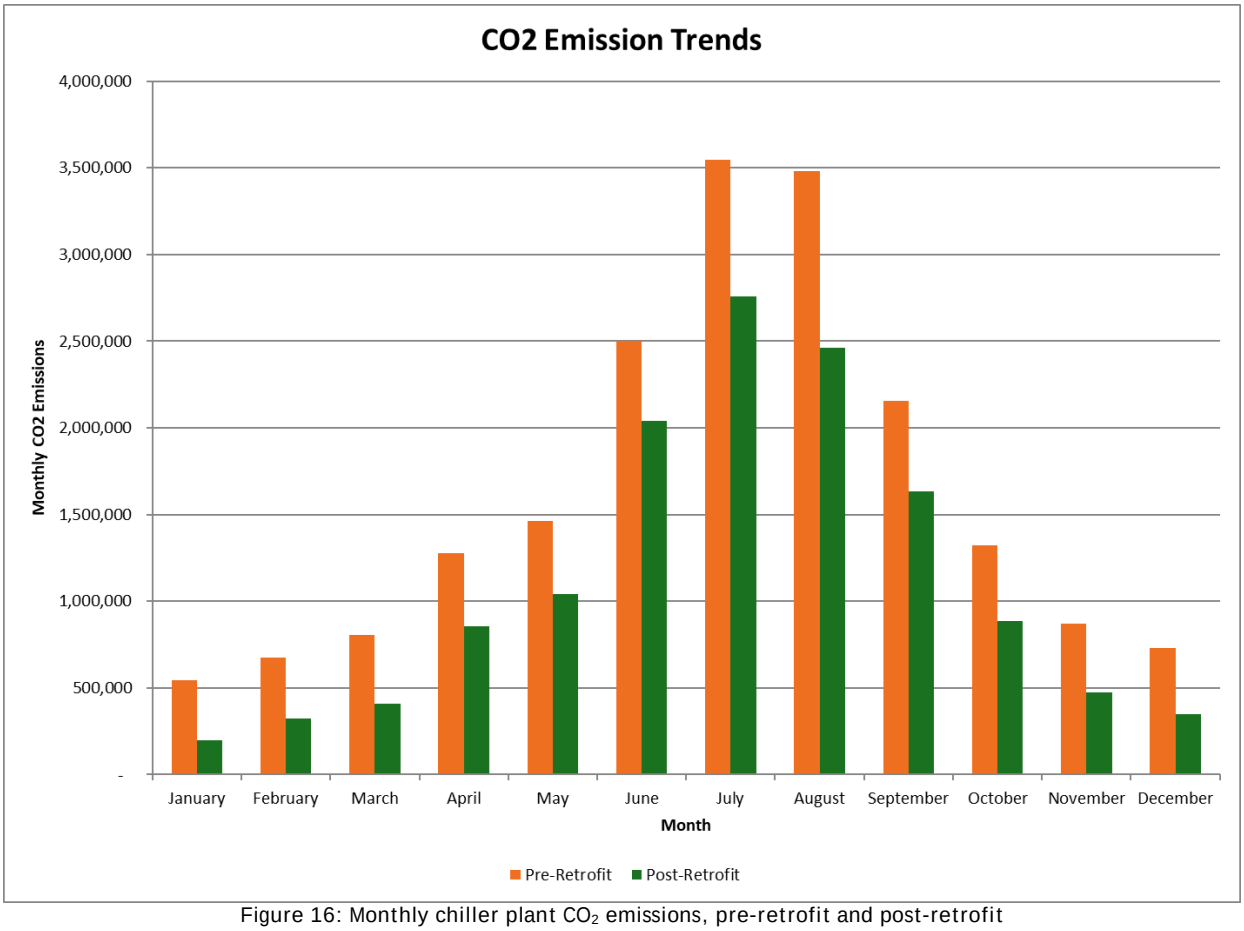

Figure 16: Monthly chiller plant CO_2 emissions, pre-retrofit and post-retrofit

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SECTION 3: THE PA CAPITOL CENTRAL CHILLED WATER PLANT PROJECT SCOPE OF WORK

MECHANICAL SCOPE OF WORK

The mechanical contractor is responsible for coordination of all work with the owner to ensure no disruption in chilled water production at the site. All work shall be closely coordinated with the engineer of record, project managers, central plant staff, and owner to complete all major work while plant is operating.

1. Install three (3) new 1200-ton Smardt chillers and all associated chilled water and condenser water piping connections. Provide rigging, support pads, coordination, and field required insulation associated with the machines and piping. Provide support during startup of the new machines as necessary for repair work as required by the chiller manufacturer. Installation details and requirements provided by engineer of record.

2. Flow Meter for York Chillers: Install total of four (4) new flow meter via hot tap, one (1) new Onicon F-3500 series insertion-type electromagnetic flow meter in the chilled water line and one (1) new Onicon F-3500 series insertion-type electromagnetic flow meter for each existing York chiller and. Flow meters to be installed per the manufacturer's specification meeting minimum straight pipe run requirements. Flow meters furnished by controls contractor and approved by Optimum Energy.

3. Flow Meter for Smardt Chillers: Install total of six (6) new flow meters via hot tap, one (1) new Onicon F-3500 series insertion-type electromagnetic flow meter in the chilled water line and one (1) new Onicon F-3500 series insertion-type electromagnetic flow meter in the condenser water line of each new Smardt chiller. Flow meter to be installed per the manufacturer's specification meeting minimum straight pipe run requirements. Flow meters furnished by controls contractor and approved by Optimum Energy. Where new piping installation prevents adequate straight piping run for new chiller installation, substitute Onicon F-3500 meter with Onicon F-3200 series inline electro-magnetic flow meter. Onicon F-3200 inline meter requires 5 diameters of straight piping for accurate flow reading in lieu of 15 diameters for F-3500 model.

4. Evaporator and Condenser Isolation Valve Actuators for York Chillers: Replace total of four (4) existing isolation valve actuators with new fully modulating (0-100%) control actuators. Actuators supplied by controls contractor and approved by Optimum Energy. Reuse existing line size butterfly valves where applicable. Please refer to Appendix 2: OptimumLOOP Controls Diagram for proposed device locations:
    a. CH1CHWRVLV
    b. CH1CDWRVLV
    c. CH2CHWRVLV
    d. CH2CDWRVLV

5. Evaporator and Condenser Isolation Valve Actuators for the Smardt Chillers: Install total of six (6) automatic isolation valves with new fully modulating (0-100%) control actuators. Automatic isolation valves and actuators supplied by controls contractor and approved by Optimum Energy. Please refer to Appendix 2: OptimumLOOP Controls Diagram for proposed device locations:
    a. CH3CHWVLV
    b. CH3CDWVLV
    c. CH4CHWVLV
    d. CH4CDWVLV
    e. CH5CHWVLV
    f. CH5CDWVLV

6. Bearing Cooling Circuit: Eliminate bearing cooling circuit from the chilled water system and provide dedicated condenser water circulation pump and plate and frame heat exchanger to cool existing

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pump bearing circuit. Install new piping connecting to the existing condenser water system and new plate and frame heat exchanger and new inline circulation pump (estimated less than 1HP).

Alternate Bearing Cooling Circuit scope: Remove existing 3-Way chilled water valve and install new smaller 2-way valve and balance chilled water flow through bearing cooling circuit heat exchanger to the appropriate flow and temperature required for bearing cooling.

7. Flash Tank Cooling Circuit: Decommission the chilled water connection to the hot water heat exchanger flash tank condenser. Re-pipe high pressure steam condensate to NRG utility condensate return line or pipe high pressure condensate to into the condenser water system in lieu of dumping to drain. Eliminate the flash tank and demolish existing chilled water piping and controls associated with flash tank cooling circuit.

8. Main Campus Flow Meter: Install one (1) new flow meter via hot tap, one (1) new Onicon F-3500 series insertion-type electromagnetic flow meter(s) in the chilled water supply piping within the piping tunnel leaving the central plant. Flow meter to be installed per the manufacturer's specification meeting minimum straight pipe run requirements. Flow meter to be furnished by controls contractor and approved by Optimum Energy.

9. Flow Meter in Keystone Building: Install one (1) new flow meter via hot tap, one (1) new Onicon F-3500 series insertion-type electromagnetic flow meter(s) in the supply line to the Keystone building. Flow meter to be installed per the manufacturer's specification meeting minimum straight pipe run requirements. Flow meter to be furnished by controls contractor

10. Differential Pressure Sensors on pump headers: Install two (2) new differential pressure sensors for pumping header differential pressure measurement. One (1) DP sensor for the existing chilled water pump header connected from pump discharge to pump suction. One (1) DP sensor for the existing condenser water pump header connected from the pump discharge to the condenser water sump. DP sensors shall be furnished by controls contractor. Differential pressure sensor to be installed per the manufacturer's installation instructions. Install DP sensor taps on the pump headers (not connected to any one specific pump discharge piping. Taps shall be located on the side or the top of the piping to avoid sediment from clogging ports. Provide tubing, shut-off valves, mounting hardware, etc. as required for fully functional system. Coordinate exact DP locations with owner and Optimum Energy.

11. Differential Pressure Sensor in Health & Welfare Building: Install via hot tap (as necessary) one (1) new differential pressure sensor on the chilled water building loop that supplies the heat exchanger in the Health & Welfare building. Sensors shall be installed on the cold side (central plant side) of the heat exchanger and control valve. DP sensors shall be furnished by controls contractor. Differential pressure sensor to be installed per the manufacturer's installation instructions. Install DP sensor taps on the plant side of the heat exchanger, at least 10 ft away from the valve between the supply and return piping. Taps shall be located on the side or the top of the piping to avoid sediment from clogging ports. Provide tubing, shut-off valves, mounting hardware, etc. as required for fully functional system ideally located within the Health and Welfare mechanical room. Coordinate exact DP locations with owner and Optimum Energy.

12. Properly insulate all piping changes (from flow meter hot tap, etc.).

13. Properly remove and dispose of all demolition.

14. Provide all documentation and manuals for installed equipment.

15. Provide one (1)-year parts and labor warranty for installed equipment.

16. Provide all necessary permits to complete the scope.

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ELECTRICAL SCOPE OF WORK

The electrical contractor is responsible for coordination of all work with the owner to ensure no disruption in chilled water production at the site. All work shall be closely coordinated with the engineer of record, project managers, central plant staff, and owner to complete all major work while plant is operating.

1. The electrical contractor is responsible for all electrical 110 V and higher. The controls contractor is responsible for all low-voltage electrical (less than 110 V).

2. Installation of New Optimum Hardware: Install, mount, and provide 110 V power for one (1) OptiCx on premise software module to be supplied by Optimum in one (1) enclosure. The enclosure dimensions are: width, 12.5”; depth, 6.5”; and height, 24.5”. Work with controls contractor to locate unit near central plant controller. Install OptiCx on premise software module in the vicinity of main BAS control panels.

3. Smardt Chiller Power: Provide power for three new 1200-ton VS Smardt chillers. Install conduit and conductors and all electric breakers and disconnects required for new machines. Electrical installation details provided by engineer of record. Harmonic filters for each chiller provided by Smardt installed by electrical contractor.
    a. Chiller 5: 1200-ton, 460V-3PH, 1029 MCA, 1346 MOCP.
    b. Chiller 6: 1200-ton, 460V-3PH, 1029 MCA, 1346 MOCP.
    c. Chiller 7: 1200-ton, 460V-3PH, 1029 MCA, 1346 MOCP.

4. Smardt Chiller Power Meters: Install three (3) new correctly sized 460 V three phase real kW meters. Veris E50 series meter is an example of an acceptable power meter. The power meters to be purchased with network capabilities to Metasys control system. Work with JCI to connect power meters to the central plant BAS. Power meters furnished by controls contractor and approved by Optimum Energy.
    a. Chiller 5: 1200-ton, 460V-3PH, 687.5 kW
    b. Chiller 6: 1200-ton, 460V-3PH, 687.5 kW
    c. Chiller 7: 1200-ton, 460V-3PH, 687.5 kW

5. Evaporator and Condenser Isolation Valve Actuators for the York Chillers: Provide power to total of four (4) new analog DDC actuators on the evaporator and condenser of the two (2) existing York chillers. Actuators furnished by controls contractor and installed by mechanical contractor.
    a. CH1CHWRVLV
    b. CH1CDWRVLV
    c. CH2CHWRVLV
    d. CH2CDWRVLV

6. Evaporator and Condenser Isolation Valve Actuators for the Smardt Chillers: Provide power to total of six (6) new analog DDC actuators on the evaporator and condenser of the three (3) new Smardt chillers. Actuators furnished by controls contractor and installed by mechanical contractor.
    a. CH3CHWVLV
    b. CH3CDWVLV
    c. CH4CHWVLV
    d. CH4CDWVLV
    e. CH5CHWVLV
    f. CH5CDWVLV

7. Condenser Pumps Motor: Replace the 4180V motors of the three (3) condenser water pumps with 480V-3PH motors.
    a. CDWP1: 200 HP, 4160 V, 3-phase
    b. CDWP2: 200 HP, 4160 V, 3-phase

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c. CDWP3: 200 HP, 4160 V, 3-phase

8. Condenser Pump VFD: Furnish, install, and startup three (3) new 480V VFDs for the condenser water pump motors listed below. All VFDs are to be provided enclosures appropriate for its location and network cards for communication with the BAS. VFDs shall be located within the chiller plant in place of existing disconnects (or other suitable locations determined in the field). Modify and re-connect power to new VFDs as required for variable speed control of each pump motor. Provide new conduit and power wiring from VFD to newly installed motor.
    a. CDWP1: 200 HP, 480 V, 3-phase
    b. CDWP2: 200 HP, 480 V, 3-phase
    c. CDWP3: 200 HP, 480 V, 3-phase

    REQUIRED: VFDs must have kW available as a network point. If not available, new correctly sized kW meters must be installed (furnished and installed by electrical contractor). Veris E50 series power meter is an example of an acceptable power meter.

9. Chilled Water Pump Power Meter: Install new three (3) new correctly sized 460 V three phase real kW meters. Veris E50 series meter is an example of an acceptable power meter. The power meters to be purchased with network capabilities to Metasys control system. Work with JCI to connect power meters to the central plant BAS. Power meters furnished by controls contractor and approved by Optimum Energy.
    a. CHWP1: 350 HP, 480 V, 3-phase
    b. CHWP2: 350 HP, 480 V, 3-phase
    c. CHWP3: 350 HP, 480 V, 3-phase

10. Bearing Cooling Circuit: Furnish and install power including conduit, wire, disconnect and circuit breaker for one (1) new bearing cooling circuit circulating pump (estimated 1HP or less). Approximate pump location is near the existing bearing cooling circuit heat exchanger and existing condenser water pumps. Design details provided by engineer of record.

11. Properly remove and dispose of all demolition.

12. Provide all documentation and manuals for installed equipment.

13. Provide one (1)-year parts and labor warranty for installed equipment and two (2)-years parts and labor warranty for VFDs.

14. Provide all necessary permits to complete the scope.

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CHILLER SCOPE OF WORK (YORK)

1. York Chillers Refrigerant Level Control: Re-establish proper automatic refrigerant level control for CH2. Recalibrate refrigerant level sensor and verify propoer operation of variable orifice for automatic control.

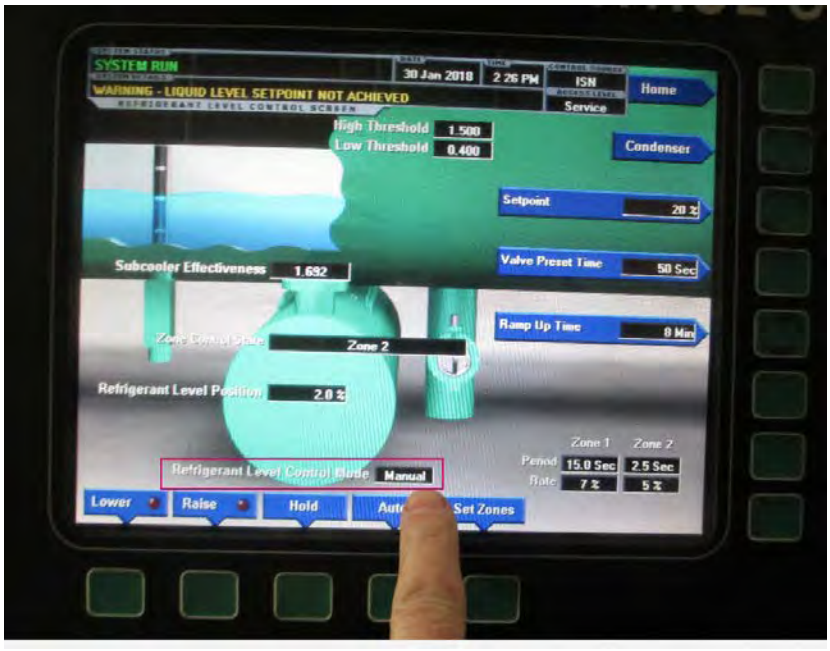

Figure 17 Chiller 2 Refrigerant Level Control is in Manual

2. Repair the oil cooling circuit in CH1 to fix the low oil temperature trips on the chiller. Ensure the oil cooling circuit control (thermostatic or solenoid valve) automatically closes as oil temperatures decrease. Multiple trips were identified on CH1 due to low oil temperature alarm.

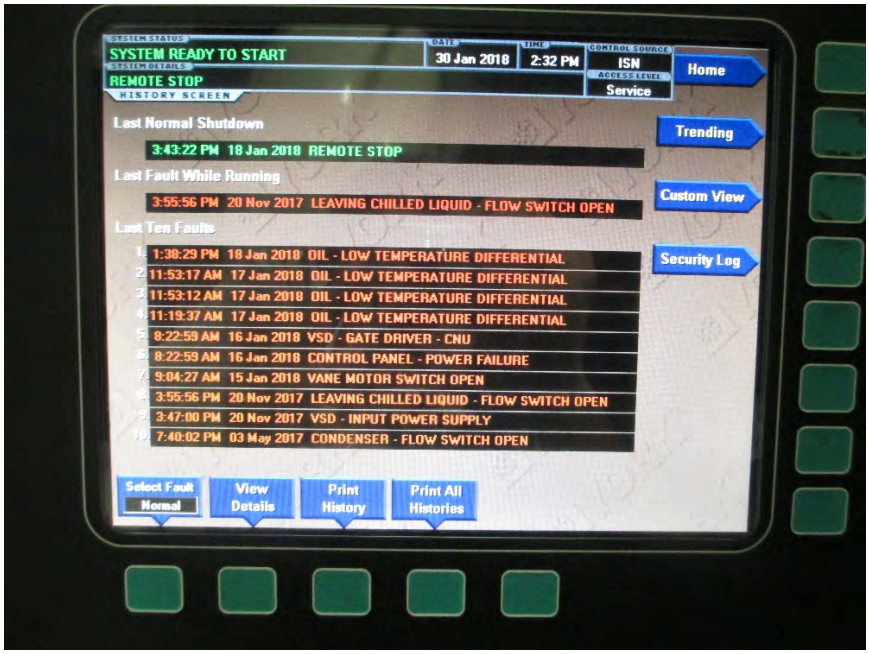

Figure 18 Chiller 1 Low Oil Temperature Trips

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CHILLER SCOPE OF WORK (SMARDT)

1. Furnish three (3) new Smardt chillers, startup, and commission one new water-cooled, variable-speed Smardt chillers with unit-mounted variable frequency drive (3). Chiller installed by mechanical contractor. Electrical completed by electrical contractor.

   Basis of design:

   - 1200-ton nominal capacity
   - 480 V, 60 Hz
   - Unit-mounted VSD
   - 42°F chilled water supply design (T_{out})
   - 1920 gpm evaporator design flow
   - 85°F condenser water supply design (T_{in})

   Given the above criteria, include the following as a part of a chiller:

   a. Network communication via BACnet MSTP for each chiller.
   b. Provide chiller control panel configuration and start-up support to allow all chiller points to be available for network communications and active control through Metasys control system.
   c. Factory installed flow proving devices for evaporator and condenser bundle (insertion-type thermal flow switches)
   d. Refrigerant level site glasses on evaporator and condenser
   e. IEEE filter (or equivalent) for VSD, providing 5 percent total harmonic distortion
   f. Written verification of factory refrigerant charge added to each chiller. Weigh refrigerant on-site and prove to owner the machine is properly charged if documentation cannot be provided from the factory.
   g. Manufacturer's factory-trained and factory-employed service technician shall be on-site for a minimum of one (1) day to startup, test, check, and adjust chiller. One day per chiller.

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CONTROLS CONTRACTOR SCOPE OF WORK

Provide support of the Optimum all-variable speed OptimumLOOP implementation at The PA capitol central chilled water plant chiller plant located at Harrisburg, PA.

1. The controls contractor is responsible for coordination of all work with owner to ensure no un-scheduled disruption in chilled water production at site. All work shall be closely coordinated with the engineer of record, project managers, central plant staff, and owner.

2. The controls contractor is responsible for all low-voltage electrical (less than 110 V). The electrical contractor is responsible for all electrical 110 V and higher.

3. Install one additional BAS integration controller (NAE) dedicated to integration of the OptimumLOOP system. Provide all software, hardware, networking, cabling, and programming as necessary for low latency (for example, fast communications and fast data polling rates) and in order to complete the scope below. (Refresh rates of 15 seconds or faster are required.)

4. Provide plant automation: Furnish and implement all necessary changes to programming for reliable and dynamic automatic operation of all-variable chiller plant (five [5] chillers and associated auxiliary equipment). There will be two (2) distinct modes of operation:

    a. BASMODE: Metasys BAS operates systems as it does today, updated for fully automated function, variable primary only configuration, and new VFDs
    b. LOOPMODE: Metasys BAS uses set points from the OptimumLOOP application to optimize chilled water plant

    In both modes, the speed of the chilled water pumps, condenser water pumps, and cooling tower fans, as well as the chilled water supply temperatures, number of chillers, number of chilled water pumps, number of condenser water pumps, and number of cooling towers shall be automatic. All start/stop, lead/lag, fail over safe modes, and alarms shall be fully automatic and the responsibility of the existing Metasys BAS. Furnish all programming, testing, commissioning and training for new reliable, fully automatic control sequences for primary-only/all-variable flow chiller plant. Prove to owner reliable lead/lag changeover of new and existing equipment and starting and stopping of chillers.

5. Field verify (and recalibrate as necessary) accurate temperature, transmitter readings for the chilled and condenser water system:
    a. CHWST: Main campus chilled water supply distribution temperature sensor
    b. CHWRT: Main campus chilled water return distribution temperature sensor
    c. CDWST: Headered condenser water supply temperature sensor

6. Ensure reliable point mapping of the existing campus outdoor air temperature sensor and relative humidity sensor to be used for central chiller plant control strategies.

7. Smardt Chiller Power Meter: Furnish new power meters for three (3) new 1200-ton Smardt chillers associated with Optimized control. Provide conduit and communication wire to monitor KW readings of the chillers to the BAS. Power meter reading must provide real-time KW reading to the BAS system for each chiller.

8. Chilled Water Pump Power Meter: Furnish new power meters for two (2) existing and one (1) new 480 V chilled water pump VFD associated with Optimized control. Provide conduit and communication wire to monitor KW reading of the CHWP VFDs to the BAS. Power meter reading must provide real-time KW reading to the BAS system for each chilled water pump.
    a. CHWP1: 288 HP, 480 V, 3-phase
    b. CHWP2: 288 HP, 480 V, 3-phase
    c. CHWP3: 288 HP, 480 V, 3-phase

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9. Cooling Tower Network Connections: Re-establish network connection for three (3) existing cooling tower VFDs. Network KW readings from each VFD. Provide new VFD communication cards as necessary to provide network point integration to the BAS. Verify accurate KW reading is provided from the VFD for point mapping to the Optimum LOOP controller. Provide any conversions as necessary to provide units of “KW” for all VFDs. Note, existing point mapping is shown within the existing automation system for KW reading for each cooling tower fan VFD. Ensure point mapping provides live “KW” reading provided by the VFDs.

10. Condenser Water Pump VFD: Provide programming variable speed control for three (3) new condenser water pump VFDs. Provide conduit and communication wire to control and monitor new VFD operation to the BAS. Network KW readings from each VFD. VFDs will be supplied with communication cards to provide network point integration to the BAS. Verify accurate KW reading is provided from the VFD for point mapping to the Optimum LOOP controller. Provide any conversions as necessary to provide units of “KW” for each VFD.
    a. CDWP1: 200 HP, 480 V, 3-phase
    b. CDWP2: 200 HP, 480 V, 3-phase
    c. CDWP3: 200 HP, 480 V, 3-phase

11. Evaporator and Condenser Isolation Valve Actuators for the York Chillers: Furnish new fully modulating automatic isolation valve actuators on existing chiller butterfly valves for the following chillers. Provide communication wire (utilizing existing conduit where available) for isolation valve position control and feedback to the BAS. Verify existing valves for application of new modulating actuators. Provide programming to utilize new isolation valves for chiller flow balancing for equal chiller loading for all operating chiller combinations.
    a. CH1CHWRVLV
    b. CH1CDWRVLV
    c. CH2CHWRVLV
    d. CH2CDWRVLV

12. Evaporator and Condenser Isolation Valve Actuators for the Smardt Chillers: Furnish new full line size fully modulating automatic isolation valve and valve actuators for the following new chillers. Provide conduit and communication wire for valve position control and feedback to the BAS. Provide programming to utilize new isolation valves for chiller flow balancing for equal chiller loading for all operating chiller combinations.
    a. CH3CHWVLV
    b. CH3CDWVLV
    c. CH4CHWVLV
    d. CH4CDWVLV
    e. CH5CHWVLV
    f. CH5CDWVLV

13. Furnish one (1) new insertion electro-magnetic flow meter for the existing main campus chilled water distribution flow readings. Flow meter shall be Onicon F-3500 model flow meter. Provide conduit and communication wire for flow reading. Note, existing ultrasonic flow meter shall remain active for future M&V verification.

14. Flow Meter for York Chillers: Furnish total of four (4) new insertion electro-magnetic flow meters for existing 2500-ton VS chiller’s chilled water and condenser water flow readings. Flow meters shall be Onicon F-3500 model flow meter. Provide conduit and communication wire for flow reading to the BAS. Provide programming to utilize new flow meter readings for chiller flow balancing for equal chiller loading for the following chillers:
    a. CH1CHWFLO
    b. CH2CHWFLO

15. Flow Meter for Smardt Chillers: Furnish total of six (6) new insertion electro-magnetic flow meters for new 1200-ton VS chiller chilled water and condenser water flow readings. Flow meters shall be Onicon F-3200 model flow meter. Provide conduit and communication wire for flow reading to the

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BAS. Provide programming to utilize new flow meter readings for chiller flow balancing for equal chiller loading for all the following chillers:

a. CH3CHWFLO
b. CH4CHWFLO
c. CH5CHWFLO

16. Chilled Water Bypass: Recommission existing low flow bypass valve actuator to re-establish proper low-flow bypass operation. Provide programming to modulate low flow bypass to maintain minimum flow set point for each chiller based on each chiller's individual flow meter. Minimum flow set points for each chiller TBD.

17. Furnish one (1) Network Control Engine (NCE) for the Keystone Building and integrate the engine to the BAS.

18. Remote Building Readings: Verify and re-map as necessary the existing remote building chilled water system readings (Chilled Water Supply Temperature, Chilled Water Return Temperature, Chilled Water Differential Pressure, Chilled Water Cooling Control Valve, and Chilled Water Flow) back to the central plant BAS for the following remote building. Ensure reliable communications to be used for central plant control.
    a. Ryan Bldg.
    b. East Wing (Excluding Cooling Valve and DP Reading)
    c. Forum Bldg.
    d. L&I Bldg.
    e. Finance Bldg.
    f. North Office Bldg. (Excluding DP Reading)
    g. Judicial Bldg.
    h. Main Capitol – Interface A
    i. Main Capitol – Interface B (Excluding DP Reading)
    j. Main Capitol – Interface C (Excluding DP Reading)

19. New Remote Building Devices: Furnish new differential pressure sensor on the chilled water supply and return lines that serves the following buildings. Install one (1) new NCE locally to connect to the newly installed DP sensor. Where existing NCE exists, it is acceptable to connect the new DP sensor to an existing NCE. Provide conduit and control wire from the new DP sensor to the NCE and map DP sensor reading back to the BAS via Capitol complex network.
    a. North Office Bldg. (Metasys panel exists and DP sensor exists, consider re-using)
    b. Keystone Bldg. (Web Control only, requires new NCE)
    c. Health and Wellness Bldg. (Web Control only, requires new NCE)

20. De-commission operation and control interface of all demolished equipment within the plant including:
    a. CH3 – 2500-ton OM Chiller
    b. CH4 – 1250-ton Trane Chiller
    c. Control associated with the bearing cooling circuit chilled water control valve
    d. Control associated with the steam flash tank cooling circuit chilled water control valve
    e. Sensors and devices removed as part of the project demolition

21. Furnish, install, and program BACnet/IP interface to OptimumLOOP controller software. Provide BACnet/IP interface and wiring between Optimum supplied OptiCx on premise software module and the BAS.

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22. Provide all software, hardware, networking, cabling, and programming as necessary for low latency (for example, fast communications and fast data polling rates) and in order to complete the scope below (refresh rates of 15 seconds or faster are required).

23. Provide all points listed in Table 5 and Appendix 1: The PA capitol central chilled water plant OptimumLOOP Controls Diagram to map over to the OptiCx on premise software module. All points listed in Table 5 are required and must be provided. Please ensure the availability of these points.

24. The Metasys building automation system (BAS) will always be and will remain the primary control for the chiller plant, but will provide ("write") the real-time integration points (see Table 5) to the OptiCx on premise software module via BACnet/IP. This will allow OptimumLOOP to make operating requests back to the chiller plant control system.

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Table 4: Example of Required BAS Points

<table>
<tr><th>EQUIPMENT</th><th>POINTS</th></tr>
<tr><td>Each cooling tower fan VFD</td><td>Start/stop, VFD output frequency, operating kW, status, and alarm/fault status (BAS alarm)</td></tr>
<tr><td>Each condenser water pump VFD</td><td>Start/stop, VFD output frequency, operating kW, status, and alarm/fault status (BAS alarm)</td></tr>
<tr><td>Each chilled water pump VFD</td><td>Start/stop, VFD output frequency, operating kW, status, and alarm/fault status (BAS alarm)</td></tr>
<tr><td>Two (2) York Chillers
Three (3) Smardt Chillers</td><td>
<table>
<tr><th colspan="2">CHILLER NETWORK POINTS
(Required Points)</th></tr>
<tr><th>POINT DESCRIPTION</th><th>TYPE</th></tr>
<tr><td>Chilled Water Supply Temperature</td><td>AV</td></tr>
<tr><td>Chilled Water Return Temperature</td><td>AV</td></tr>
<tr><td>Entering Condenser Water Temperature</td><td>AV</td></tr>
<tr><td>Leaving Condenser Water Temperature</td><td>AV</td></tr>
<tr><td>Condenser Refrigerant Pressure</td><td>AV</td></tr>
<tr><td>Condenser Refrigerant Temperature</td><td>AV</td></tr>
<tr><td>Evaporator Refrigerant Pressure</td><td>AV</td></tr>
<tr><td>Evaporator Refrigerant Temperature</td><td>AV</td></tr>
<tr><td>Chiller Alarm/Fault Message</td><td>AV</td></tr>
<tr><td>Total Chiller kW</td><td>AV</td></tr>
<tr><td>Chiller State</td><td>AV</td></tr>
<tr><td>Chilled Water Supply Setpoint Adjust</td><td>AV</td></tr>
<tr><td>Chiller % Motor Current</td><td>AV</td></tr>
<tr><td>Compressor Discharge Temperature</td><td>AV</td></tr>
<tr><td>Compressor Surge Count</td><td>AV</td></tr>
<tr><td>Guide Vane Position</td><td>AV</td></tr>
<tr><td>VFD Output Frequency</td><td>AV</td></tr>
<tr><td>Chiller Start/Stop</td><td>BV</td></tr>
</table>
Chiller in alarm and chiller failed alarm (Metasys controller).
</td></tr>
<tr><td>All chiller isolation valves</td><td>Valve position (Open/Close or 0—100%)</td></tr>
<tr><td>All chilled water temperature sensors</td><td>Headered chilled water supply and return temperatures</td></tr>
<tr><td>All condenser water temperature sensors</td><td>Headered condenser water supply and return temperatures</td></tr>
<tr><td>All chilled water system pressure transducers</td><td>Chilled water system differential pressure</td></tr>
<tr><td>All chilled water system flow meters</td><td>Scaled gpm from each chilled water flow meter</td></tr>
<tr><td>Chilled water low flow bypass valve</td><td>Valve position (0—100%)</td></tr>
<tr><td>Cooling tower bypass valve</td><td>Valve position (Open/Close or 0—100%)</td></tr>
<tr><td>AHU chilled water control valves</td><td>Commanded valve position (0—100%)</td></tr>
<tr><td>Outside air ambient conditions</td><td>Outside air temperature (dry bulb) and relative humidity (% RH)</td></tr>
</table>

25. Map and forward the points listed in Table 5 through BACnet to the new OptiCx on premise software module.

26. Program the BAS to monitor the BACnet communications between the BAS and the OptiCx on premise software module. If there is a failure of communications, the BAS will automatically revert back and control the chiller plant system using fully dynamic set point controls. Once

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communication has been reliably re-established, the BAS may resume following OptiCx on premise software module set points.

27. Work with Optimum to integrate and implement the control application and provide points in the BAS to support the all-variable speed, demand-based control algorithms. The algorithms to determine optimally efficient equipment speeds and settings according to the OptimumLOOP design will be processed by the OptiCx on premise software module and communicated via a BACnet/IP signal to the BAS. The BAS will be modified to incorporate ("read") these signals into its existing strategy and control of the chiller plant.

28. The normal mode of operation for the chillers and chiller plant auxiliary equipment will be determined by the facility BAS, including all individual equipment enables, failures, safeties, and alarms. In the event of a communication failure with the OptiCx on premise software module, the BAS will be able to run the chilled water system in a dynamic, fully functioning BASMODE; that is, smoothly revert back to the control logic and sequencing to produce the cooling and reliability required for the building.

29. Furnish programming and updated graphics for this new scope of work on the operator workstation graphical user interface (GUI).

30. Test functionality of Integration Control Sequences: Verify that all physical points mapped through the system operate correctly and that the OptimumLOOP set points are read and followed accurately.

31. Create and provide as-built drawings to provide customer with adequate system documentation.

32. Furnish a one (1)-year parts and labor warranty for new controls furnished and installed by contractor.

33. Provide training of building staff on upgrade and changes.

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OWNER SCOPE OF WORK

1. Optimum will ship the OptimumLOOP on premise controller and associated equipment when the owner provides approval to Optimum for the wireless connection. As an alternative to the wireless connection, owner can provide a high-speed internet connection with a static IP address and access through ports 3011 and 1911, bi-directionally enabled. Only gateway-to-gateway VPN connections are acceptable in this case.

2. Provide information on any facility standards for VFDs, wiring, etc.

3. Provide all existing HVAC information and drawings.

4. Facilitate access to facility and tenant spaces and use of chiller plant, piping, and air-handler systems as necessary during construction.

5. Assist in functional testing as necessary.

6. Schedule staff for training on OptimumLOOP system.

7. Accept completed system.

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APPENDIX 1: THE PA CAPITOL CENTRAL CHILLED WATER PLANT – ALTERNATE ANALYSIS SIMULATIONS

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Free Cooling Savings (ECM2A):

Free cooling was analyzed by simulating the existing operations compared to the existing plant retrofitted with a plate and frame heat exchanger for water-side economizer. The following summary represents the savings achieved with the addition of free cooling equipment (excluding any savings associated with the proposed optimization control or plant mechanical upgrades detailed within the scope of work – Section 3 above).

This simulation is based on utilization of free cooling via a plate and frame heat exchanger serving the campus cooling loads whenever the outside air conditions are below 38°F wet bulb. Additional modeling assumptions within free cooling mode include one (1) condenser water pump, three (3) cooling tower cells, and one (1) chilled water pump running to maintain 40°F cooling tower water to the heat exchanger and 42°F chilled water supplied to the campus.

Free Cooling Only Savings (Existing CWP vs. Existing CWP with Free Cooling):

PA Capitol Optimization - Savings Summary by Month - ECMs (2A)

	Existing CWP Plant				Existing CWP Plant with Free Cooling Heat Exchanger			
Month	Ton-Hours	Plant kWh	Plant kW/ton	Water Gallons	Ton-Hours	Plant kWh	Plant kW/ton	Water Gallons
January	383,375	337,858	0.881	810,629	383,375	254,886	0.665	762,498
February	623,279	416,089	0.668	1,265,093	623,279	301,254	0.483	1,194,290
March	755,757	499,205	0.661	1,528,611	755,757	416,177	0.551	1,466,955
April	1,198,314	789,901	0.659	2,400,437	1,198,314	768,050	0.641	2,381,056
May	1,434,299	905,775	0.632	2,853,988	1,434,299	904,471	0.631	2,852,411
June	2,192,046	1,548,621	0.706	4,411,194	2,192,046	1,548,621	0.706	4,411,194
July	2,721,555	2,194,288	0.806	5,605,663	2,721,555	2,194,288	0.806	5,605,663
August	2,513,955	2,154,261	0.857	5,239,195	2,513,955	2,154,261	0.857	5,239,195
September	1,905,305	1,333,743	0.700	3,833,988	1,905,305	1,333,743	0.700	3,833,988
October	1,263,689	816,740	0.646	2,527,285	1,263,689	809,014	0.640	2,517,305
November	847,400	539,247	0.636	1,702,213	847,400	489,321	0.577	1,662,388
December	668,903	452,216	0.676	1,360,736	668,903	324,744	0.485	1,280,978
Total	16,507,877	11,987,944	0.726	33,539,033	16,507,877	11,498,831	0.697	33,207,921

* Energy costs calculated at $0.075546/kWh blended and $9.46 per kgal of tower make-up water water, and $5 per kgal of tower make-up for chemical treatment.

* ECM2A is based on water-side economizer operation when outside air is below 38°F WB.

Free Cooling (ECM2A): Savings Summary

	Savings of ECMs (2A)					
Month	Ton-Hours Saved	kWh saved	Water Saved	Electric Cost Saved	Water Cost Saved	Total Cost Saved
January	0	82,972	48,131	$6,268	$792	$7,060
February	0	114,835	70,803	$8,675	$1,165	$9,841
March	0	83,027	61,657	$6,272	$1,015	$7,287
April	0	21,851	19,381	$1,651	$319	$1,970
May	0	1,304	1,577	$98	$26	$124
June	0	0	0	$0	$0	$0
July	0	0	0	$0	$0	$0
August	0	0	0	$0	$0	$0
September	0	0	0	$0	$0	$0
October	0	7,725	9,980	$584	$164	$748
November	0	49,926	39,825	$3,772	$656	$4,427
December	0	127,472	79,758	$9,630	$1,313	$10,943
Total	0	489,113	331,112	$36,951	$5,450	$42,401

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Mechanical Upgrade and Plant Optimization (ECM2B):

This simulation is based on savings associated with the proposed central plant upgrades and plant optimization control as detailed in section 3 above, except without variable speed retrofit of the condenser water pumps (no variable speed drives added to the condenser water pumps).

ECM2B Savings (Existing CWP vs. Upgraded and Optimized CWP):

PA Capitol Optimization - Savings Summary by Month - ECMs (2B)

	Existing CWP Plant				Upgraded and Optimized CWP Plant				L&I Chiller Plant (New CH & Pump)		
Month	Ton-Hours	Plant kWh	Plant kW/ton	Water Gallons	Ton-Hours	Plant kWh	Plant kW/ton	Water Gallons	Ton-Hours	Plant kWh	Plant kW/ton
January	383,375	337,858	0.881	810,629	383,375	169,039	0.441	736,490	0	0	0.000
February	623,279	416,089	0.668	1,265,093	623,279	273,258	0.438	1,196,696	0	0	0.000
March	755,757	499,205	0.661	1,528,611	755,757	334,672	0.443	1,452,407	0	0	0.000
April	1,198,314	789,901	0.659	2,400,437	1,198,314	633,512	0.529	2,347,057	0	0	0.000
May	1,434,299	905,775	0.632	2,853,988	1,434,299	774,205	0.540	2,815,996	0	0	0.000
June	2,192,046	1,548,621	0.706	4,411,194	2,192,046	1,405,389	0.641	4,399,717	0	0	0.000
July	2,721,555	2,194,288	0.806	5,605,663	2,721,555	1,853,545	0.681	5,509,612	0	0	0.000
August	2,513,955	2,154,261	0.857	5,239,195	2,513,955	1,662,614	0.661	5,067,649	0	0	0.000
September	1,905,305	1,333,743	0.700	3,833,988	1,905,305	1,151,767	0.605	3,793,955	0	0	0.000
October	1,263,689	816,740	0.646	2,527,285	1,263,689	663,532	0.525	2,473,107	0	0	0.000
November	847,400	539,247	0.636	1,702,213	847,400	385,030	0.454	1,632,672	0	0	0.000
December	668,903	452,216	0.676	1,360,736	668,903	292,485	0.437	1,283,970	0	0	0.000
Total	16,507,877	11,987,944	0.726	33,539,033	16,507,877	9,599,046	0.581	32,709,327	0	0	0.000

* Energy costs calculated at $0.075546/kWh blended and $9.46 per kgal of tower make-up water water, and $7 per kgal of tower make-up for chemical treatment.

* Savings is based on 100% of time operating within "LOOP MODE" for Post scenario with all equipment available for control (except for 12 days of shutdown in January)

Upgraded and Optimized (ECM2B): Savings Summary

	Savings of ECMs (2B)					
Month	Ton-Hours Saved	kWh saved	Water Saved	Electric Cost Saved	Water Cost Saved	Total Cost Saved
January	0	168,819	74,139	$12,754	$1,220	$13,974
February	0	142,831	68,397	$10,790	$1,126	$11,916
March	0	164,533	76,205	$12,430	$1,254	$13,684
April	0	156,389	53,380	$11,815	$879	$12,693
May	0	131,570	37,991	$9,940	$625	$10,565
June	0	143,232	11,477	$10,821	$189	$11,010
July	0	340,743	96,052	$25,742	$1,581	$27,323
August	0	491,648	171,546	$37,142	$2,824	$39,966
September	0	181,976	40,033	$13,748	$659	$14,407
October	0	153,208	54,179	$11,574	$892	$12,466
November	0	154,217	69,541	$11,650	$1,145	$12,795
December	0	159,732	76,767	$12,067	$1,264	$13,331
Total	0	2,388,897	829,706	$180,472	$13,657	$194,129

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Mechanical Upgrade and Plant Optimization (ECM2B & 3A):

This simulation is based on savings associated with the proposed central plant upgrades and plant optimization control as detailed in section 3 above, except without variable speed retrofit of two of the condenser water pumps (only one variable speed drive added to the condenser water pumps).

ECM2B & 3A Savings (Existing CWP vs. Upgraded and Optimized CWP and one VSD CDWP):

PA Capitol Optimization - Savings Summary by Month - ECMs (2B & 3A)

	Existing CWP Plant				Upgraded and Optimized CWP Plant				L&I Chiller Plant (New CH & Pump)		
Month	Ton-Hours	Plant kWh	Plant kW/ton	Water Gallons	Ton-Hours	Plant kWh	Plant kW/ton	Water Gallons	Ton-Hours	Plant kWh	Plant kW/ton
January	383,375	337,858	0.881	810,629	383,375	123,550	0.322	715,306	0	0	0.000
February	623,279	416,089	0.668	1,265,093	623,279	204,981	0.329	1,164,907	0	0	0.000
March	755,757	499,205	0.661	1,528,611	755,757	264,171	0.350	1,419,614	0	0	0.000
April	1,198,314	789,901	0.659	2,400,437	1,198,314	593,621	0.495	2,328,608	0	0	0.000
May	1,434,299	905,775	0.632	2,853,988	1,434,299	750,353	0.523	2,804,813	0	0	0.000
June	2,192,046	1,548,621	0.706	4,411,194	2,192,046	1,402,713	0.640	4,398,440	0	0	0.000
July	2,721,555	2,194,288	0.806	5,605,663	2,721,555	1,853,545	0.681	5,509,612	0	0	0.000
August	2,513,955	2,154,261	0.857	5,239,195	2,513,955	1,660,250	0.660	5,066,522	0	0	0.000
September	1,905,305	1,333,743	0.700	3,833,988	1,905,305	1,143,833	0.600	3,790,183	0	0	0.000
October	1,263,689	816,740	0.646	2,527,285	1,263,689	623,273	0.493	2,454,329	0	0	0.000
November	847,400	539,247	0.636	1,702,213	847,400	326,529	0.385	1,605,505	0	0	0.000
December	668,903	452,216	0.676	1,360,736	668,903	214,855	0.321	1,247,824	0	0	0.000
Total	16,507,877	11,987,944	0.726	33,539,033	16,507,877	9,161,675	0.555	32,505,662	0	0	0.000

* Energy costs calculated at $0.075546/kWh blended and $9.46 per kgal of tower make-up water water, and $7 per kgal of tower make-up for chemical treatment.

* Savings is based on 100% of time operating within "LOOP MODE" for Post scenario with all equipment available for control (except for 12 days of shutdown in January)

Upgraded and Optimized (ECM2B & 3A): Savings Summary

	Savings of ECMs (2B & 3A)					
Month	Ton-Hours Saved	kWh saved	Water Saved	Electric Cost Saved	Water Cost Saved	Total Cost Saved
January	0	214,307	95,324	$16,190	$1,569	$17,759
February	0	211,108	100,186	$15,948	$1,649	$17,597
March	0	235,034	108,997	$17,756	$1,794	$19,550
April	0	196,279	71,829	$14,828	$1,182	$16,010
May	0	155,422	49,175	$11,742	$809	$12,551
June	0	145,908	12,754	$11,023	$210	$11,233
July	0	340,743	96,052	$25,742	$1,581	$27,323
August	0	494,011	172,673	$37,321	$2,842	$40,163
September	0	189,910	43,805	$14,347	$721	$15,068
October	0	193,467	72,956	$14,616	$1,201	$15,816
November	0	212,719	96,708	$16,070	$1,592	$17,662
December	0	237,361	112,912	$17,932	$1,859	$19,790
Total	0	2,826,268	1,033,370	$213,513	$17,009	$230,523

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Mechanical Upgrade and Plant Optimization (ECM2B, 3A & 3B):

This simulation is based on savings associated with the proposed central plant upgrades and plant optimization control as detailed in section 3 above, except without variable speed retrofit of one of the condenser water pumps (only two variable speed drive added to the condenser water pumps).

ECM2B, 3A, & 3B Savings (Existing CWP vs. Upgraded and Optimized CWP and two VSD CDWPs):

PA Capitol Optimization - Savings Summary by Month - ECMs (2B, 3A, & 3B)

	Existing CWP Plant				Upgraded and Optimized CWP Plant				L&I Chiller Plant (New CH & Pump)		
Month	Ton-Hours	Plant kWh	Plant kW/ton	Water Gallons	Ton-Hours	Plant kWh	Plant kW/ton	Water Gallons	Ton-Hours	Plant kWh	Plant kW/ton
January	383,375	337,858	0.881	810,629	383,375	123,288	0.322	715,184	0	0	0.000
February	623,279	416,089	0.668	1,265,093	623,279	200,990	0.322	1,163,052	0	0	0.000
March	755,757	499,205	0.661	1,528,611	755,757	253,767	0.336	1,414,765	0	0	0.000
April	1,198,314	789,901	0.659	2,400,437	1,198,314	544,396	0.454	2,305,620	0	0	0.000
May	1,434,299	905,775	0.632	2,853,988	1,434,299	661,382	0.461	2,763,255	0	0	0.000
June	2,192,046	1,548,621	0.706	4,411,194	2,192,046	1,341,645	0.612	4,369,798	0	0	0.000
July	2,721,555	2,194,288	0.806	5,605,663	2,721,555	1,820,324	0.669	5,494,010	0	0	0.000
August	2,513,955	2,154,261	0.857	5,239,195	2,513,955	1,611,852	0.641	5,043,796	0	0	0.000
September	1,905,305	1,333,743	0.700	3,833,988	1,905,305	1,068,455	0.561	3,754,887	0	0	0.000
October	1,263,689	816,740	0.646	2,527,285	1,263,689	566,908	0.449	2,428,033	0	0	0.000
November	847,400	539,247	0.636	1,702,213	847,400	293,740	0.347	1,590,240	0	0	0.000
December	668,903	452,216	0.676	1,360,736	668,903	214,072	0.320	1,247,462	0	0	0.000
Total	16,507,877	11,987,944	0.726	33,539,033	16,507,877	8,700,820	0.527	32,290,102	0	0	0.000

* Energy costs calculated at $0.075546/kWh blended and $9.46 per kgal of tower make-up water water, and $7 per kgal of tower make-up for chemical treatment.

* Savings is based on 100% of time operating within "LOOP MODE" for Post scenario with all equipment available for control (except for 12 days of shutdown in January)

Upgraded and Optimized (ECM2B, 3A, & 3B): Savings Summary

	Savings of ECMs (2B, 3A, & 3B)					
Month	Ton-Hours Saved	kWh saved	Water Saved	Electric Cost Saved	Water Cost Saved	Total Cost Saved
January	0	214,570	95,445	$16,210	$1,571	$17,781
February	0	215,099	102,040	$16,250	$1,680	$17,929
March	0	245,438	113,846	$18,542	$1,874	$20,416
April	0	245,505	94,817	$18,547	$1,561	$20,108
May	0	244,392	90,733	$18,463	$1,493	$19,956
June	0	206,976	41,396	$15,636	$681	$16,318
July	0	373,964	111,653	$28,251	$1,838	$30,089
August	0	542,409	195,399	$40,977	$3,216	$44,193
September	0	265,288	79,101	$20,041	$1,302	$21,343
October	0	249,832	99,252	$18,874	$1,634	$20,507
November	0	245,507	111,973	$18,547	$1,843	$20,390
December	0	238,144	113,274	$17,991	$1,864	$19,855
Total	0	3,287,124	1,248,931	$248,329	$20,557	$268,886

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Mechanical Upgrade and Plant Optimization (ECM2B, 3A, 3B & 3C):

This simulation is based on savings associated with the proposed central plant upgrades and plant optimization control as detailed in section 3 above (all three variable speed drive added to the condenser water pumps per based scope of work).

ECM2B, 3A, 3B, & 3C Savings (Existing CWP vs. Upgraded and Optimized CWP and three VSD CDWPs):

PA Capitol Optimization - Savings Summary by Month - ECMs (2B, 3A, 3B, & 3C)

	Existing CWP Plant				Upgraded and Optimized CWP Plant				L&I Chiller Plant (New CH & Pump)		
Month	Ton-Hours	Plant kWh	Plant kW/ton	Water Gallons	Ton-Hours	Plant kWh	Plant kW/ton	Water Gallons	Ton-Hours	Plant kWh	Plant kW/ton
January	383,375	337,858	0.881	810,629	383,375	123,288	0.322	715,184	0	0	0.000
February	623,279	416,089	0.668	1,265,093	623,279	200,990	0.322	1,163,052	0	0	0.000
March	755,757	499,205	0.661	1,528,611	755,757	253,767	0.336	1,414,765	0	0	0.000
April	1,198,314	789,901	0.659	2,400,437	1,198,314	527,736	0.440	2,297,834	0	0	0.000
May	1,434,299	905,775	0.632	2,853,988	1,434,299	645,142	0.450	2,755,680	0	0	0.000
June	2,192,046	1,548,621	0.706	4,411,194	2,192,046	1,260,959	0.575	4,332,065	0	0	0.000
July	2,721,555	2,194,288	0.806	5,605,663	2,721,555	1,705,977	0.627	5,440,419	0	0	0.000
August	2,513,955	2,154,261	0.857	5,239,195	2,513,955	1,522,509	0.606	5,001,908	0	0	0.000
September	1,905,305	1,333,743	0.700	3,833,988	1,905,305	1,011,809	0.531	3,728,398	0	0	0.000
October	1,263,689	816,740	0.646	2,527,285	1,263,689	548,386	0.434	2,419,379	0	0	0.000
November	847,400	539,247	0.636	1,702,213	847,400	293,740	0.347	1,590,240	0	0	0.000
December	668,903	452,216	0.676	1,360,736	668,903	214,072	0.320	1,247,462	0	0	0.000
Total	16,507,877	11,987,944	0.726	33,539,033	16,507,877	8,308,375	0.503	32,106,385	0	0	0.000

* Energy costs calculated at $0.075546/kWh blended and $9.46 per kgal of tower make-up water water, and $7 per kgal of tower make-up for chemical treatment.

* Savings is based on 100% of time operating within "LOOP MODE" for Post scenario with all equipment available for control (except for 12 days of shutdown in January)

Upgraded and Optimized (ECM2B, 3A, 3B, & 3C): Savings Summary

	Savings of ECMs (2B, 3A, 3B, & 3C)					
Month	Ton-Hours Saved	kWh saved	Water Saved	Electric Cost Saved	Water Cost Saved	Total Cost Saved
January	0	214,570	95,445	$16,210	$1,571	$17,781
February	0	215,099	102,040	$16,250	$1,680	$17,929
March	0	245,438	113,846	$18,542	$1,874	$20,416
April	0	262,165	102,603	$19,806	$1,689	$21,494
May	0	260,633	98,308	$19,690	$1,618	$21,308
June	0	287,662	79,129	$21,732	$1,302	$23,034
July	0	488,311	165,245	$36,890	$2,720	$39,610
August	0	631,752	237,287	$47,726	$3,906	$51,632
September	0	321,935	105,590	$24,321	$1,738	$26,059
October	0	268,354	107,906	$20,273	$1,776	$22,049
November	0	245,507	111,973	$18,547	$1,843	$20,390
December	0	238,144	113,274	$17,991	$1,864	$19,855
Total	0	3,679,569	1,432,647	$277,977	$23,581	$301,558

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Mechanical Upgrade and Plant Optimization (ECM2B, 3A, 3B, 3C, & 4C):

This simulation is based on savings associated with the proposed central plant upgrades and plant optimization control as detailed in section 3 above (three variable speed drive added to the condenser water pumps). Additionally, this simulation includes the total system effect of the additional load and resulting savings associated with the installation of a new 500-ton York YMC2 chiller within the L&I building designed to satisfying the unmet peak cooling load for this building. The additional cooling load is simulated from 0 tons to 500 tons as outside air increases from 63°F wet bulb to 81°F wet bulb. No CWP pumping energy savings was simulated based on any potential L&I flow/DT improvement from the installation of the new chiller. All additional cooling load and chiller/pump energy heat of rejection load from L&I equipment was simulated as additional chilled water load on the central chilled water plant (CWP).

ECM2B, 3A, 3B, 3C, & 4C Savings (Existing CWP vs. Upgraded and Optimized CWP, three VSD CDWPs and new L&I chiller):

PA Capitol Optimization - Savings Summary by Month - ECMs (2B, 3A, 3B, 3C, & 4C)

	Existing CWP Plant				Upgraded and Optimized CWP Plant				L&I Chiller Plant (New CH & Pump)		
Month	Ton-Hours	Plant kWh	Plant kW/ton	Water Gallons	Ton-Hours	Plant kWh	Plant kW/ton	Water Gallons	Ton-Hours	Plant kWh	Plant kW/ton
January	383,375	337,858	0.881	810,629	383,375	123,288	0.322	715,184	0	0	0.000
February	623,279	416,089	0.668	1,265,093	623,279	200,990	0.322	1,163,052	0	0	0.000
March	755,847	499,261	0.661	1,528,794	755,854	253,835	0.336	1,414,962	90	23	0.251
April	1,211,778	800,340	0.660	2,428,521	1,212,637	537,956	0.444	2,327,031	13,464	3,018	0.224
May	1,443,878	910,497	0.631	2,872,707	1,444,505	651,900	0.451	2,776,256	9,579	2,205	0.230
June	2,271,405	1,614,147	0.711	4,578,586	2,276,513	1,323,435	0.581	4,505,263	79,360	18,152	0.229
July	2,861,405	2,306,398	0.806	5,899,081	2,870,343	1,823,101	0.635	5,748,607	139,850	31,284	0.224
August	2,630,052	2,241,248	0.852	5,479,944	2,637,440	1,619,274	0.614	5,257,468	116,098	25,886	0.223
September	1,954,893	1,371,082	0.701	3,936,904	1,957,987	1,049,950	0.536	3,836,033	49,588	11,112	0.224
October	1,277,967	827,310	0.647	2,556,835	1,278,856	558,998	0.437	2,450,206	14,279	2,839	0.199
November	847,400	539,247	0.636	1,702,213	847,400	293,740	0.347	1,590,240	0	0	0.000
December	668,903	452,216	0.676	1,360,736	668,903	214,072	0.320	1,247,462	0	0	0.000
Total	16,930,184	12,315,693	0.727	34,420,043	16,957,091	8,650,539	0.510	33,031,763	422,307	94,518	0.224

* Energy costs calculated at $0.075546/kWh blended and $9.46 per kgal of tower make-up water water, and $7 per kgal of tower make-up for chemical treatment.
* Savings is based on 100% of time operating within "LOOP MODE" for Post scenario with all equipment available for control (except for 12 days of shutdown in January)
* ECM4C is based on meeting the previously unmet building peak loads at L&I. Simulated 0 to 500 tons at 63°F WB to 81°F WB (peak). No CWP pumping energy savings assumed.
* ECM4C L&I chiller and new pump KW will be metered for M&V. The total heat of rejection of the additional load and L&I chiller energy is included for CWP cooling load.

Upgraded and Optimized (ECM2B, 3A, 3B, 3C, & 4C): Savings Summary

	Savings of ECMs (2B, 3A, 3B, 3C, & 4C)					
Month	Ton-Hours Saved	kWh saved	Water Saved	Electric Cost Saved	Water Cost Saved	Total Cost Saved
January	0	214,570	95,445	$16,210	$1,571	$17,781
February	0	215,099	102,040	$16,250	$1,680	$17,929
March	-6	245,403	113,832	$18,539	$1,874	$20,413
April	-858	259,367	101,491	$19,594	$1,671	$21,265
May	-627	256,391	96,451	$19,369	$1,588	$20,957
June	-5,108	272,560	73,323	$20,591	$1,207	$21,798
July	-8,938	452,013	150,474	$34,148	$2,477	$36,625
August	-7,387	596,088	222,476	$45,032	$3,662	$48,694
September	-3,094	310,020	100,872	$23,421	$1,660	$25,081
October	-888	265,473	106,629	$20,055	$1,755	$21,811
November	0	245,507	111,973	$18,547	$1,843	$20,390
December	0	238,144	113,274	$17,991	$1,864	$19,855
Total	-26,907	3,570,635	1,388,280	$269,747	$22,851	$292,598

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APPENDIX 2: THE PA CAPITOL CENTRAL CHILLED WATER PLANT OPTIMUMLOOP CONTROLS DIAGRAM

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NOT FOR CONSTRUCTION

Typ. CT - 7410 GPM,
150 HP, 78 deg WB

CT1Fan VFD
Network Connection

CT2Fan VFD
Network Connection

CT3Fan VFD
Network Connection

AV
CDWRT

BV
CT1EVLV

BV
CT2EVLV

BV
CT3EVLV

Cooling Tower #1

Cooling Tower #2

Cooling Tower #3

BV
CT1LVT

BV
CT2LVT

BV
CT3LVT

AV
CDWST

CDWP4
Start/Stop, Status

AV
CDWPDP

DP

CDWP1 VFD
Network Connection

CDWP2 VFD
Network Connection

CDWP3 VFD
Network Connection

Typ. CDWP - 7410 GPM,
200 HP, 86 FT HD

CHILLER NETWORK POINTS (Required Points)	
POINT DESCRIPTION	TYPE
Chilled Water Supply Temperature	AV
Chilled Water Return Temperature	AV
Entering Condenser Water Temperature	AV
Leaving Condenser Water Temperature	AV
Condenser Refrigerant Pressure	AV
Condenser Refrigerant Temperature	AV
Evaporator Refrigerant Pressure	AV
Evaporator Refrigerant Temperature	AV
Chiller Alarm/Fault Message	AV
Total Chiller kW	AV
Chiller State	AV
Chilled Water Supply Setpoint Adjust	AV
Chiller % Motor Current	AV
Compressor Discharge Temperature	AV
ACC Surge Count	AV
Guide Vane Position	AV
VFD Output Frequency	AV
Chiller Start/Stop	BV
Chiller Refrigerant Level Set Point	BV
Chiller Refrigerant Level	BV
Chiller Operating Hours	AV

VFD POINTS (Required Points)	
POINT DESCRIPTION	TYPE
VFD Output Frequency	AV
VFD kW	AV
VFD Status	BV
VFD Start/Stop	BV
VFD Operating Hours	BV

AV CH1CDWRTS

CH1
Network Connection

2500-TON VARIABLE
SPEED YORK
CHILLER #1

AV CH1CHWRTS

AV CH1CHWRVLV

AV CH1CHWFLO

AV CH1CDWFLO

AV CH1CDWRVLV

AV CH1CDWSTS

AV CH1CHWSTS

BV CH1CHWSVLV

TYP. YORK Condenser
Design GPM: 7,500
Min GPM: 6,115
Max GPM: 22,037
85°F - 94.3°F 5.8 FT PD
1470 kW, R-134a

TYP. YORK Evaporator
Design GPM: 4,000
Min GPM: 1,318
Max GPM: 7,318
42°F - 57°F 15.5 FT PD
1470 kW, R-134a

AV CH2CDWRTS

CH2
Network Connection

2500-TON VARIABLE
SPEED YORK
CHILLER #2

AV CH2CHWRTS

AV CH2CHWRVLV

AV CH2CDWFLO

AV CH2CDWRVLV

AV CH2CDWSTS

AV CH2CHWSTS

BV CH2CHWSVLV

AV CH2CHWFLO

AV CH3CDWRTS

CH3
Network Connection

AV
kW

1200-TON VARIABLE
SPEED SMARDT
CHILLER #3

AV CH3CHWRTS

AV CH3CHWVLV

AV CH3CHWFLO

AV CH3CDWFLO

AV CH3CDWVLV

AV CH3CDWSTS

AV CH3CHWSTS

TYP. Smardt Condenser
Design GPM: 3600
Min GPM: 1231 / Max GPM: xxxx
85°F - 94.26°F 11.1 FT PD
687.6 kW, R-134a

TYP. Smardt Evaporator
Design GPM: 1920
Min GPM: 842 / Max GPM: xxxx
56.94°F - 42°F 5.45 FT PD
687.6 kW, R-134a

AV CH4CDWRTS

CH4
Network Connection

AV
kW

1200-TON VARIABLE
SPEED SMARDT
CHILLER #4

AV CH4CHWRTS

AV CH4CHWVLV

AV CH4CHWFLO

AV CH4CDWFLO

AV CH4CDWVLV

AV CH4CDWSTS

AV CH4CHWSTS

AV CH5CDWRTS

CH5
Network Connection

AV
kW

1200-TON VARIABLE
SPEED SMARDT
CHILLER #5

AV CH5CHWRTS

AV CH5CHWVLV

AV CH5CHWFLO

AV CH5CDWFLO

AV CH5CDWVLV

AV CH5CDWRTS

AV CH5CHWSTS

Typ. CHWP - 3330 GPM,
350 HP, 288 FT HD

AV
kW

CHWP1
Network Connection

CHWP2
Network Connection

CHWP3
Network Connection

DP

AV
CHWPDP

AV
CHWSP

AV
CHWFLO

AV
CHWFLO2

CHWS

AV
CHWST

Bearing Cooling
Supply

AV
CHWBPV

Bearing Cooling
Return

AV
CHWRP

CHWR

AV
CHWRT

AV
OAT

AV
OAWB

AV
CHWDPx

DP

Building DP sensors (x5)

AV
CHWVx

Building Control Valves (x11)

AV
CHWFLOx

Building CHW Flow (x15)

AV
CHWSTx

Building CHW Supply Temp (x15)

AV
CHWRTx

Building CHW Supply Temp (x15)

LEGEND

Primary Chilled Water Piping

Condenser Water Piping

Automatically Operated Valves

Normally Closed Manual Shutoff Valves

Check Valve

New	Existing
XX	XX
XXXX	XXXX

Notes:
1. All pumps are operated by variable speed drives. Drives are set to limit current to maximum motor nameplate rating including service factor.
2. All pumps incorporate check valves to prevent reverse flow through pumps
3. Network connections for Variable Speed Drives shall include at a minimum: On/Off Control, Speed Control, Output Frequency, Drive Status, and Drive kW output.

TITLE: PA Capitol Complex, Controls Diagram, Chiller Plant					
DESCRIPTION: CONTROLS DIAGRAM, POST CHILLER PLANT					
DRAWN BY: Catherine Corrales	SCALE: None	PAGE: 1 OF 1	DRAWING NUMBER:	Revision:	DATE OF ISSUE: 03/28/2018

True Optimization Starts Here®

APPENDIX B

Heating Hot Water Loop Decentralization Savings Analysis

Central Plant HHW Pump Power Estimate	Plant Equipment					
	Flow Rate (gpm)	Pressure drop (ft w.c.)	assume efficiencies			power input kW
			device (%)	motor (%)	VFD (%)	
• 4160V HHW Pump #1 or #2	2010	***288***	***85.5%***	***93.8%***	***100%***	135.9

annual operation (hours)	8760
annual energy savings (kWh)	1190431
electric expense rate ($/kWh)	$ 0.075546
annual energy savings ($)	$ 89,932

Capitol CHW Plant

Estimate of Heat Transfer from Insulated Heating Hot Water Piping

Cooling Offset

Fully Insulated

Central Plant Chilled Water

pipe & insulation dimensions (inch)					temperatures (°F)			surface coefficient		length of pipe (lineal feet)			annual	heat transfer		Heat Transmission Impact		
diameter				th'ckns	pipe	ambient	surface	Btu / hr / sf / °F		piping	fitting	total	transfer	Btu	mmBtu	ton-hr	estimated	kWh
nom	int'rnl	ext'rnl	insulation		int'rnl	room	ext'rnl	convect	radiant	runs	ELF	length	hr / yr	hr - sf	yr	yr	kW/ton	yr
High Pressure Steam																		
2 1/2	2.5	2.9	6.9	2	349	68	85	0.68	0.84	13	0.0	13.2	8,760	23.9	5.0	415	0.503	209
6	6.1	6.6	10.6	2	349	68	85	0.63	0.84	66	0.0	66.0	8,760	28.2	45.3	3,775	0.503	1,899
24	24.0	24.8	28.8	2	349	68	85	0.51	0.84	10.2	0.0	10.2	8,760	32.2	21.6	1,801	0.503	906
170 deg.F Hydronic Loop																		
8	8.0	8.6	12.6	2	170	75	85	0.52	0.86	1298	0.0	1298	8,760	9.9	370.5	30,879	0.503	15,532
10	10.0	10.8	14.8	2	170	75	85	0.50	0.86	1045	0.0	1045	8,760	10.1	358	29,846	0.503	15,013
12	12.0	12.8	16.8	2	170	75	85	0.49	0.86	754	0.0	754	8,760	10.3	299	24,916	0.503	12,533
14	14.0	14.8	18.8	2	170	75	85	0.48	0.86	3245	0.0	3245	8,760	10.5	1,460	121,657	0.503	61,194
16	16.0	16.8	20.8	2	170	75	85	0.47	0.86	941	0.0	941	8,760	10.6	473	39,457	0.503	19,847
20	20.0	20.8	24.8	2	170	75	85	0.45	0.86	75	0.0	75	8,760	10.7	46	3,801	0.503	1,912
36	36.0	36.8	40.8	2	170	75	85	0.41	0.86	9	0.0	9	8,760	11.1	9	747	0.503	376
													TOTAL INSULATED TRANSFER MMBTU / YR:		3,087.5	257,294		129,419

hours	8,760
average tons	29

APPENDIX B

Chilled Water Pump Motor and VFD Replacement Savings Analysis

Central Plant **CHW Pump Power Estimate**	**Plant Equipment**					
	Flow Rate (gpm)	Pressure drop (ft w.c.)	assume efficiencies			power
			device (%)	motor (%)	VFD (%)	input kW
• 4160 CHW Pump with Robicon VFD	3333	***288***	***85.5%***	***93.8%***	***96.0%***	234.7
• 480V CHW Pump with New VFD	3333	***288***	***85.5%***	***95.0%***	***97.0%***	229.3
change in peak power						5.4

annual operation (hours)	8760
average qty pumps online over 8760 hours	**1.85**
average hours of operation, 1 of 3 pumps	5402
assume average speed	75%
speed impact on load	45%
annual energy savings (kWh)	13197
electric expense rate ($/kWh)	$ 0.075546
annual energy savings ($)	$ 997

APPENDIX B

Retro Commissioning Savings Analysis

ECM: Psychrometric Optimization

Building / Air Handling Unit		Unit Total Flow CFM	Min OA CFM	Hr/yr DP<55	Cooling Δh	Cooling BTU	Cooling Tons	Cooling ton-hr year	Cooling kWh @ 0.4 kW/T	Cooling Savings $/yr	Heating BTUH	Heating #/hr	Heating MLB year	Heating Savings $/yr	Remarks	Economizer	VAV Fan Power Savings (Costs) average flow	VAV Fan Power Savings (Costs) power kW	VAV Fan Power Savings (Costs) energy kWh	VAV Fan Power Savings (Costs) Savings	NET total Savings $/yr
SUMMARY ALL SYSTEMS SHOWN	Central Plant							23,310	9,324	$704			12	$295					-	$0	$1,000
	East Wing							85,888	34,355	$2,595			442	$10,884					(36,541)	($2,761)	$10,719
	Finance Building							413,073	165,229	$12,482			687	$16,925					-	$0	$29,407
	Health & Welfare							37,067	14,827	$1,120			191	$4,697					(542)	($41)	$5,776
	Irvis Building							29,360	11,744	$887			151	$3,720					(15,502)	($1,171)	$3,437
	Judicial Building							39,984	15,993	$1,208			139	$3,429					(13,336)	($1,007)	$3,630
	Keystone Building							201,622	80,649	$6,093			1,037	$25,550					(120,004)	($9,066)	$22,577
	Labor & Industry							114,799	45,919	$3,469			590	$14,547					-	$0	$18,016
	Main Capitol							22,619	9,048	$684			116	$2,866					(16,423)	($1,241)	$2,309
	North Office Building							55,200	22,080	$1,668			284	$6,995					(21,006)	($1,587)	$7,076
	Ryan Office Building							28,229	11,292	$853			145	$3,577					-	$0	$4,430
				totals:				1,027,841	411,136	$ 31,060			3,782	$ 93,191					(223,354)	($16,873)	$107,377
Central Plant																					
AC-1	basement west	10,000	1,000	777	4.0	180,000	15.0	11,655	4,662	$352	7,560	7.7	6.0	$148		yes					$500
AC-2	basement east	10,000		777	4.0	180,000	15.0	11,655	4,662	$352	7,560	7.7	6.0	$148		yes					$500
East Wing																					
AHU-1	Plaza N East	35,000	5,600	777	4	100,800	8.4	6,527	2,611	$197	42,336	43.2	33.6	$827		yes	75%	(6.8)	(5,278)	($399)	$626
AHU-2	Plaza N West	35,000	5,600	777	4	100,800	8.4	6,527	2,611	$197	42,336	43.2	33.6	$827		yes	75%	(6.8)	(5,278)	($399)	$626
AHU-3	Plaza S East	35,000	5,600	777	4	100,800	8.4	6,527	2,611	$197	42,336	43.2	33.6	$827		yes	75%	(6.8)	(5,278)	($399)	$626
AHU-4	Plaza S West	35,000	5,600	777	4	100,800	8.4	6,527	2,611	$197	42,336	43.2	33.6	$827		yes	75%	(6.8)	(5,278)	($399)	$626
AHU-8	Media	16,000	1,760	777	4	31,680	2.6	2,051	821	$62	13,306	13.6	10.5	$260		yes	75%	(3.1)	(2,413)	($182)	$140
AHU-9	Capitol Police	9,500	1,520	777	4	27,360	2.3	1,772	709	$54	11,491	11.7	9.1	$224		yes	75%	(1.8)	(1,433)	($108)	$170
AHU-13	IMCS Equipment	10,000	-	2,487	4	18,000	1.5	3,731	1,492	$113	7,560	7.7	19.2	$473		no	75%	(1.9)	(4,827)	($365)	$221
AHU-14	Kitchen	14,000	14,000	2,487	4	252,000	21.0	52,227	20,891	$1,578	105,840	108.0	268.6	$6,618		no	75%	(2.7)	(6,757)	($510)	$7,686
Finance																					
AHU-A	Basement	11,536	*2,884*	1,795	4.0	207,648	17.3	31,061	12,424	$939	21,803	22.2	39.9	$984		%					$1,923
AHU-B	Basement	7,516	*2,381*	1,795	4.0	135,288	11.3	20,237	8,095	$612	18,000	18.4	33.0	$812		%					$1,424
AHU-C	1st FL	25,924	*8,555*	1,795	4.0	466,632	38.9	69,800	27,920	$2,109	64,675	66.0	118.5	$2,919		%					$5,028
AHU-D	1st FL	20,648	*6,814*	1,795	4.0	371,664	31.0	55,595	22,238	$1,680	51,513	52.6	94.4	$2,325		%					$4,005
AHU-E	4th FL	40,592	*13,395*	1,795	4.0	730,656	60.9	109,294	43,718	$3,303	101,269	103.3	185.5	$4,570		%					$7,873
AHU-F	4th FL	47,200	*15,576*	1,795	4.0	849,600	70.8	127,086	50,834	$3,840	117,755	120.2	215.7	$5,314		%					$9,155
Health & Welfare																					
AHU-1	North Exterior	26,700	6,675	563	4	120,150	10.0	5,637	2,255	$170	50,463	51.5	29.0	$714		yes					$885
AHU-2	East Interior	38,500	14,800	563	4	266,400	22.2	12,499	4,999	$378	111,888	114.2	64.3	$1,584		yes					$1,962
AHU-3	South Exterior	22,500	5,625	563	4	101,250	8.4	4,750	1,900	$144	42,525	43.4	24.4	$602		yes					$746
AHU-4	West Interior	41,300	15,800	563	4	284,400	23.7	13,343	5,337	$403	119,448	121.9	68.6	$1,691		yes					$2,094
AHU-5	Annex	***4,960***	***992***	563	4	17,856	1.5	838	335	$25	7,500	7.7	4.3	$106		yes	75%	(1.0)	(542)	($41)	$91
Irvis																					
AC-1	Ground thru 6th FL	49,000	9,800	777	4	176,400	14.7	11,422	4,569	$345	74,088	75.6	58.7	$1,447		yes	75%	(9.5)	(7,389)	($558)	$1,234
AC-2	Ground thru 6th FL	49,000	9,800	777	4	176,400	14.7	11,422	4,569	$345	74,088	75.6	58.7	$1,447		yes	75%	(9.5)	(7,389)	($558)	$1,234
AC-3	Basement	8,500	850	777	4	15,300	1.3	991	396	$30	6,426	6.6	5.1	$126		yes					$155
AC-4	Basement	4,800	480	777	4	8,640	0.7	559	224	$17	3,629	3.7	2.9	$71		yes	75%	(0.9)	(724)	($55)	$33
AC-5	Basement	8,000	800	2,487	4	14,400	1.2	2,984	1,194	$90	6,048	6.2	15.3	$378		no					$468
AC-6	Basement	7,500	750	777	4	13,500	1.1	874	350	$26	5,670	5.8	4.5	$111		yes					$137
AC-7	Snack Bar	3,800	950	777	4	17,100	1.4	1,107	443	$33	7,182	7.3	5.7	$140		yes					$174

ECM: Psychrometric Optimization

Building / Air Handling Unit		Unit Total Flow CFM	Min OA CFM	Hr/yr DP<55	Cooling						Heating				Remarks	Economizer	VAV Fan Power Savings (Costs)				NET total Savings $/yr
					Δh	BTU	Tons	ton-hr year	kWh @ 0.4 kW/T	Savings $/yr	BTUH	#/hr	MLB year	Savings $/yr			average flow	power kW	energy kWh	Savings	
Judicial																					
AHU/B-1	Basement	3,650	1,380	1,795	4	24,840	2.1	3,716	1,486	$112	10,433	10.6	19.1	$471		no	75%	(0.7)	(1,272)	($96)	$487
AHU/B-2	Basement	10,400	-	1,795	4	18,720	1.6	2,800	1,120	$85	7,862	8.0	14.4	$355		no	75%	(2.0)	(3,623)	($274)	$166
AHU/B-3	Basement	1,410	530	1,795	4	9,540	0.8	1,427	571	$43	4,007	4.1	7.3	$181		no	75%	(0.3)	(491)	($37)	$187
AHU/2-A	2nd FL C Wing	12,690	4,800	1,795	4	86,400	7.2	12,924	5,170	$391					no reheat	no	75%	(2.5)	(4,421)	($334)	$57
AHU/4-C	4th FL Courtroom	2,930	2,090	1,795	4	37,620	3.1	5,627	2,251	$170	15,800	16.1	28.9	$713		no	75%	(0.6)	(1,021)	($77)	$806
AHU/4-D	4th FL Courtroom	2,930	2,090	1,795	4	37,620	3.1	5,627	2,251	$170	15,800	16.1	28.9	$713		no	75%	(0.6)	(1,021)	($77)	$806
AHU/5-C	5th FL Courtroom	4,270	2,920	1,795	4	52,560	4.4	7,862	3,145	$238	22,075	22.5	40.4	$996		no	75%	(0.8)	(1,488)	($112)	$1,121
Keystone																					
1	AHU-N-1	38,000	17,500	563	4	315,000	26.3	14,779	5,912	$447	132,300	135	76.0	$1,873		yes	75%	(7.4)	(4,152)	($314)	$2,006
2	AHU-N-2	38,000	17,500	563	4	315,000	26.3	14,779	5,912	$447	132,300	135	76.0	$1,873		yes	75%	(7.4)	(4,152)	($314)	$2,006
3	AHU-N-3	38,000	17,500	563	4	315,000	26.3	14,779	5,912	$447	132,300	135	76.0	$1,873		yes	75%	(7.4)	(4,152)	($314)	$2,006
4	AHU-N-4	60,000	0	1,795	4	108,000	9.0	16,155	6,462	$488	45,360	46	83.1	$2,047		no	75%	(11.6)	(20,902)	($1,579)	$956
5	AHU-N-5	38,000		563	4	68,400	5.7	3,209	1,284	$97	28,728	29	16.5	$407		yes	75%	(7.4)	(4,152)	($314)	$190
6	AHU-N-6	38,000	17,500	563	4	315,000	26.3	14,779	5,912	$447	132,300	135	76.0	$1,873		yes	75%	(7.4)	(4,152)	($314)	$2,006
7	AHU-N-7	38,000	17,500	563	4	315,000	26.3	14,779	5,912	$447	132,300	135	76.0	$1,873		yes	75%	(7.4)	(4,152)	($314)	$2,006
8	AHU-E-1	26,300	7,500	563	4	135,000	11.3	6,334	2,534	$191	56,700	58	32.6	$803		yes	75%	(5.1)	(2,874)	($217)	$777
9	AHU-E-2	26,300	7,500	563	4	135,000	11.3	6,334	2,534	$191	56,700	58	32.6	$803		yes	75%	(5.1)	(2,874)	($217)	$777
10	AHU-E-3	26,300	7,500	563	4	135,000	11.3	6,334	2,534	$191	56,700	58	32.6	$803		yes	75%	(5.1)	(2,874)	($217)	$777
11	AHU-E-4	35,000	0	1,795	4	63,000	5.3	9,424	3,770	$285	26,460	27	48.5	$1,194		no	75%	(6.8)	(12,193)	($921)	$558
12	AHU-E-5	38,000	9,000	563	4	162,000	13.5	7,601	3,040	$230	68,040	69	39.1	$963		yes	75%	(7.4)	(4,152)	($314)	$879
13	AHU-E-6	38,000	9,000	563	4	162,000	13.5	7,601	3,040	$230	68,040	69	39.1	$963		yes	75%	(7.4)	(4,152)	($314)	$879
14	AHU-E-7	38,000	9,000	563	4	162,000	13.5	7,601	3,040	$230	68,040	69	39.1	$963		yes	75%	(7.4)	(4,152)	($314)	$879
15	AHU-W-1	26,300	7,500	563	4	135,000	11.3	6,334	2,534	$191	56,700	58	32.6	$803		yes	75%	(5.1)	(2,874)	($217)	$777
16	AHU-W-2	26,300	7,500	563	4	135,000	11.3	6,334	2,534	$191	56,700	58	32.6	$803		yes	75%	(5.1)	(2,874)	($217)	$777
17	AHU-W-3	26,300	7,500	563	4	135,000	11.3	6,334	2,534	$191	56,700	58	32.6	$803		yes	75%	(5.1)	(2,874)	($217)	$777
18	AHU-W-4	35,000	0	1,795	4	63,000	5.3	9,424	3,770	$285	26,460	27	48.5	$1,194		no	75%	(6.8)	(12,193)	($921)	$558
19	AHU-W-5	38,000	9,000	563	4	162,000	13.5	7,601	3,040	$230	68,040	69	39.1	$963		yes	75%	(7.4)	(4,152)	($314)	$879
20	AHU-W-6	38,000	9,000	563	4	162,000	13.5	7,601	3,040	$230	68,040	69	39.1	$963		yes	75%	(7.4)	(4,152)	($314)	$879
21	AHU-W-7	38,000	9,000	563	4	162,000	13.5	7,601	3,040	$230	68,040	69	39.1	$963		yes	75%	(7.4)	(4,152)	($314)	$879
22	AHU-A-1	35,000	0	563	4	63,000	5.3	2,956	1,182	$89	26,460	27	15.2	$375		yes	75%	(6.8)	(3,824)	($289)	$175
23	AHU-A-2	35,000	0	563	4	63,000	5.3	2,956	1,182	$89	26,460	27	15.2	$375		yes	75%	(6.8)	(3,824)	($289)	$175
Labor & Industry																					
AHU-8	East Wing Interior	32,000	11,789	563	4	212,211	17.7	9,956	3,982	$301	89,128	90.9	51.2	$1,262		yes					$1,563
AHU-9	East Wing Primary	5,800	5,800	563	4	104,400	8.7	4,898	1,959	$148	43,848	44.7	25.2	$621		yes					$769
AHU-10	West Wing Primary	6,100	6,100	563	4	109,800	9.2	5,151	2,061	$156	46,116	47.1	26.5	$653		yes					$808
AHU-11	West Wing Interior	14,060	5,180	563	4	93,240	7.8	4,375	1,750	$132	39,161	40.0	22.5	$554		yes					$687
AHU-12	West Wing Interior	13,940	8,804	563	4	158,476	13.2	7,435	2,974	$225	66,560	67.9	38.2	$942		yes					$1,167
AHU-2	North Primary	34,500	34,500	563	4	621,000	51.8	29,135	11,654	$880	260,820	266.1	149.8	$3,692		yes					$4,572
AHU-3	South Primary	32,500	32,500	563	4	585,000	48.8	27,446	10,979	$829	245,700	250.7	141.2	$3,478		yes					$4,307
AHU-4A	North Interior	27,000	7,816	563	4	140,684	11.7	6,600	2,640	$199	59,087	60.3	33.9	$836		yes					$1,036
AHU-4B	North Interior	27,000	7,816	563	4	140,684	11.7	6,600	2,640	$199	59,087	60.3	33.9	$836		yes					$1,036
AHU-5A	South Interior	27,500	7,816	563	4	140,684	11.7	6,600	2,640	$199	59,087	60.3	33.9	$836		yes					$1,036
AHU-5B	South Interior	27,500	7,816	563	4	140,684	11.7	6,600	2,640	$199	59,087	60.3	33.9	$836		yes					$1,036

ECM: Psychrometric Optimization

Building / Air Handling Unit		Unit Total Flow CFM	Min OA CFM	Hr/yr DP<55	Cooling						Heating				Remarks	Economizer	VAV Fan Power Savings (Costs)				NET total Savings $/yr
					Δh	BTU	Tons	ton-hr year	kWh @ 0.4 kW/T	Savings $/yr	BTUH	#/hr	MLB year	Savings $/yr			average flow	power kW	energy kWh	Savings	
Main Capitol																					
1	AHU-1	2,500	75	2,487	4	1,350	0.1	280	112	$8	567	0.6	1.4	$35		no					$44
3	AHU-3	2,900	290	777	4	5,220	0.4	338	135	$10	2,192	2.2	1.7	$43		yes					$53
4	AHU-4	3,200	96	2,487	4	1,728	0.1	358	143	$11	726	0.7	1.8	$45		no					$56
5	AHU-5	3,150	378	2,487	4	6,804	0.6	1,410	564	$43	2,858	2.9	7.3	$179		no					$221
6	AHU-6	1,200	144	777	4	2,592	0.2	168	67	$5	1,089	1.1	0.9	$21		yes					$26
7	AHU-7	2,500	75	2,487	4	1,350	0.1	280	112	$8	567	0.6	1.4	$35		no					$44
9	AHU-19	19,315	2,897	777	4	52,151	4.3	3,377	1,351	$102	21,903	22.4	17.4	$428		yes	75%	(3.7)	(2,913)	($220)	$310
10	AHU-20	5,750	863	777	4	15,525	1.3	1,005	402	$30	6,521	6.7	5.2	$127		yes	75%	(1.1)	(867)	($66)	$92
11	AHU-21	6,780		777	4	12,204	1.0	790	316	$24	5,126	5.2	4.1	$100		yes	75%	(1.3)	(1,022)	($77)	$47
12	AHU-22	6,780		777	4	12,204	1.0	790	316	$24	5,126	5.2	4.1	$100		yes	75%	(1.3)	(1,022)	($77)	$47
13	AHU-23	5,875	881	777	4	15,863	1.3	1,027	411	$31	6,662	6.8	5.3	$130		yes	75%	(1.1)	(886)	($67)	$94
14	AHU-24	5,875	588	777	4	10,575	0.9	685	274	$21	4,442	4.5	3.5	$87		yes	75%	(1.1)	(886)	($67)	$41
15	AHU-25	3,500	525	777	4	9,450	0.8	612	245	$18	3,969	4.1	3.1	$78		yes	75%	(0.7)	(528)	($40)	$56
16	AHU-27	3,925	393	777	4	7,065	0.6	457	183	$14	2,967	3.0	2.4	$58		yes	75%	(0.8)	(592)	($45)	$27
17	AHU-29	5,875	1,469	777	4	26,438	2.2	1,712	685	$52	11,104	11.3	8.8	$217		yes	75%	(1.1)	(886)	($67)	$202
18	AHU-30	5,875	881	777	4	15,863	1.3	1,027	411	$31	6,662	6.8	5.3	$130		yes					$161
19	AHU-31	6,780	1,695	777	4	30,510	2.5	1,976	790	$60	12,814	13.1	10.2	$250		yes	75%	(1.3)	(1,022)	($77)	$233
20	AHU-32	6,780	678	777	4	12,204	1.0	790	316	$24	5,126	5.2	4.1	$100		yes	75%	(1.3)	(1,022)	($77)	$47
24	AHU-42	3,325	499	777	4	8,978	0.7	581	233	$18	3,771	3.8	3.0	$74		yes	75%	(0.6)	(501)	($38)	$53
28	AHU-A	28,350	4,253	777	4	76,545	6.4	4,956	1,983	$150	32,149	32.8	25.5	$628		yes	75%	(5.5)	(4,275)	($323)	$455
North Office																					
AC-1	BSMT thru 6th FL	69,650	23,681	777	4	426,258	35.5	27,600	11,040	$834	179,028	183	141.9	$3,497		yes	75%	(13.5)	(10,503)	($793)	$3,538
AC-2	BSMT thru 6th FL	69,650	23,681	777	4	426,258	35.5	27,600	11,040	$834	179,028	183	141.9	$3,497		yes	75%	(13.5)	(10,503)	($793)	$3,538
Ryan																					
AHU-1	Basement (East)	1,500	1,500	1,795	4	27,000	2.3	4,039	1,616	$122	11,340	11.6	20.8	$512		no					$634
AHU-2	Basement (East)	2,270	2,270	1,795	4	40,860	3.4	6,112	2,445	$185	17,161	17.5	31.4	$775		no					$959
AHU-3	Attic	2,270	2,270	1,795	4	40,860	3.4	6,112	2,445	$185	17,161	17.5	31.4	$775		no					$959
AHU-4	Basement (West)	2,340	1,550	563	4	27,900	2.3	1,309	524	$40	11,718	12.0	6.7	$166		yes					$205
AHU-5	Basement (West)	2,080	2,080	1,795	4	37,440	3.1	5,600	2,240	$169	15,725	16.0	28.8	$710		no					$879
AHU-7	Attic	1,400	1,400	1,795	4	25,200	2.1	3,770	1,508	$114	10,584	10.8	19.4	$478		no					$592
AHU-8	Basement	4,080	1,525	563	4	27,450	2.3	1,288	515	$39	11,529	11.8	6.6	$163		yes					$202

Central Plant

Assumption		Remarks
Cooling Enthalpy Savings (Δh)	4.00	Btu/lbm dry air
Day Time Cooling Operation Hours <55 DP	1,795	hr/yr
Day Time Cooling Operation Hours <55 DP with Economizers	563	hr/yr
Day Time Cooling Operation Hours <55 DP Core Buildings*	2,487	hr/yr
Day Time Cooling Operation Hours <55 DP with Economizers Core Buildings*	777	hr/yr
ΔT Reduction for Reheat Savings	7.00	deg.F
Cost of Electricity ($/kWh)	$ 0.075546	/kWh
Cost of steam ($/MLb)	$ 24.64	/MLB
Assumed average VAV flow rate under optimizing conditions	75%	of full flow
Optimization impact on fan power	(0.000194)	kW/kCFM of unit design flow
pro-rated average shoulder season power input rate for cooling	0.40	k/ton

* Core buildings are North Office, Irvis Office, Main Capitol and East Wing

Retro-Commissioning (rCx)
Buildings Served by Central CHW Loop

Enhancement Savings Estimates

Enhancement Savings Estimates

			rCx conditions per BMS Graphics 2/13/2018															Heating Season					Cooling Season					Utility Savings				
			total	OA	system	CC	CC	CC	CC	CC	CC	CC	PHT	PHT	PHT	PHT	PHT	OCC	UNO	excess	excess	UNO	OCC	UNO	excess	excess	UNO	district steam		district CHW		Total
ID #	Building	Service	unit cfm	min cfm	air flow cfm	valve position	capacity mBh	excess deg.F	air flow cfm	EAT deg.F	LAT deg.F	excess deg.F	air flow OA min cfm	EAT deg.F	LAT deg.F	LAT set deg.F	excess deg.F	heating hours	heating hours	cooling tons	steam MLB/hr	leakage MLB/hr	cooling hours	cooling hours	cooling tons	steam MLB/hr	leakage MLB/hr	annual MLB	expenses $/yr	annual kWh	expenses $/yr	Savings $/yr
Fan A	Finance	bsmt west	11,536	274	100%				100%	73.2	55.9	17.3	100%	35.4	57.6	45.0	12.6	1,537	3,044	18.0	0.0	0.0	1,591	2,587	0.3	0.0	0.0	11.7	$ 288	11,356	$ 858	$ 1,146
Fan B	Finance	bsmt east	7,516	2,381	100%				100%				100%	35.4	77.0	45.0	32.0	1,537	3,044	-	0.1	0.0	1,591	2,587	6.9	0.1	0.0	257.9	$ 6,355	6,897	$ 521	$ 6,876
Fan C1&2	Finance	low flrs east	25,924	145	100%				100%	70.0	66.2	3.8	100%	35.4	73.2	45.0	28.2	1,537	3,044	8.9	0.0	0.0	1,591	2,587	0.4	0.0	0.0	13.8	$ 341	5,821	$ 440	$ 781
Fan D1&2	Finance	low flrs west	20,648	2,065	100%				100%	69.7	65.5	4.2	100%	35.4	50.7	45.0	5.7	1,537	3,044	7.8	0.0	0.0	1,591	2,587	1.1	0.0	0.0	39.8	$ 981	5,864	$ 443	$ 1,424
Fan E1&2	Finance	uppr flrs east	40,592	3,099	100%				100%	65.5	56.7	8.8	100%	35.4	65.2	45.0	20.2	1,537	3,044	32.1	0.1	0.0	1,591	2,587	5.6	0.1	0.0	211.9	$ 5,221	25,432	$ 1,921	$ 7,142
Fan F1&2	Finance	uppr flrs west	47,200	1,974	100%				100%	63.1	51.7	11.4	100%	35.4	57.7	45.0	12.7	1,537	3,044	48.4	0.0	0.0	1,591	2,587	2.3	0.0	0.0	84.8	$ 2,090	32,042	$ 2,421	$ 4,511
AC-1	CW Plant		10,000	300	100%				100%	106.7	66.1	40.6	100%	73.5	106.7	45.0	33.2	4,581	-	36.6	0.4		4,178	-	29.9	0.4	0.0	3,140.6	$ 77,385	145,894	$ 11,022	$ 88,407
AC-2	CW Plant		10,000	1,000	100%				100%	70.8	49.9	20.9	100%					4,581	-	18.8	-		4,178	-	-	-	-	-	$ -	34,467	$ 2,604	$ 2,604
AC-1	North	building east	69,650			19.0%	3,479	8.3	35.0%	67.8	59.1	8.7	5%	59.1	114.5	98.6	15.9	2,152	2,429	18.2	0.1	-	2,228	1,950				128.7	$ 3,171	15,648	$ 1,182	$ 4,353
AC-2	North	building west	69,650			44.0%	3,479	18.7	36.0%	63.4	61.6	1.8	5%	-	-	-	-	2,152	2,429	42.1	-	-	2,228	1,950				-	$ -	36,236	$ 2,738	$ 2,738
AC-5	Irvis	local	8,000			11.0%	***400***	1.7	100.0%	-	-	-		-	-	-	-	2,152	2,429	1.2								-	$ -	1,041	$ 79	$ 79
AC-6	Irvis	local	7,500						50.0%	-	-	(28.4)	50%	50.0	78.4	50.0	28.4	2,152	2,429	(9.6)	0.1	-	2,228	1,950				247.5	$ 6,099	(8,251)	$ (623)	$ 5,476
AHU-1	East Wing	Plaza N East	35,000	5,600			1,375						76%	61.8	65.4	45.0	3.6	2,152	2,429	-	0.1	-	2,228	1,950	8.7	0.1		454.8	$ 11,206	12,185	$ 921	$ 12,126
AHU-2	East Wing	Plaza N West	35,000	5,600			1,375		60.0%	62.9	51.4	11.5						2,152	2,429	21.7	-	-	2,228	1,950				-	$ -	18,709	$ 1,413	$ 1,413
AHU-4	East Wing	Plaza S West	35,000	5,600			1,375						63%	58.0	60.3	45.0	2.3	2,152	2,429	-	0.1	-	2,228	1,950				116.9	$ 2,881	-	$ -	$ 2,881
AHU-5	East Wing	North Atrium	15,000	450			500						64%	51.9	62.5	45.0	10.6	2,152	2,429	-	0.1	-	2,228	1,950	9.2	0.1		482.3	$ 11,883	12,922	$ 976	$ 12,859
AHU-6	East Wing	Dome	15,000	750			500						87%	69.2	72.3	45.0	3.1	2,152	2,429	-	0.0	-	2,228	1,950	3.6	0.0		191.6	$ 4,721	5,133	$ 388	$ 5,109
AHU-7	East Wing	South Atrium	15,000	450			500		81.9%	64.2	59.3	4.9	82%	59.3	64.2	45.0	4.9	2,152	2,429	5.4	0.1	-						139.9	$ 3,447	4,664	$ 352	$ 3,800
AHU-10	East Wing	Shops	5,000	400		51.7%	178	5.6	100.0%				100%	51.2	58.5	45.0	7.3	2,152	2,429	2.5	0.0	-	2,228	1,950	3.3	0.0		173.2	$ 4,268	6,820	$ 515	$ 4,783
AHU-12	East Wing	IMCS Space	5,000	400		22.7%	178		72.7%	77.4	69.1	8.3	73%	69.1	73.4	69.1	4.3	2,152	2,429	2.7	0.0	-	2,228	1,950				36.3	$ 895	2,337	$ 177	$ 1,072
AHU-14	East Wing	Kitchen	14,000	14,000			1,134		100.0%	60.4	59.3	1.1	100%	49.8	60.4	59.3	1.1	2,152	2,429	1.4	0.0	-	2,228	1,950				35.8	$ 882	1,193	$ 90	$ 972
AHU-16	East Wing	Senate bills (AHU3A?)	5,250			54.6%	110		100.0%	66.1	51.9	14.2						2,152	2,429	6.7	-	-	2,228	1,950				-	$ -	5,786	$ 437	$ 437
AHU-1	MC	basement north	2,500	75					100.0%	77.4	69.1	8.3						2,152	2,429	1.9	-	-	2,228	1,950				-	$ -	1,608	$ 121	$ 121
AHU-8	MC	1st floor north	2,500	250					100.0%	71.2	52.6	18.6						2,152	2,429	4.2	-	-	2,228	1,950				-	$ -	3,602	$ 272	$ 272
AHU-21	MC	north dome	6,780						75.1%	70.6	54.9	15.7						2,152	2,429	7.2	-		2,228	1,950				-	$ -	6,193	$ 468	$ 468
AHU-22	MC	north dome	6,780						75.1%	67.0	55.0	12.0						2,152	2,429	5.5	-		2,228	1,950				-	$ -	4,734	$ 358	$ 358
AHU-23	MC	north dome	5,875	881					65.2%	73.9	57.9	16.0						2,152	2,429	5.5	-		2,228	1,950				-	$ -	4,748	$ 359	$ 359
AHU-24	MC	north dome	5,875	588					57.7%	70.0	54.8	15.2						2,152	2,429	4.6	-		2,228	1,950				-	$ -	3,992	$ 302	$ 302
AHU-25	MC	rm 601D	3,500	525		0.4%	130	0.1	66.6%	73.2	64.1	9.2	67%	66.2	73.2	65.0	7.1	2,152	2,429	0.0	0.0		2,228	1,950				38.3	$ 942	12	$ 1	$ 943
AHU-42	MC	north hyphen	3,325	499		16.5%	123		63.4%	72.4	59.8	12.7						2,152	2,429	2.4	-		2,228	1,950				-	$ -	2,066	$ 156	$ 156
AHU-43	MC	3rd floor north	***7,500***	***1,125***		60.6%			80.8%	72.6	63.9	8.8						2,152	2,429	4.8	-		2,228	1,950				-	$ -	4,108	$ 310	$ 310
AHU-45	MC	entresol south	***6,500***	***975***		26.7%			45.0%	70.8	65.1	5.7						2,152	2,429	1.5	-		2,228	1,950				-	$ -	1,302	$ 98	$ 98
AC-1	Ryan	Basement (East)	1,500	1,500		19.8%	104	4.2	100.0%				100%	31.6			4.2	2,152	2,429	0.6	0.0		2,228	1,950				14.7	$ 361	489	$ 37	$ 398
AC-4	Ryan	Basement (West)	2,340	1,550		20.5%	121		100.0%	64.3	59.0	5.3	100%					2,152	2,429	1.1	-		2,228	1,950				-	$ -	961	$ 73	$ 73
AC-5	Ryan	Basement (West)	2,080	2,080		22.8%	144	4.8	100.0%	63.6	59.2	4.4	100%	60.0	63.6	60.0	3.6	2,152	2,429	0.9	0.0		2,228	1,950	0.7	0.0	0.0	51.2	$ 1,261	1,726	$ 130	$ 1,392
AC-6	Ryan	Attic	8,890	1,400		26.8%	329	3.0	100.0%				100%				3.0	2,152	2,429	2.4	0.0		2,228	1,950				62.6	$ 1,543	2,087	$ 158	$ 1,701
AC-2	L&I	North Primary	34,500	25,530									100%	60.0	62.0		2.0	1,851	2,730	-	0.1		1,799	2,379				137.9	$ 3,399	-	$ -	$ 3,399
AC-3	L&I	South Primary	32,500	24,050									100%	58.0	64.2		6.2	1,851	2,730	-	0.2		1,799	2,379				402.8	$ 9,925	-	$ -	$ 9,925
AC-4A	L&I	North Interior	27,000	7,816									100%	55.0	59.5		4.5	1,851	2,730	-	0.1		1,799	2,379				242.9	$ 5,984	-	$ -	$ 5,984
AC-4B	L&I	North Interior	27,000	7,816									100%	55.0	59.5		4.5	1,851	2,730	-	0.1		1,799	2,379				242.9	$ 5,984	-	$ -	$ 5,984
AC-5A	L&I	South Interior	27,500	7,816									100%	60.0	62.0		2.0	1,851	2,730	-	0.1		1,799	2,379				109.9	$ 2,709	-	$ -	$ 2,709
AC-5B	L&I	South Interior	27,500	7,816									100%	60.0	62.0		2.0	1,851	2,730	-	0.1		1,799	2,379				109.9	$ 2,709	-	$ -	$ 2,709
AC-9	L&I	East Wing Primary	5,800	5,800									100%	55.0	59.0		4.0	1,851	2,730	-	0.0		1,799	2,379		0.0		91.4	$ 2,253	-	$ -	$ 2,253
AC-10	L&I	West Wing Primary	6,100	6,100									100%	56.7	61.0		4.3	1,851	2,730	-	0.0		1,799	2,379		0.0		103.4	$ 2,548	-	$ -	$ 2,548
AC-11	L&I	West Wing Interior	14,060	5,180									100%	55.4	58.1		2.7	1,851	2,730	-	0.0		1,799	2,379				75.9	$ 1,870	-	$ -	$ 1,870
AC-12	L&I	West Wing Interior	13,940	8,804									100%	54.6	58.4		3.8	1,851	2,730	-	0.1		1,799	2,379				105.9	$ 2,609	-	$ -	$ 2,609
AHUs	L&I	Scheduling	247,900	118,517									20%	37.5	55.0		17.5	314		-	0.9							293.3	$ 7,228	-	$ -	$ 7,228
AC-2	H&W	East Interior	38,500	14,800									100%				9.0	1,851	2,730	-	0.4	-	1,799	2,379				691.9	$ 17,048	-	$ -	$ 17,048
AHUs	L&I	Scheduling	129,000	42,900									20%	37.5	55.0		17.5	314		-	0.5							152.6	$ 3,761	-	$ -	$ 3,761
MUA-B	Justice	AHUB1-3,1-5B,6-9	46,570	46,570	100%	0.6%	2,223	0.1	100%			-	100%	49.9	55.4	45.0	5.5	1,537	3,044	-	0.3	-	1,591	2,587				428.1	$ 10,548	-	$ -	$ 10,548
AHU-B1	Justice	MUA-B	3,650			0.7%	127	0.1	100.0%			-					0.1	1,537	3,044	0.0	-	-						-	$ -	15	$ 1	$ 1
AHU-B3	Justice	MUA-B	1,410			1.1%	50	0.1	100.0%			-					0.1	1,537	3,044	0.0	-	-						-	$ -	9	$ 1	$ 1
AHU-1B	Justice	MUA-B	20,880			22.1%	726	9.2	25.6%	60.3	55.4	5.0						1,537	3,044	4.4	-	-						-	$ -	2,713	$ 205	$ 205
AHU-2B	Justice	MUA-B	15,470			16.5%	548	6.2	28.6%			-						1,537	3,044	2.5	-	-						-	$ -	1,529	$ 115	$ 115
AHU-3B	Justice	MUA-B	16,780			15.4%	629	5.7	31.0%	64.0	59.3	4.8						1,537	3,044	2.7	-	-						-	$ -	1,638	$ 124	$ 124
AHU-4B	Justice	MUA-B	17,730			16.9%	688	8.4	23.8%			-						1,537	3,044	3.2	-	-						-	$ -	1,966	$ 149	$ 149
AHU-5B	Justice	MUA-B	15,465			8.7%	537	3.0	30.6%			-						1,537	3,044	1.3	-	-						-	$ -	790	$ 60	$ 60
AHU-6	Justice	MUA-B	15,110			1.4%	527	0.6	26.0%			-						1,537	3,044	0.2	-	-						-	$ -	125	$ 9	$ 9
AHU-7	Justice	MUA-B	15,840			0.3%	548	0.1	30.8%			-						1,537	3,044	0.0	-	-						-	$ -	28	$ 2	$ 2
AHU-8	Justice	MUA-B	12,830			5.7%	453	2.0	31.0%	61.2	58.9	2.4						1,537	3,044	0.7	-	-						-	$ -	437	$ 33	$ 33
AHU-9	Justice	MUA-B	14,020			22.2%	495	8.9	27.0%	60.9	57.2	3.8						1,537	3,044	3.0	-	-						-	$ -	1,858	$ 140	$ 140
MUA-C	Justice	AHU1&4C,2-5A,4-5C	31,700	31,700	100%	1.0%	1,267	0.1	100%				100%	53.5	57.7	45.0	4.2	1,537	3,044	-	0.1	-	1,591	2,587				219.5	$ 5,409	-	$ -	$ 5,409
AHU-1D	Justice	MUA-C	23,035			20.8%	779	10.2	21.0%	61.8	57.6	4.3						1,537	3,044	4.5	-	-						-	$ -	2,739	$ 207	$ 207
AHU-2A	Justice	MUA-C	12,690			7.9%	440	3.5	24.0%			-						1,537	3,044	1.0	-	-						-	$ -	588	$ 44	$ 44
AHU-3A	Justice	MUA-C	14,440			20.5%	442	7.4	26.0%			-						1,537	3,044	2.5	-	-						-	$ -	1,532	$ 116	$ 116
AHU-4A	Justice	MUA-C	11,810			12.2%	417	4.3	30.9%	60.6	57.3	3.4						1,537	3,044	1.4	-	-						-	$ -	860	$ 65	$ 65
AHU-4C	Justice	MUA-C	2,930			0.6%	104	0.1	100.0%			-					0.1	1,537	3,044	0.0	-	-						-	$ -	11	$ 1	$ 1
AHU-4D	Justice	MUA-C	2,930			0.8%	104	0.1	100.0%			-					0.1	1,537	3,044	0.0	-	-						-	$ -	14	$ 1	$ 1
AHU-5A	Justice	MUA-C	14,450			22.9%	498	11.5	21.0%			-						1,537	3,044	3.1	-	-						-	$ -	1,928	$ 146	$ 146
AHU-5C	Justice	MUA-C	4,270			1.0%	150	0.1	100.0%			-					0.1	1,537	3,044	0.0	-	-						-	$ -	25	$ 2	$ 2
																																$ 263,343

The following pages contain a sampling of screen grabs from the Metasys and webCTRL BMS systems. This sample represents a strong subset of the savings potential from routine rCx improvements.

DERIVATION OF SAVINGS

- Eroded steam valve control surfaces.

In steam systems, control surfaces may erode quickly at high velocities. Though intended for steam service, seats in valves oversized for their applications or otherwise forced to throttle excessively may be wire-drawn beyond the bounds of usefulness long before anticipated lifespan.
This ECM identifies valves rendered inadequate for precise throttling by seat erosion. The scope will

This ECM identifies valves rendered inadequate for precise throttling by seat erosion. The scope will repair, rebuild or replace the failing valve as practical. Capacity reduction may be considered for valves slated for replacement.

- Air-side economizer inactive or not sufficiently engaged.

The damaging potential of frigid air carries an inherent incentive for blanketing damper- and coil- controls in safety factor. Economizer sequencing in older control systems often undergoes repeated field modification and from-the-hip adjustment to minimize risk and sidestep expensive surprises. Sensor drift and related calibration issues help drive the debate when weighing optimum efficiency against avoided downside.

This ECM restores air-side economizer where presently impaired by sensor issues or temporary "fixes" permanently residing in the system setpoints and sequencing. The ECM will also generate a scope of sensors needing calibration or replacement.

- Excessive pre-heat setpoints.

Frigid air inspires caution with regard to control settings. Such is the case with preheat settings in a greater sense than the economizer. The conventional low pressure steam heating system delivers 50 times the energy of an equal mass of heating water. The difficulty of turning down steam flow with precision by way of a comparatively large valve in part underlies the face-and-bypass concept.

This ECM modifies control of preheat coil control valves, along with that of face & bypass preheat arrangements. The ECM will also generate a scope of sensors needing calibration or replacement.

- Overlap or insufficient dead-band between setpoints of opposing coils.

Our evaluation finds numerous occasions in which air is first heated then subsequently cooled due to conflict in setpoints. Simultaneous heating and cooling is costly and should be avoided unless absolutely necessary (i.e., where active de-humidification is indispensible).

This ECM reviews and revises setpoints for each unit currently engaged in simultaneous heating and cooling.

- Index rates for some coil control valves appear to be unduly quick and should be slowed.

  Proportional+Integral+Derivative control offers slow response rates in the margin to either side of setpoint but much faster response when needed. Slow response is desired for routine daily load progression and occupant migration. Fast response should be reserved for the deviation seen in meeting rooms and on morning start, or often results in overshoot.

  This ECM tunes response times to minimize overshoot for a wider deadband effect. The work shall proceed hand-in-hand with a review of steam pressure- and heating water supply- resets.

- Above freezing, economizer sequencing on face & bypass preheats may cause unnecessarily high mixed air temperatures and erode valve seats.

  When mild ambients coincide with high internal gain rates, economizers at Finance are impaired by a number of conditions, including face dampers fully open to preheat coils with leaking valves and/or residual heat.

  The existence of freeze protection circulators and coil bypasses together represent a great deal of latitude in optimization. The imposition of OA reset schedules on the preheat become possible. And with the circulator in operation, bypass face dampers may be held closed to improve economizer.

- Insufficient or uncoordinated control of return air stream imparing economizer.

  As noted earlier, Finance building AHUs do not regulate return air volumes directly. The reduction in economizer volume adds to the chilled water load throughout the winter.

  This ECM evaluates options for BMS governance of return air flow rates.

- Maintenance of excessive winter setpoints is extremely expensive.

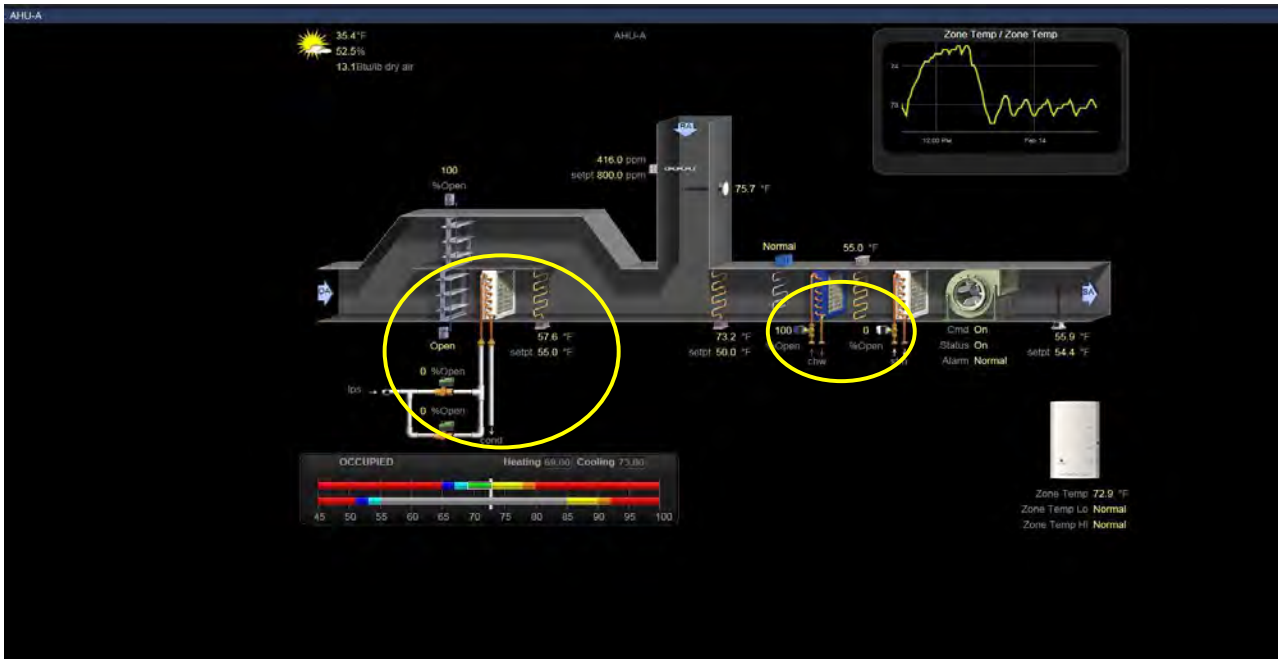
  The conditioning of ventilation air is among the most expensive tasks routinely executed by the HVAC system. At current utility rates, humidification is also extremely expensive. Depending on the source, humidification also carries a heating and/or cooling impact.

  This ECM seeks to restore uniform limits to the maintenance of temperature and humidity in office environments. Accuracy, particularly in the case of capillary elements and humidity sensors will be considered for re-calibration and/or replacement. Demand control ventilation, existing DCV strategy sensors, and the deployment of additional sensors in opportune instances will also be evaluated.

GENERAL OBSERVATIONS

- Temperature sensing in many instances is suspect
- Evaluation may be impacted marginally by residual coil effect.
- CO2 inputs do not appear to be in use by ventilation sequences.
- Some VFDs may have been set to 100% for circulation purposes.
- Deterioration of steam control valves appears to be a recurring problem.
- Outdoor air temperature readings are sometimes inconsistent on older Metasys.

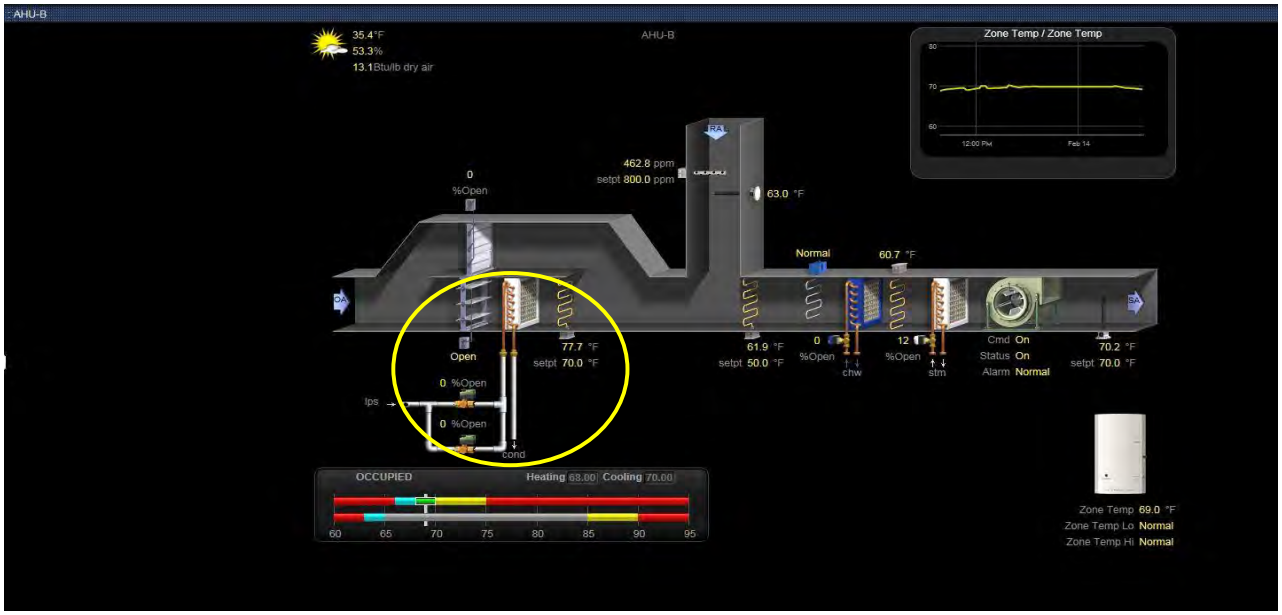
Finance Building **AHU-A**



note(s): steam valves, economizer preheat sequence

possible scope expansion(s): constant volume, return air control, CO2 DCV OAT (F): 35

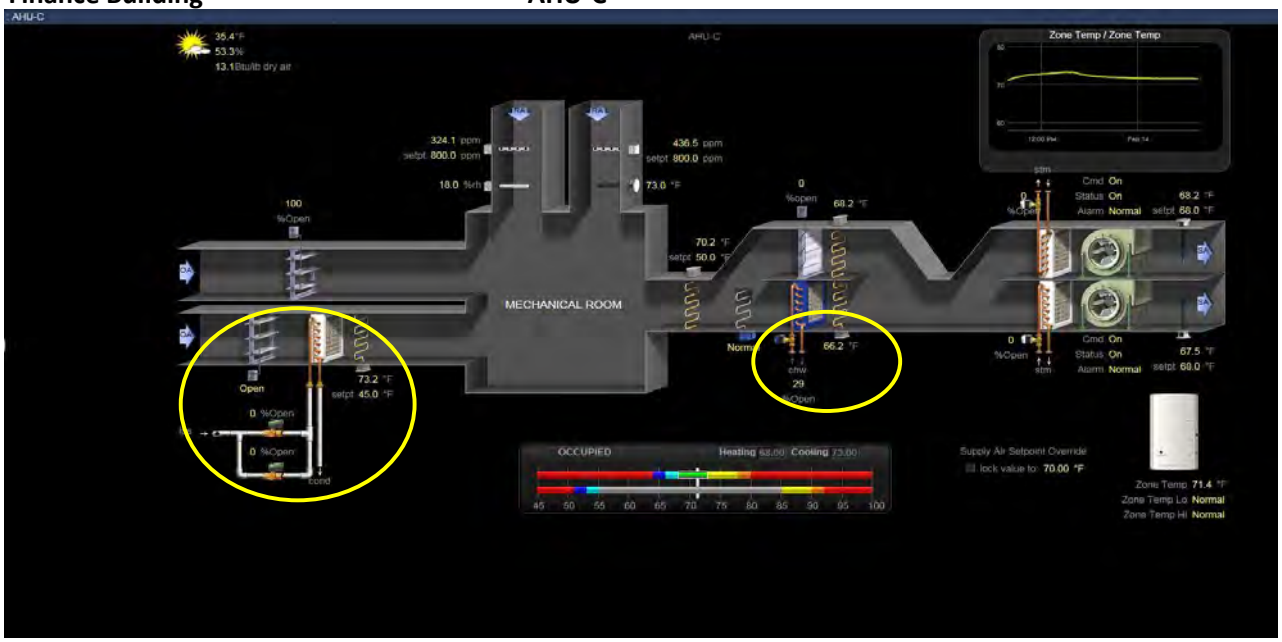
Finance Building **AHU-B**



note(s): steam valves, economizer preheat sequence

possible scope expansion(s): constant volume, return air control, CO2 DCV OAT (F): 35

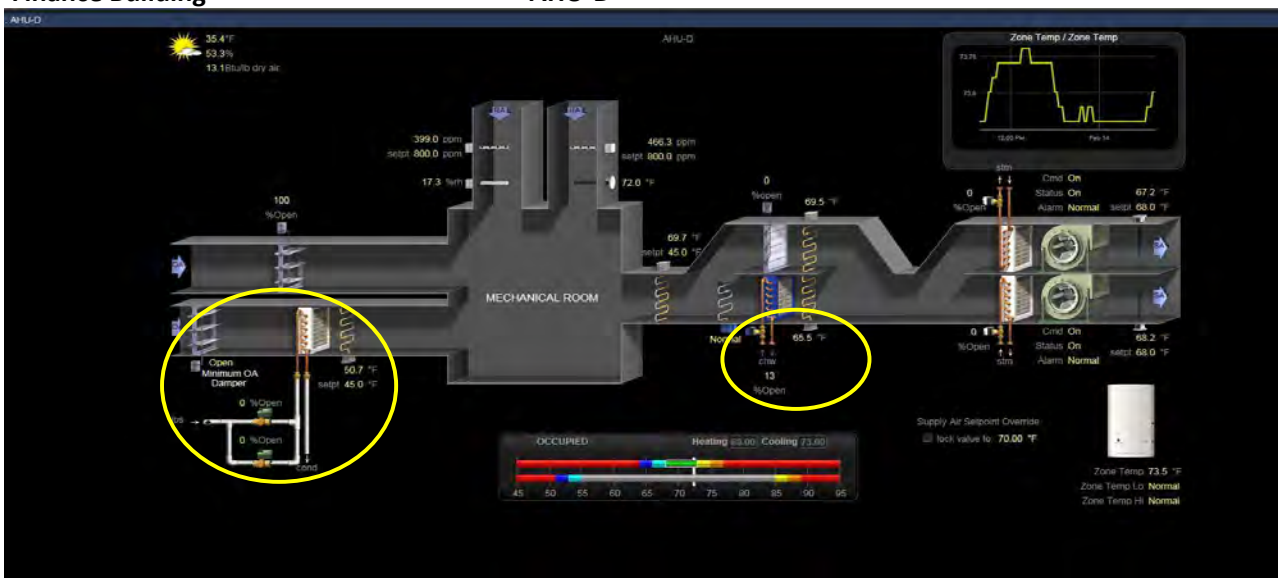
Finance Building **AHU-C**



note(s): steam valves, economizer preheat sequence

possible scope expansion(s): constant volume, return air control, CO2 DCV OAT (F): 35

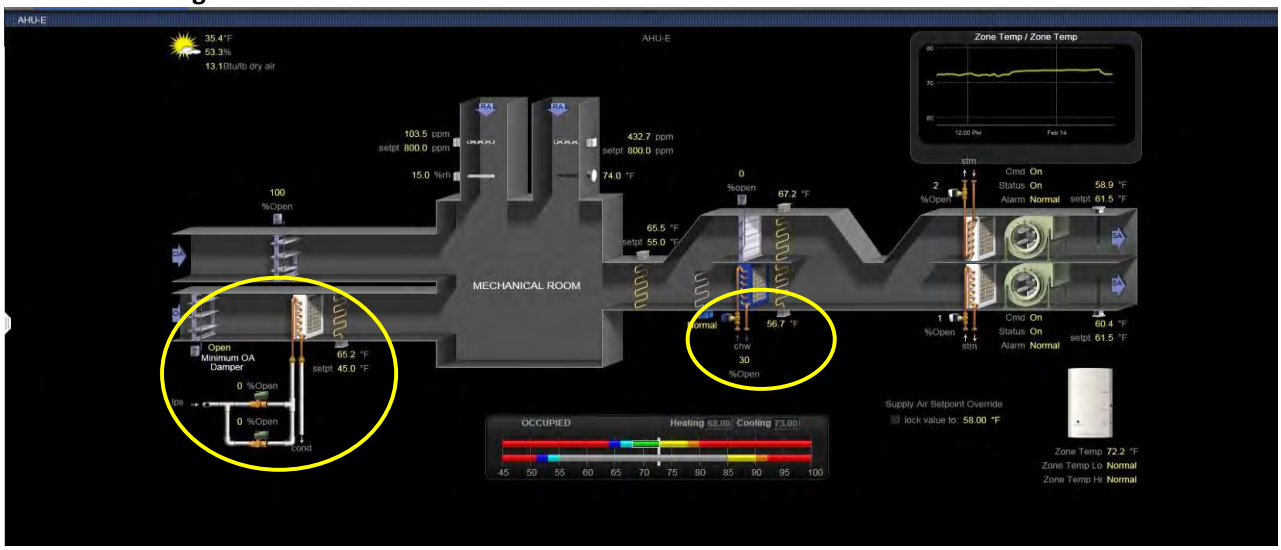
Finance Building **AHU-D**



note(s): steam valves, economizer preheat sequence

possible scope expansion(s): constant volume, return air control, CO2 DCV OAT (F): 35

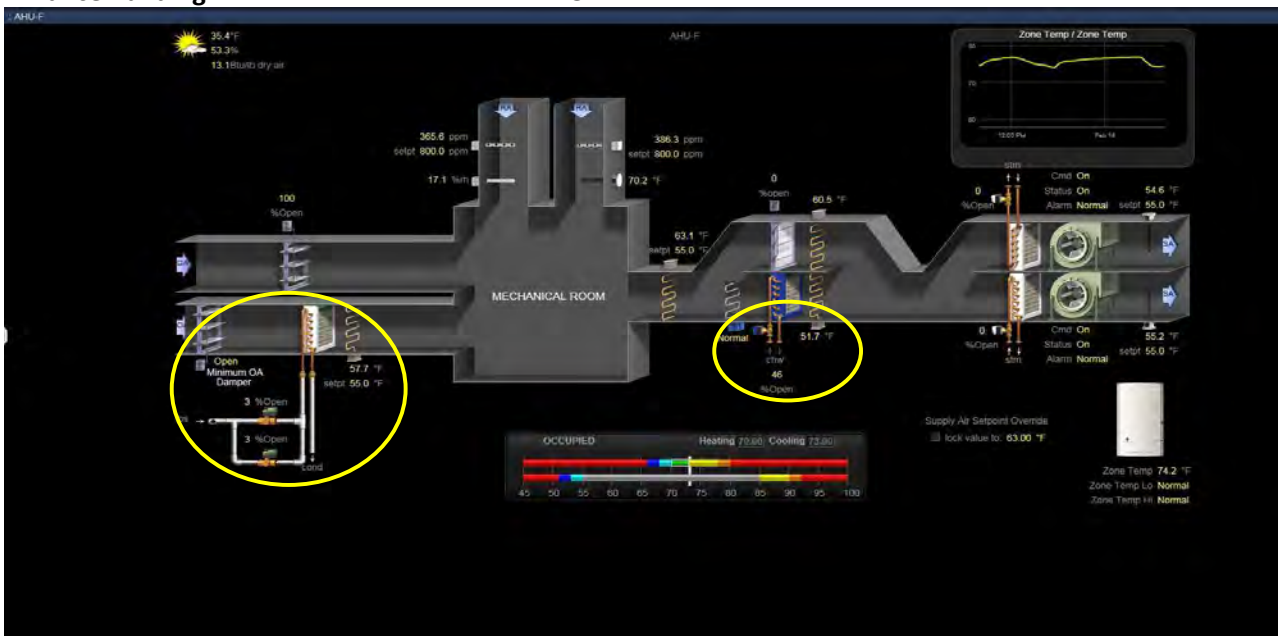
Finance Building **AHU-E**



note(s): steam valves, economizer preheat sequence

possible scope expansion(s): constant volume, return air control, CO2 DCV OAT (F): 35

Finance Building **AHU-F**



note(s): steam valves, economizer preheat sequence

possible scope expansion(s): constant volume, return air control, CO2 DCV OAT (F): 35

North Office **AC-1**

note(s): economizer control

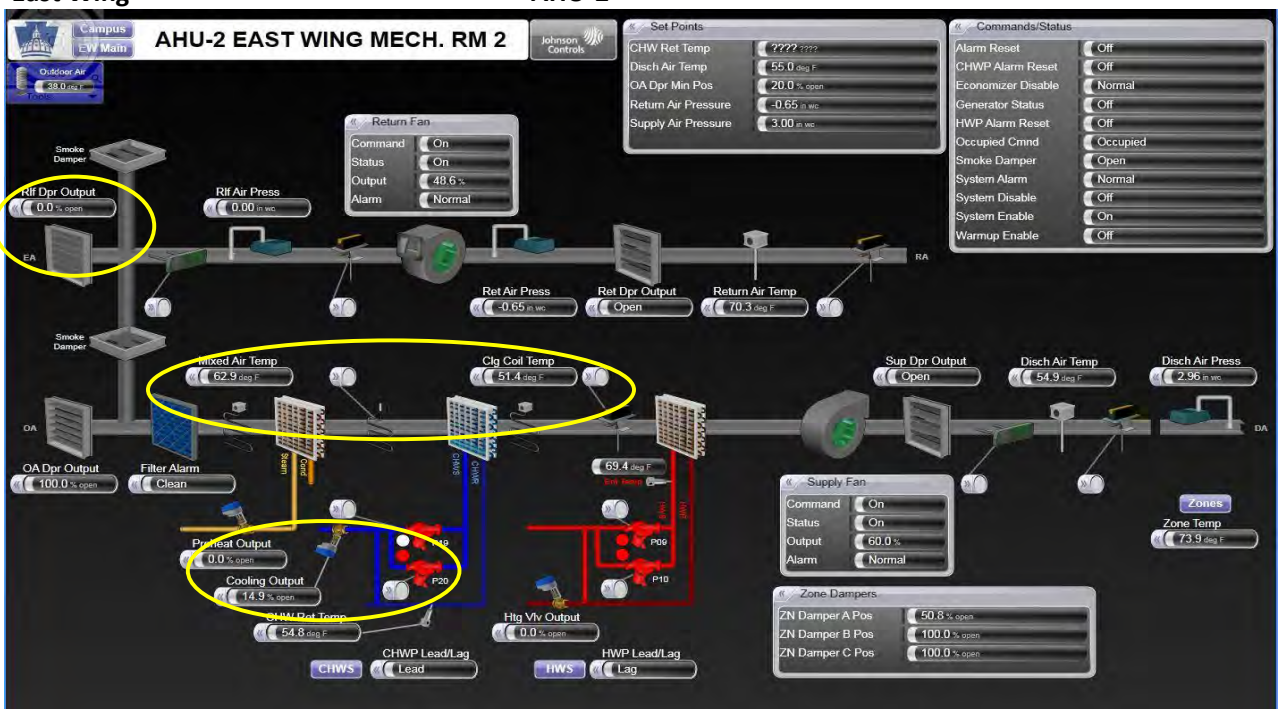
possible scope expansion(s): CO2 DCV OAT (F): 36

North Office **AC-2**

note(s): economizer control

possible scope expansion(s): CO2 DCV OAT (F): 36

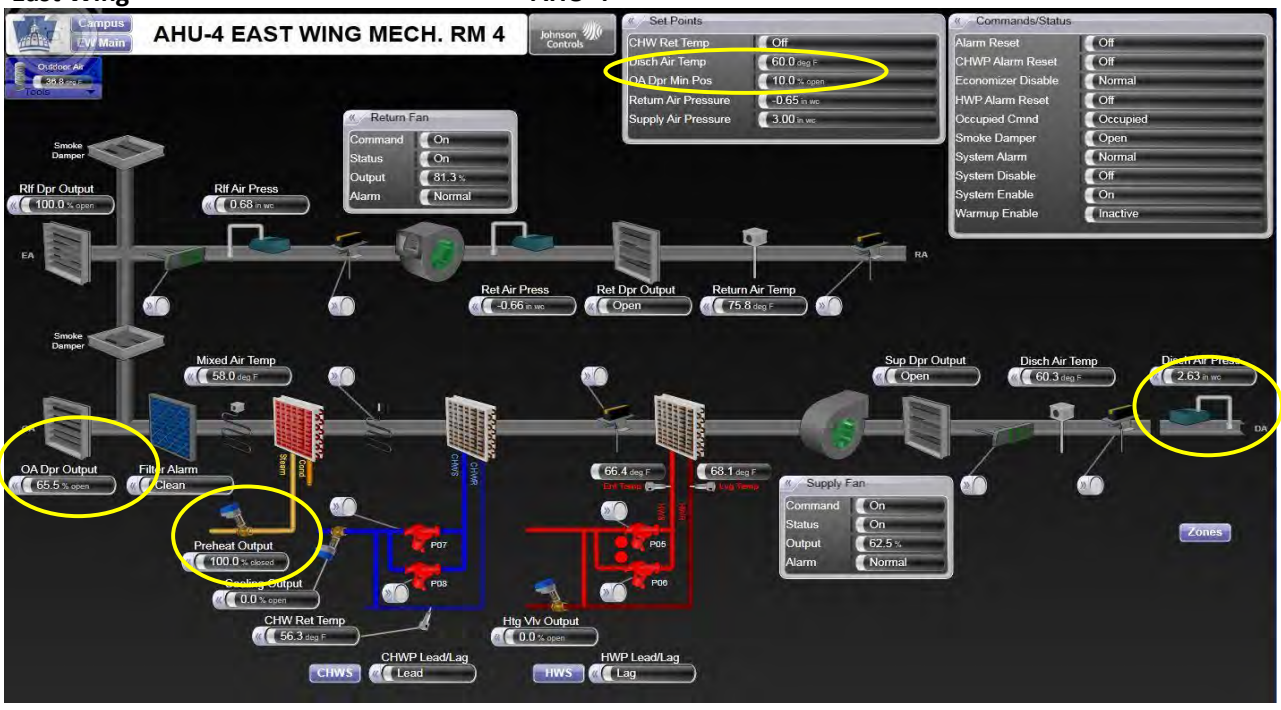
East Wing **AHU-2**



note(s): economizer control

possible scope expansion(s): CO2 DCV OAT (F): 38

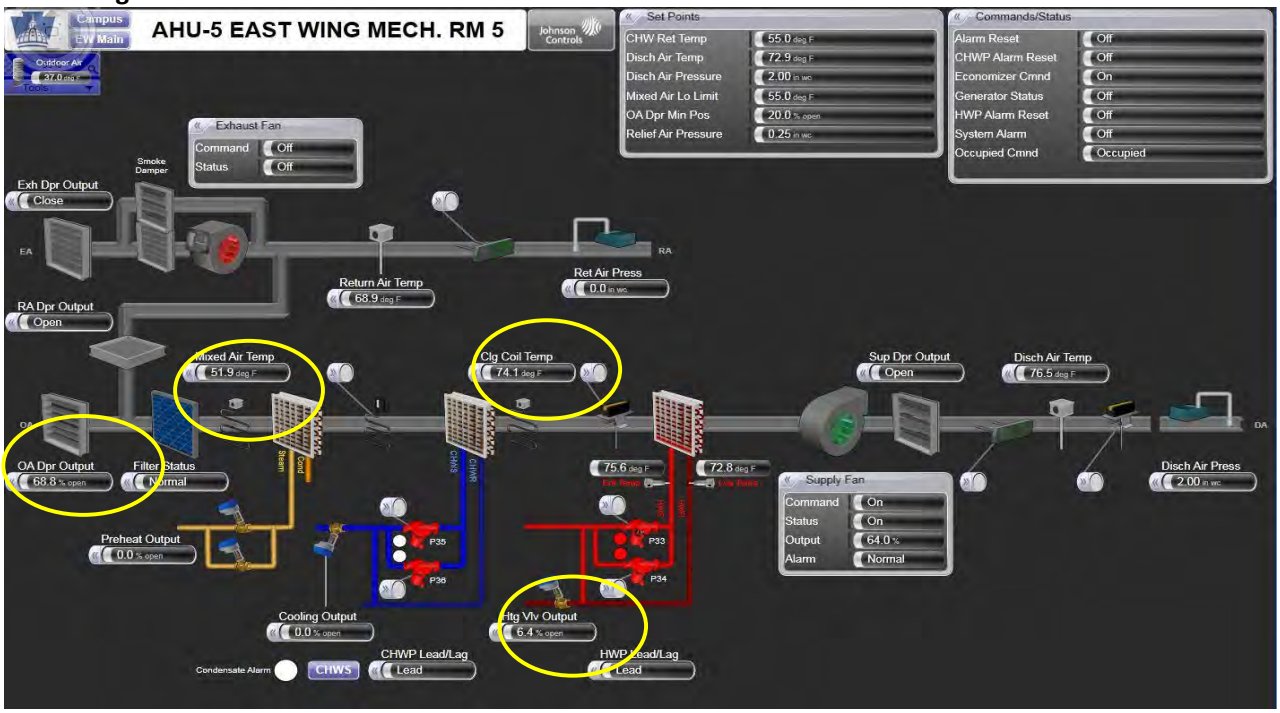
East Wing **AHU-4**



note(s): economizer control, discharge air algorithm

possible scope expansion(s): CO2 DCV OAT (F): 37

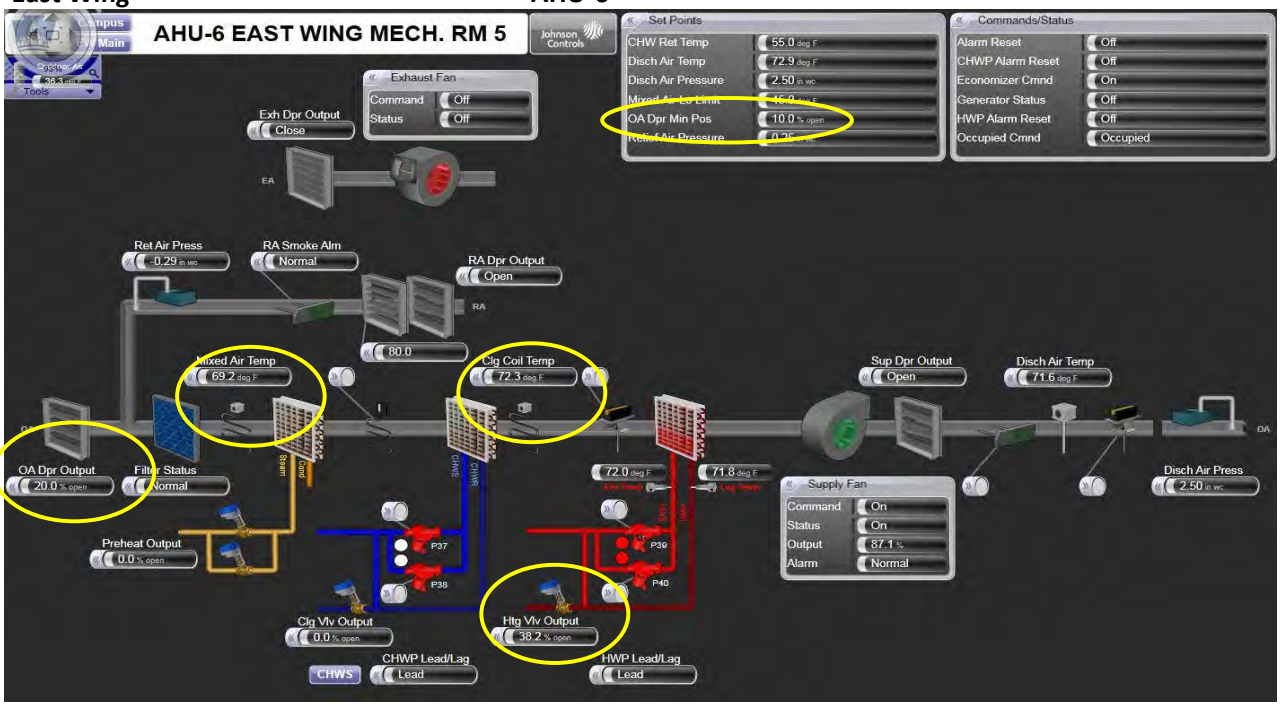
East Wing **AHU-5**



note(s): steam valves, economizer control, discharge air algorithm

possible scope expansion(s): CO2 DCV OAT (F): 37

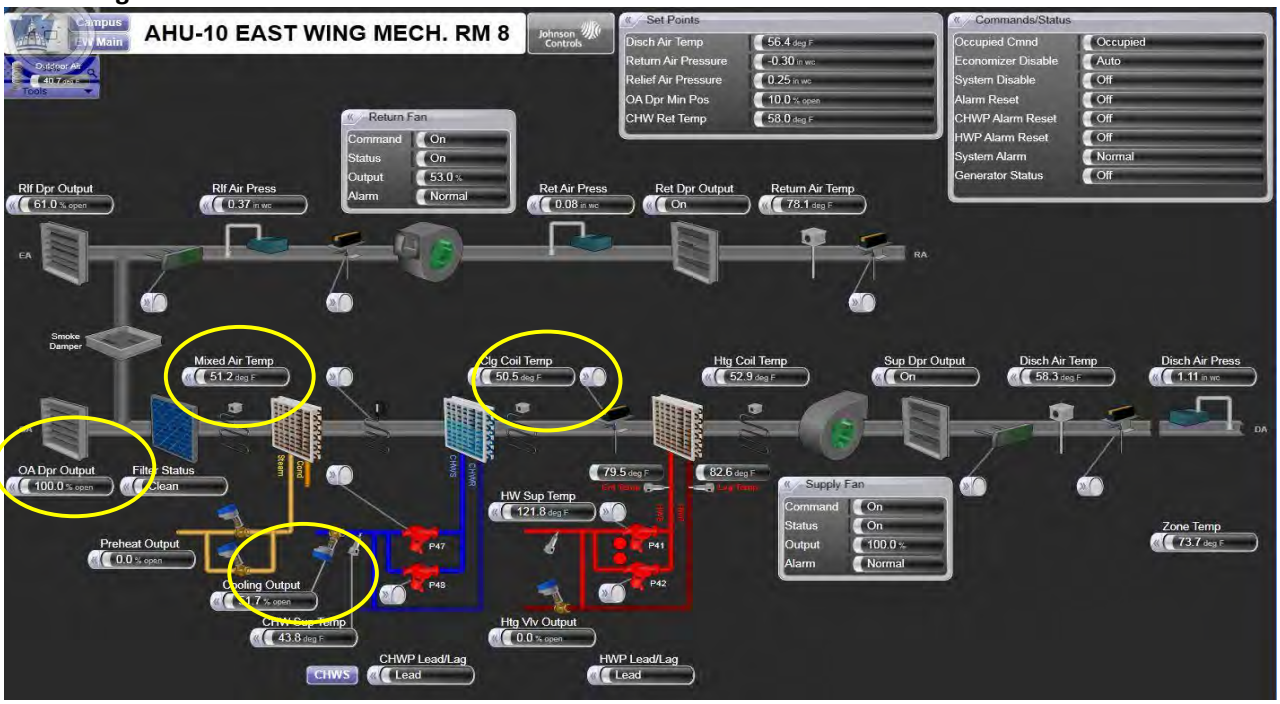
East Wing **AHU-6**



note(s): steam valve, economizer control

possible scope expansion(s): CO2 DCV OAT (F): 37

East Wing **AHU-10**

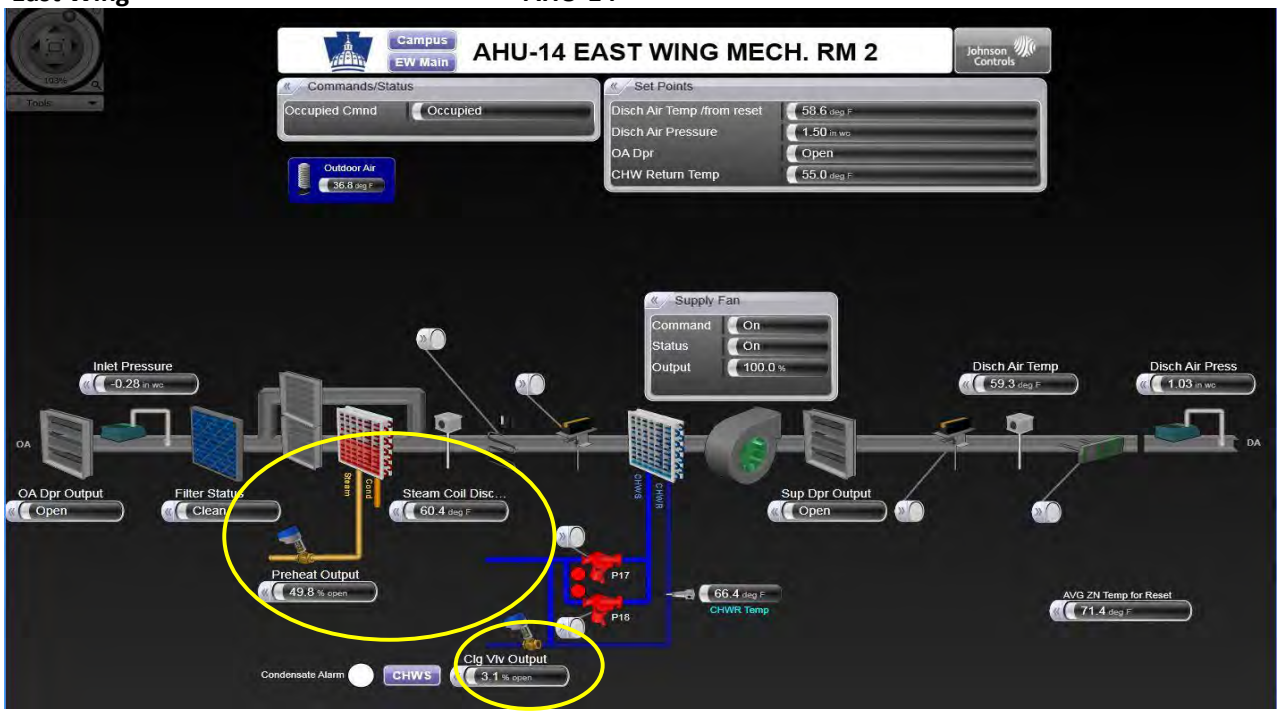


Preheat steam control valve may failing. CHW control valve commanded to 51.7% brings MAT prior to preheat from 51.2F to 50.5F per BMS, but 33% effective CHW calc estimates 5.6F drop at CC. Spot readings needed in each section.

note(s): economizer control

possible scope expansion(s): CO2 DCV OAT (F): 41

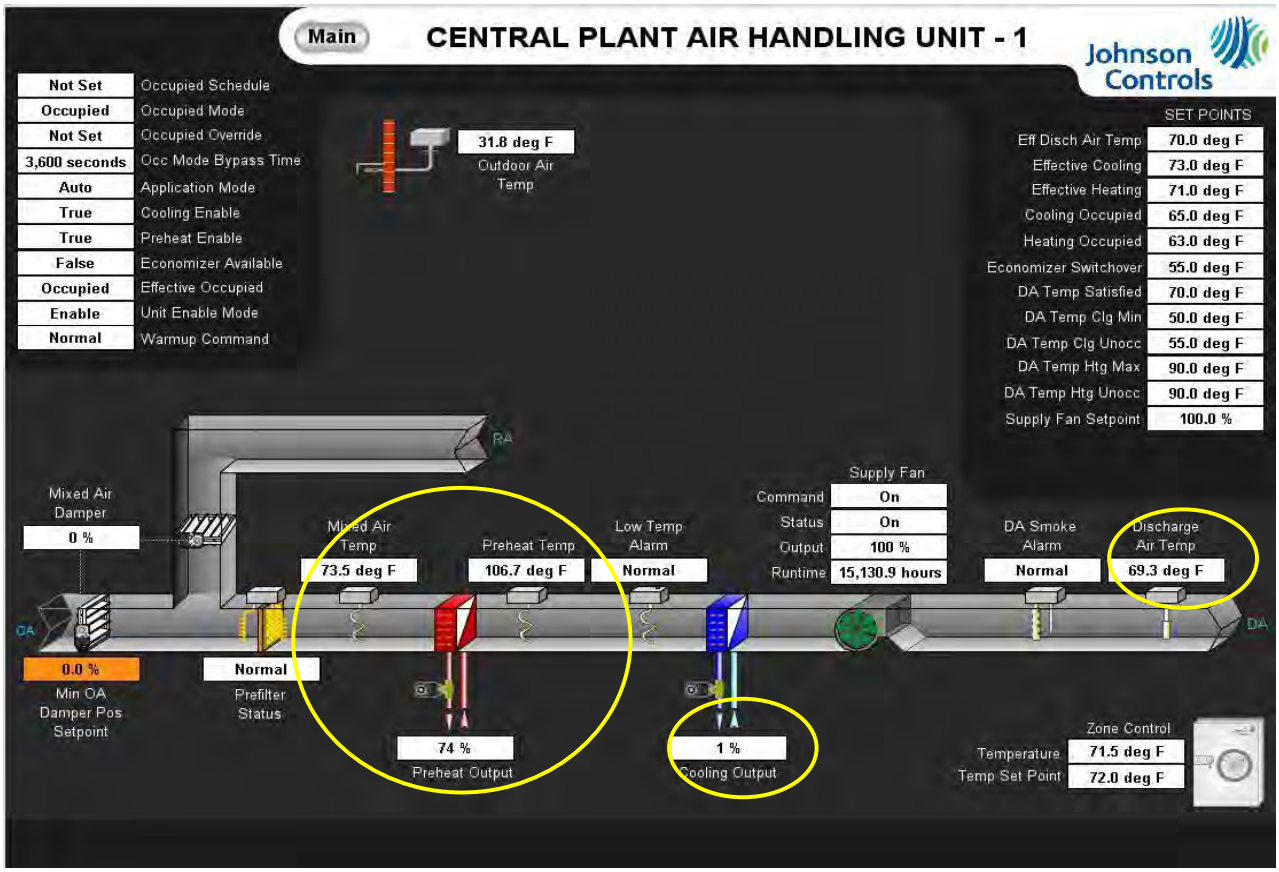
East Wing **AHU-14**



note(s): steam valve control

possible scope expansion(s): 1/3 2/3? OAT (F): 37

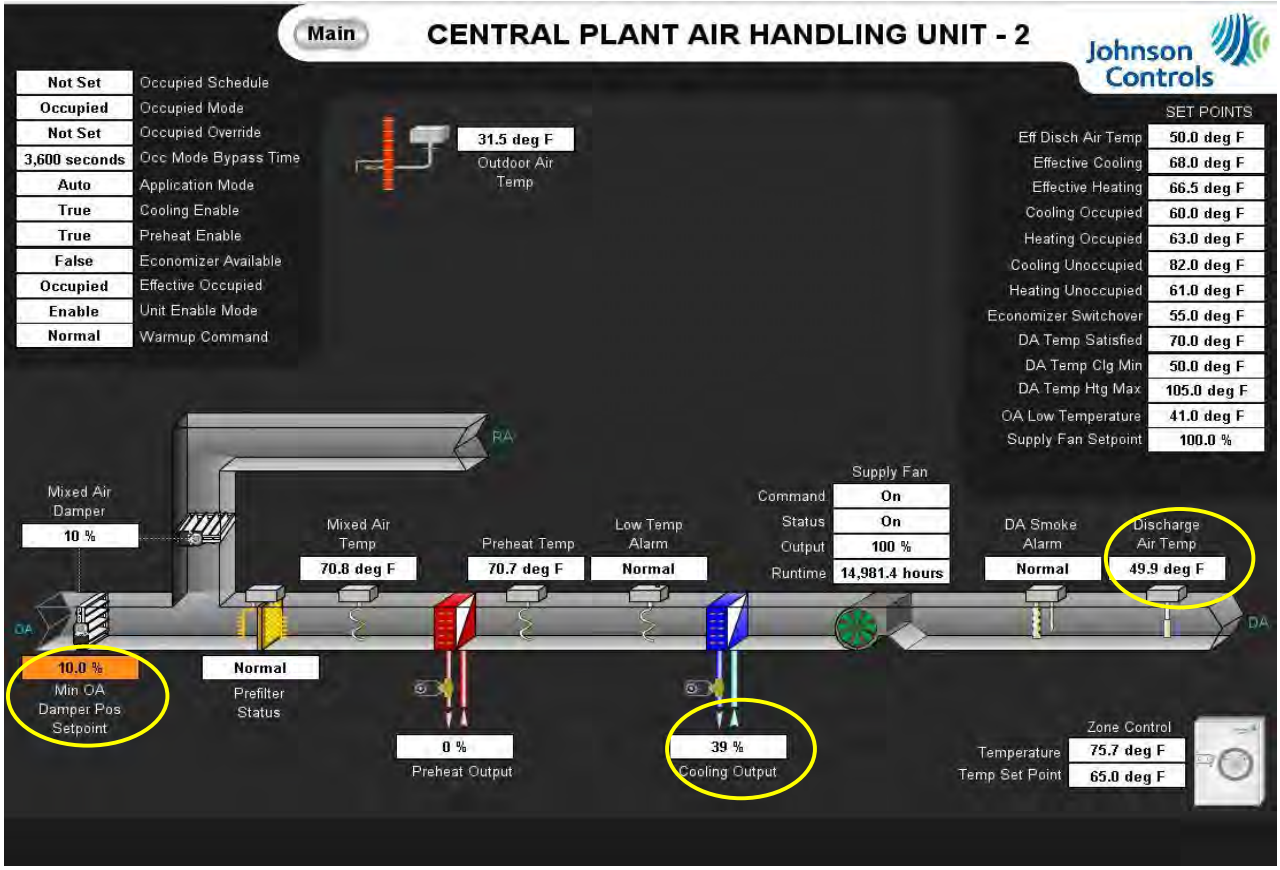
Central Plant **AC-1**



note(s): general sequencing, damper control issues, economizer control, fighting

possible scope expansion(s): CO2 DCV OAT (F): 32

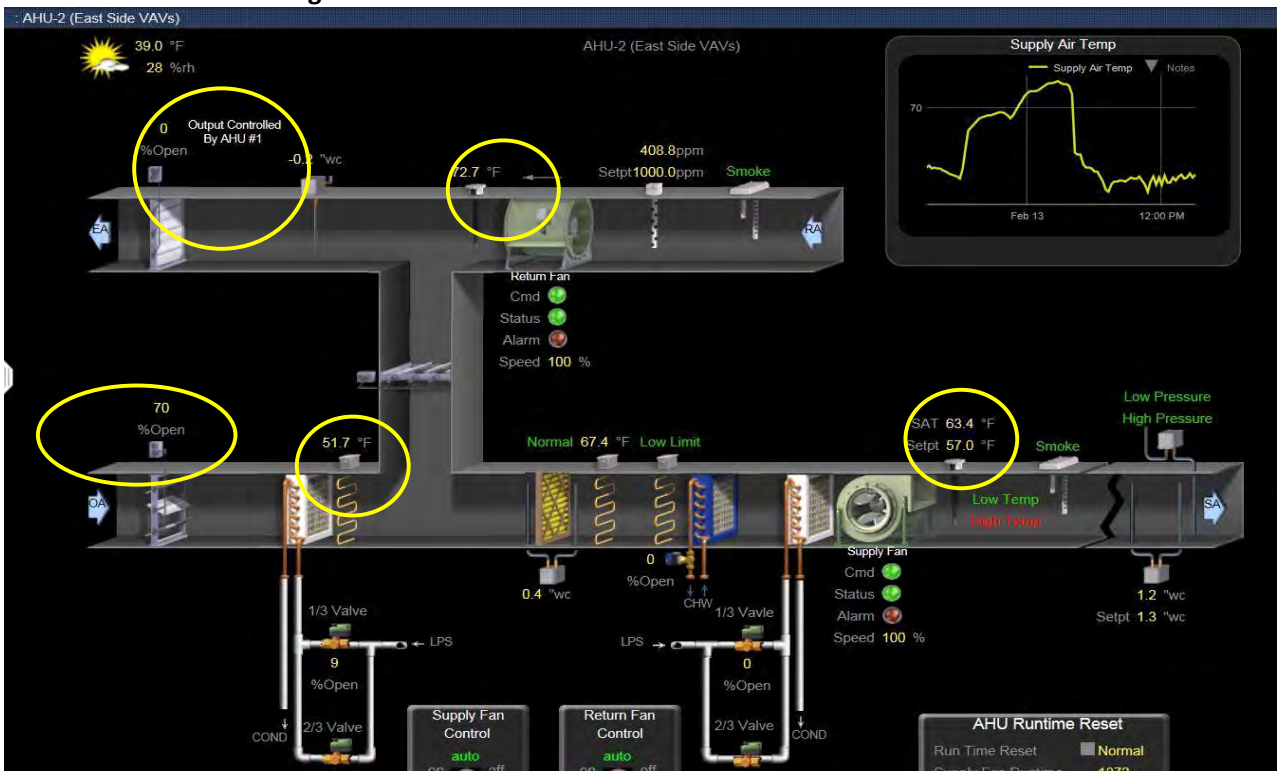
Central Plant **AC-2**



note(s): general sequencing, damper control issues, economizer control, fighting

possible scope expansion(s): CO2 DCV OAT (F): 32

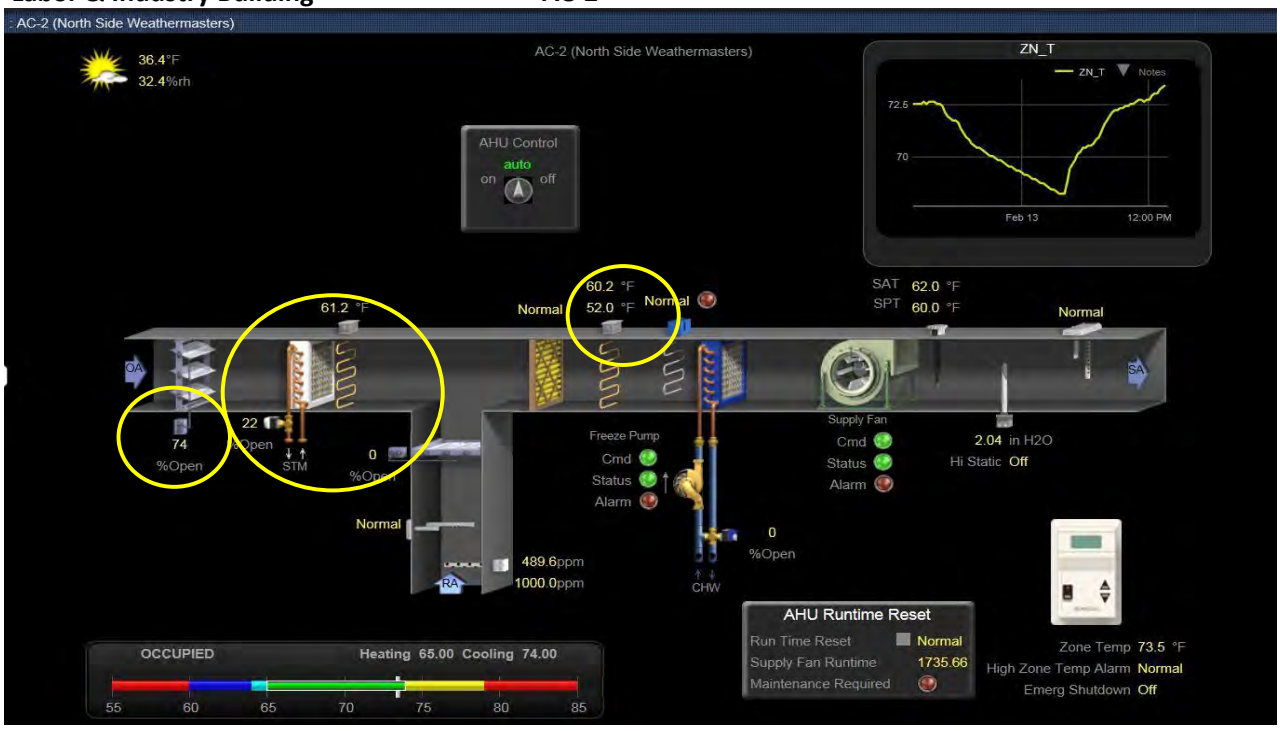
Health & Welfare Building **AC-2**



note(s): economizer control, speed control, sensor calibration, reheat steam valve

possible scope expansion(s): CO2 DCV OAT (F): 39

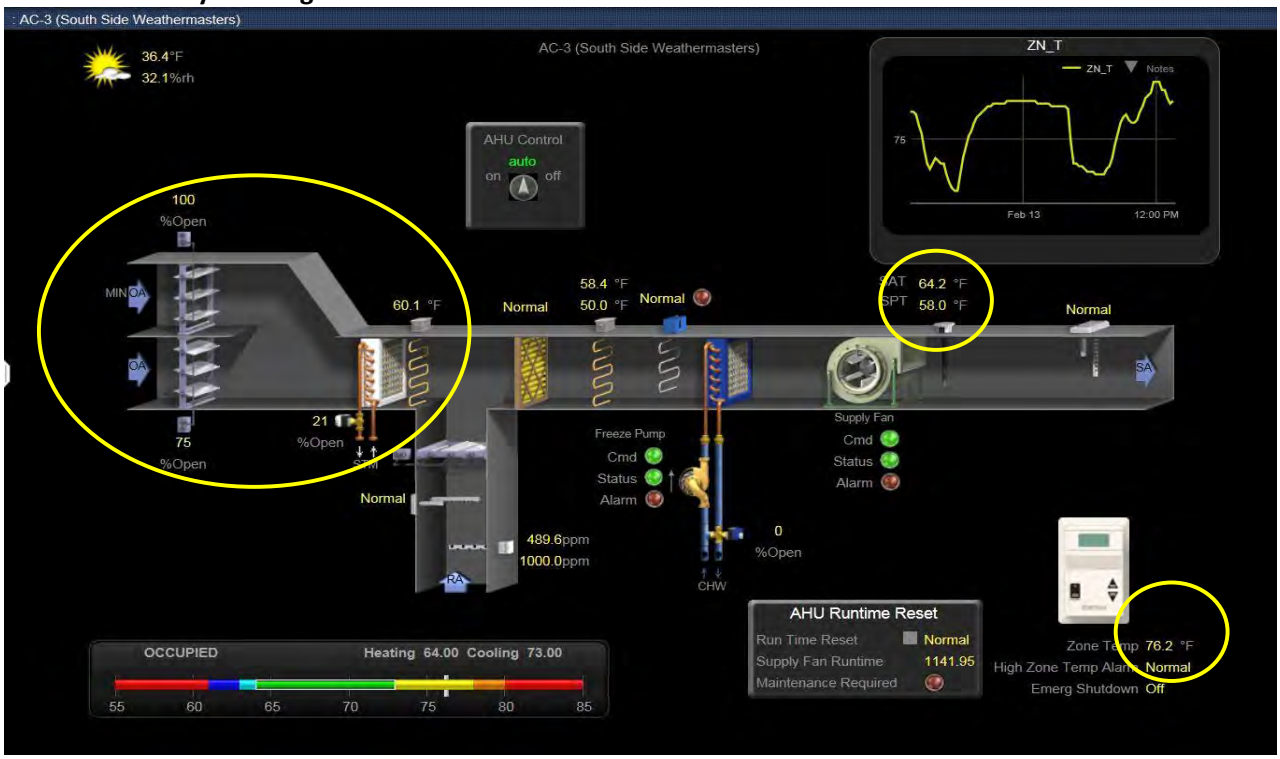
Labor & Industry Building **AC-2**



note(s): economizer control, preheat steam (valve?)

possible scope expansion(s): constant volume, CO2 DCV OAT (F): 36

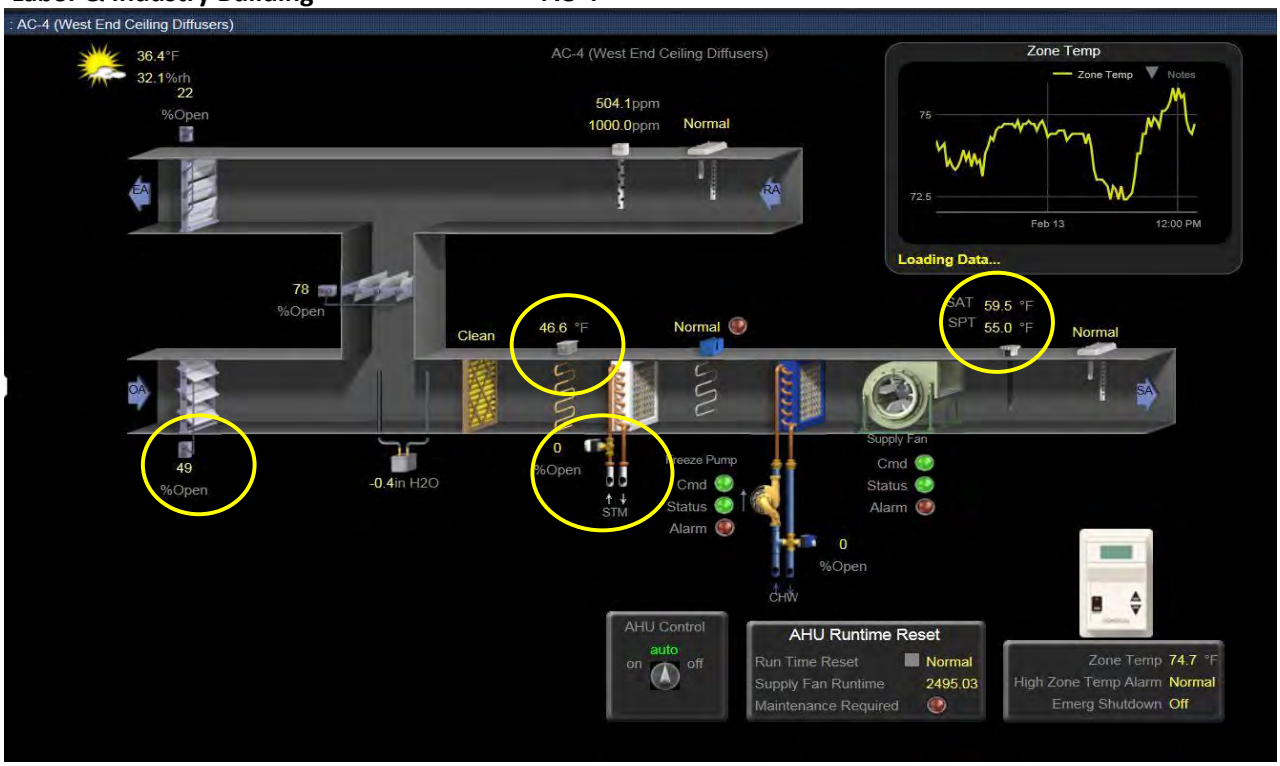
Labor & Industry Building **AC-3**



note(s): economizer control, preheat steam (valve?)

possible scope expansion(s): constant volume, CO2 DCV OAT (F): 36

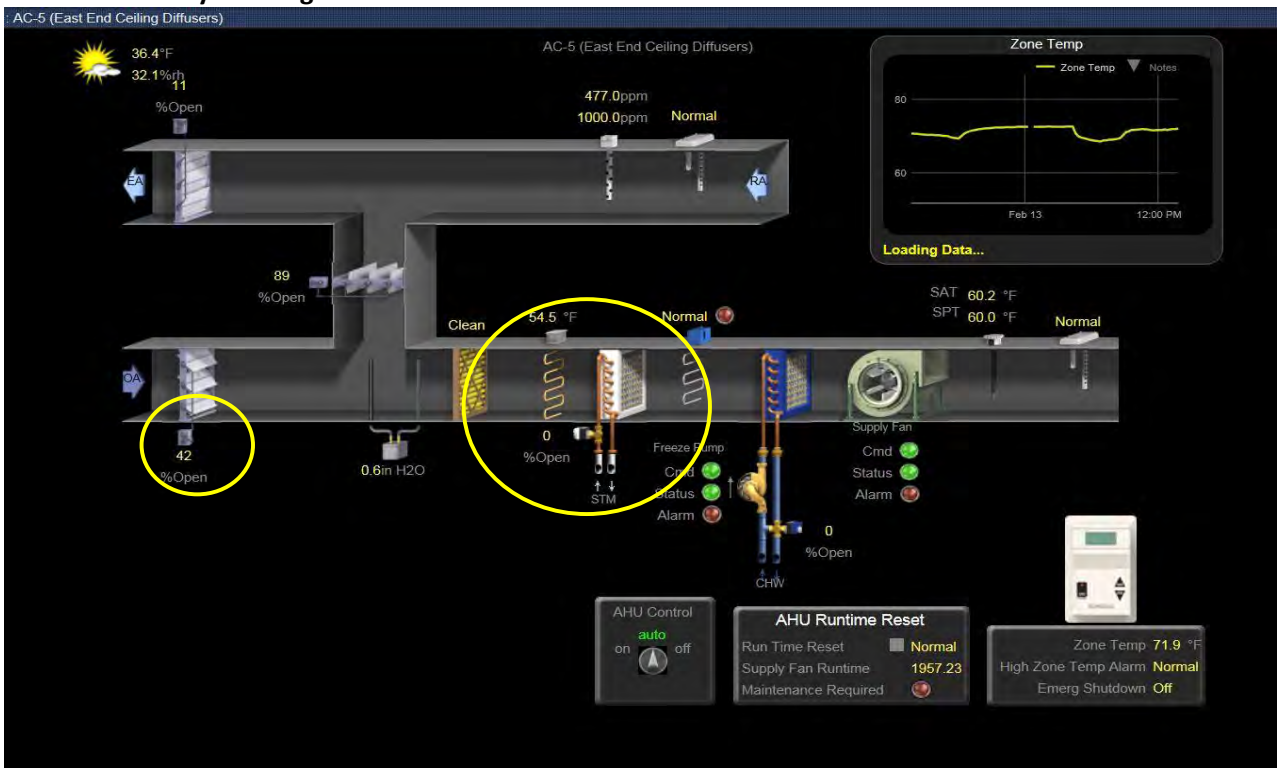
Labor & Industry Building **AC-4**



note(s): economizer control, steam valve

possible scope expansion(s): constant volume, CO2 DCV OAT (F): 36

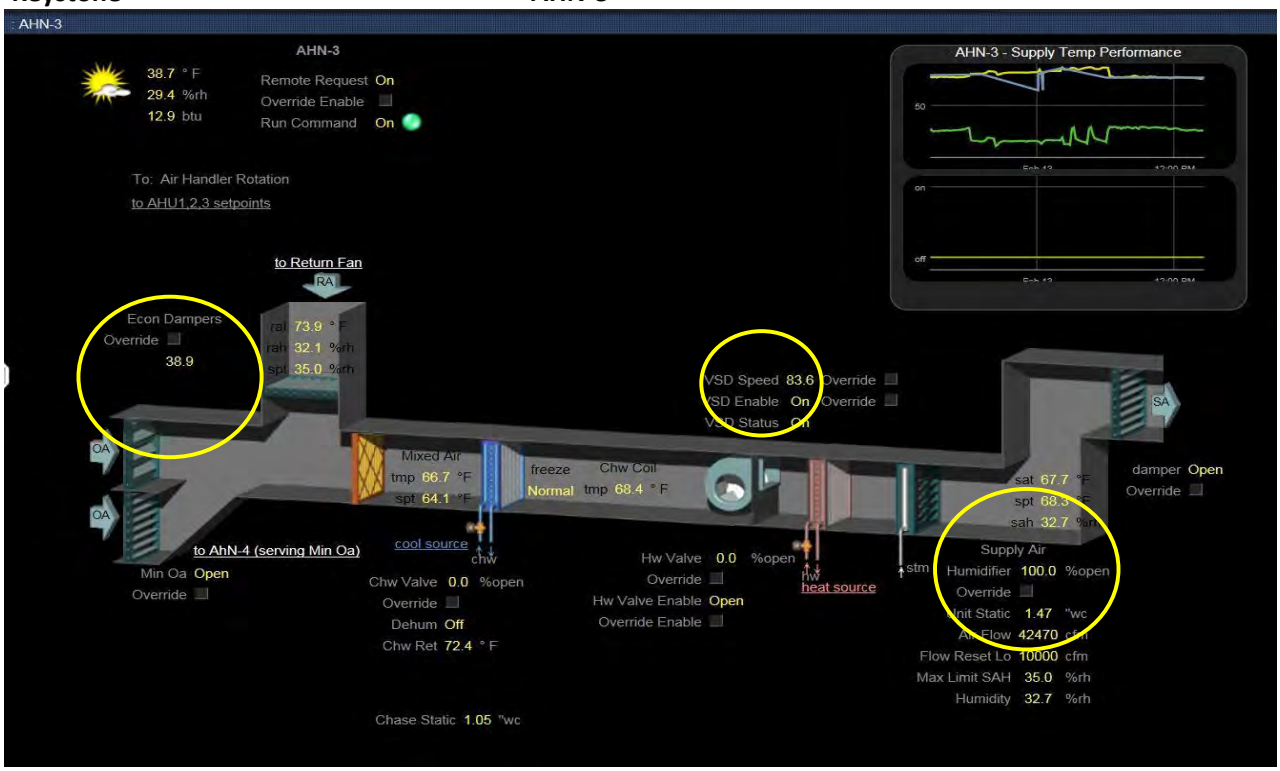
Labor & Industry Building **AC-5**



note(s): economizer control, steam valve

possible scope expansion(s): constant volume, CO2 DCV OAT (F): 36

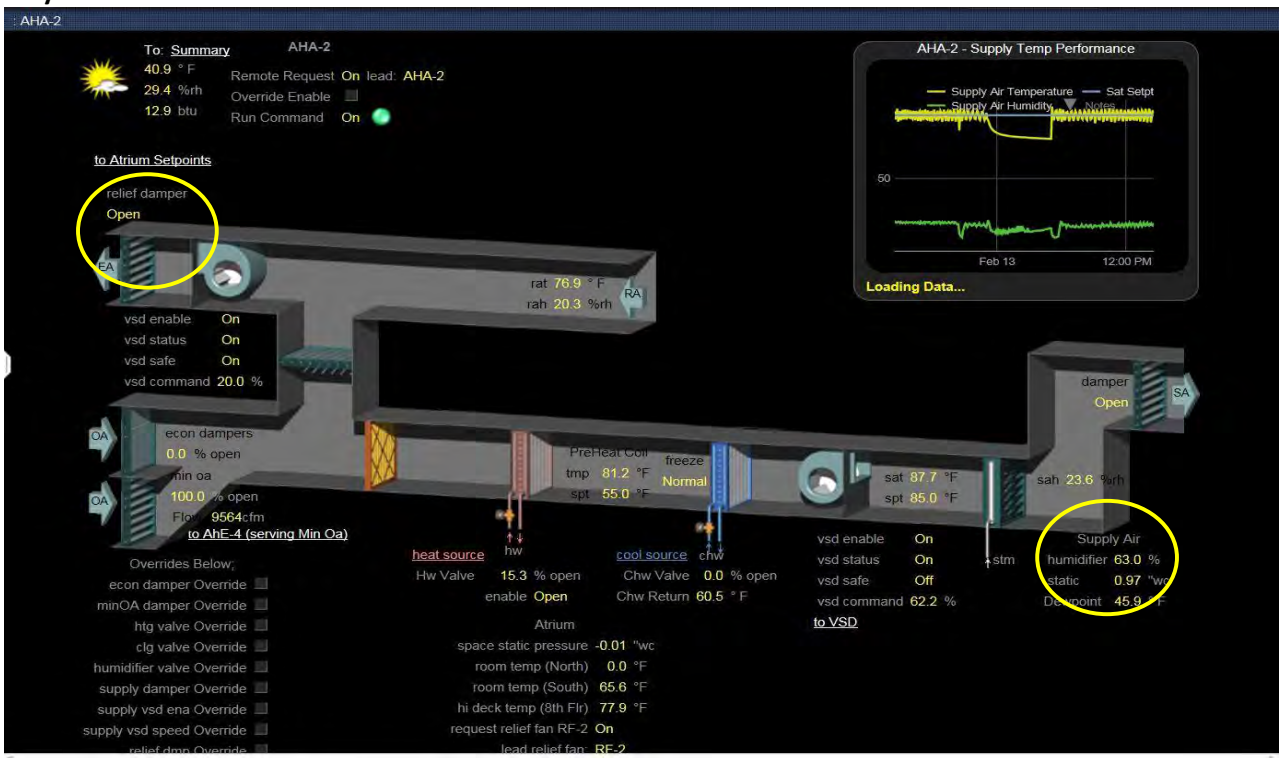
Keystone **AHN-3**



note(s): humidification setpoints, humidity sensor calibration, economizer logic

possible scope expansion(s): Keystone humidity, CO2 DCV OAT (F): 39

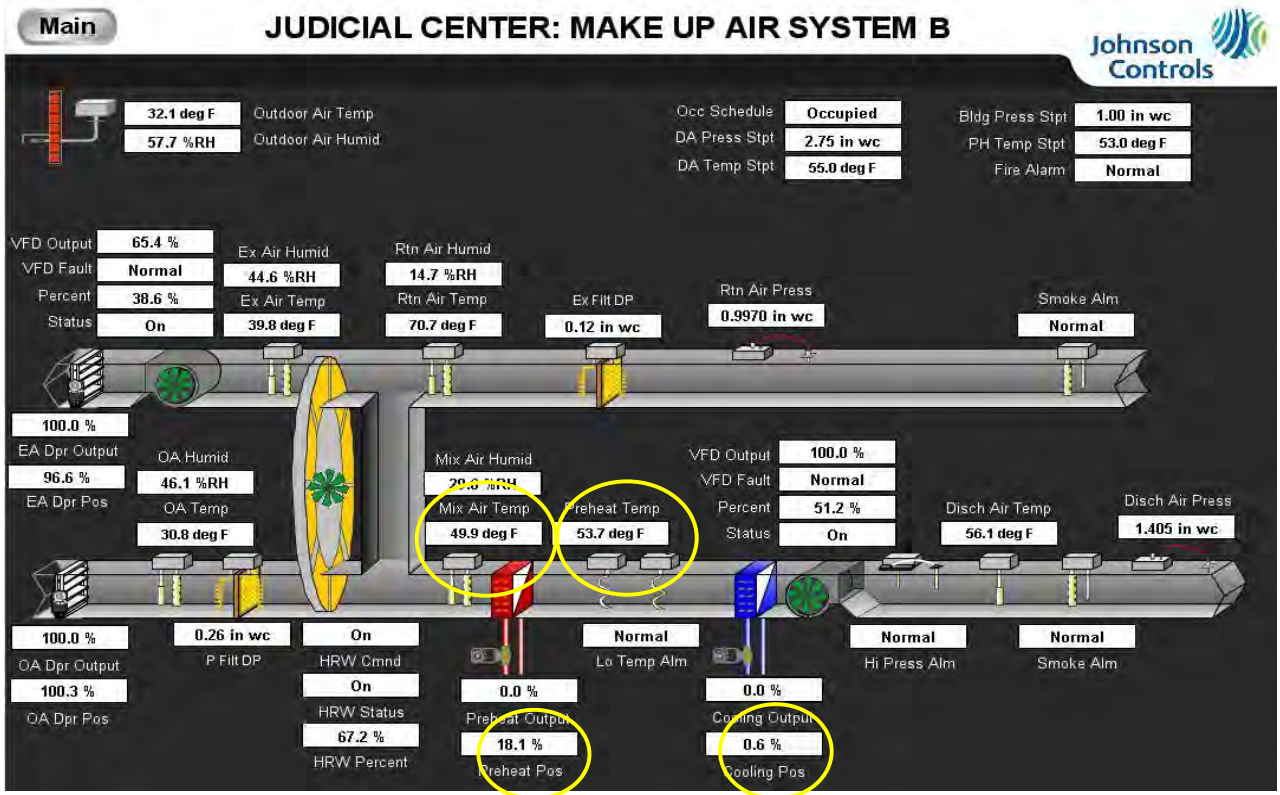
Keystone **AHA-2**



note(s): humidification setpoints, humidity sensor calibration, economizer logic

possible scope expansion(s): CO2 DCV, heat recovery OAT (F): 41

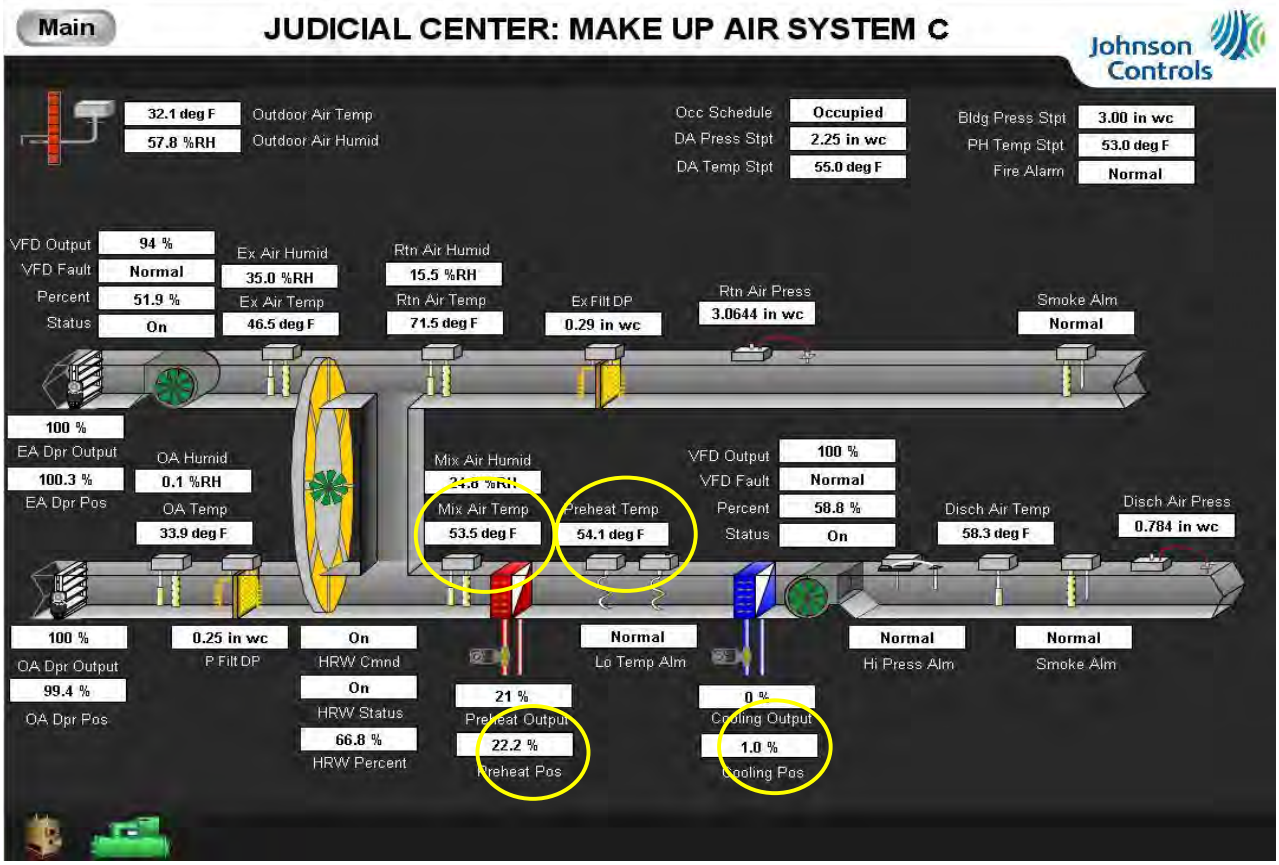
Pennsylvania Justice Center **MUA-B**



note(s): poll downstream AHUAs (all in cooling), preheat control, steam valve(?)

possible scope expansion(s): AHU feedback CO2 DCV OAT (F): 32

Pennsylvania Justice Center **MUA-C**



note(s): poll downstream AHUAs (all in cooling), preheat control, steam valve(?)

possible scope expansion(s): AHU feedback CO2 DCV OAT (F): 32

Pennsylvania Justice Center **AHUs**

Main

JUDICIAL CENTER: AIR HANDLER SUMMARY – Serving VAV Boxes

Johnson Controls

AHU#	S Fan Cmnd	S Fan Status	S Fan Output	S Fan Alarm	Clg Output	DA Temp	DA Temp Stpt	DA Press	DA Press Stpt
1B	On	On	25.6 %	Normal	21.3 %	55.9 deg F	57.0 deg F	1.001 in wc	1.00 in wc
1D	On	On	21 %	Normal	21 %	58.3 deg F	58.6 deg F	1.000 in wc	1.00 in wc
2A	On	On	24 %	Normal	7 %	57.2 deg F	58.2 deg F	0.999 in wc	1.00 in wc
2B	On	On	29.6 %	Normal	18.2 %	56.8 deg F	57.1 deg F	1.000 in wc	1.00 in wc
3A	On	On	26 %	Normal	13 %	61.2 deg F	60.7 deg F	0.999 in wc	1.00 in wc
3B	On	On	31 %	Normal	15 %	59.6 deg F	60.0 deg F	1.001 in wc	1.00 in wc
4A	On	On	30.9 %	Normal	15.5 %	58.3 deg F	59.7 deg F	1.002 in wc	1.00 in wc
4B	On	On	23.8 %	Normal	12.1 %	60.6 deg F	59.3 deg F	1.000 in wc	1.00 in wc
5A	On	On	21 %	Normal	24 %	61.1 deg F	61.3 deg F	1.000 in wc	1.00 in wc
5B	On	On	30.6 %	Normal	7.2 %	59.1 deg F	58.9 deg F	0.998 in wc	1.00 in wc
6	On	On	26.0 %	Normal	0.0 %	56.7 deg F	59.7 deg F	1.001 in wc	1.00 in wc
7	On	On	29.8 %	Normal	0.9 %	59.4 deg F	60.1 deg F	0.999 in wc	1.00 in wc
8	On	On	33 %	Normal	8 %	58.5 deg F	60.4 deg F	1.002 in wc	1.00 in wc
9	On	On	27 %	Normal	16 %	58.1 deg F	57.5 deg F	0.996 in wc	1.00 in wc

Air Hander Summary – Serving Space

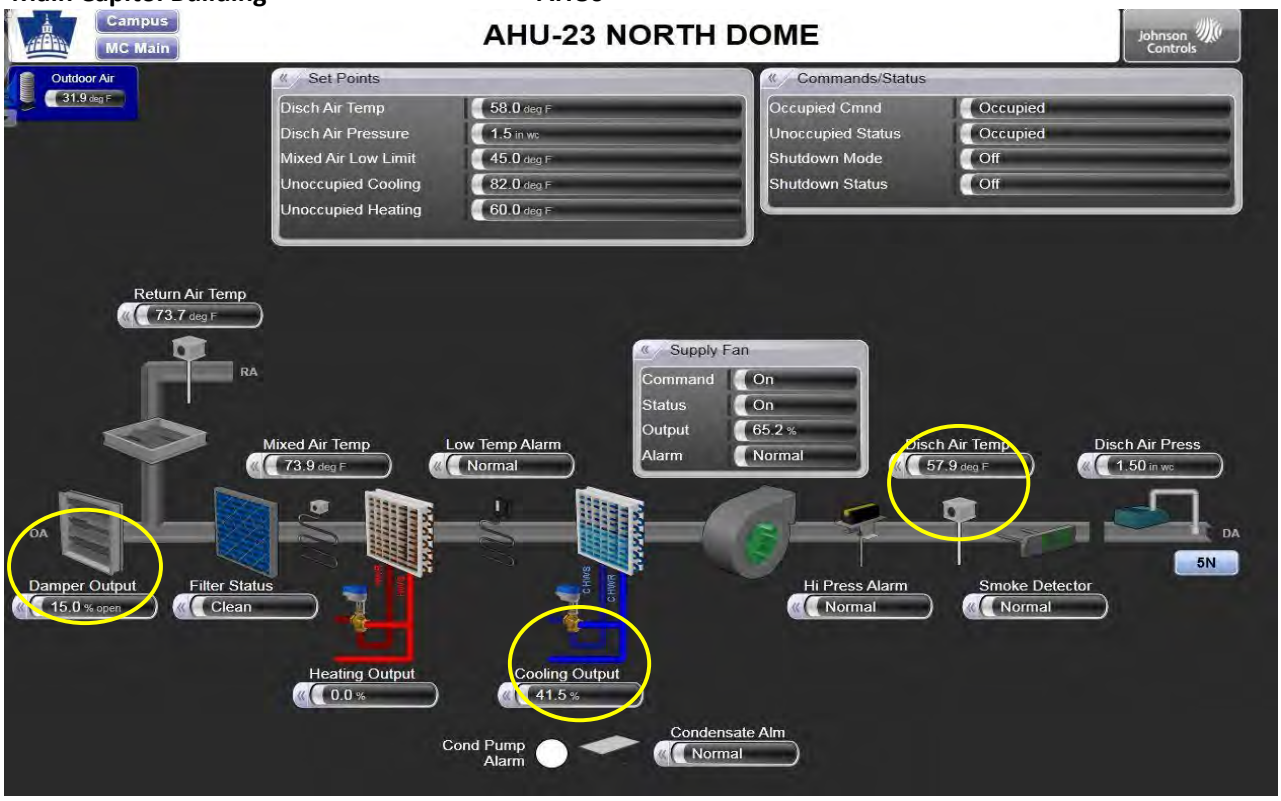
JUDICIAL DEMAND LEVEL State 0

Savings shown are summed for AHU-1B through -5B, -1D, -2A through -5A, and AHU-8 & -9

note(s): feedback from AHUs (all in cooling) to MUAs

possible scope expansion(s): AHU feedback CO2 DCV OAT (F): 32

Main Capitol Building **AHUs**

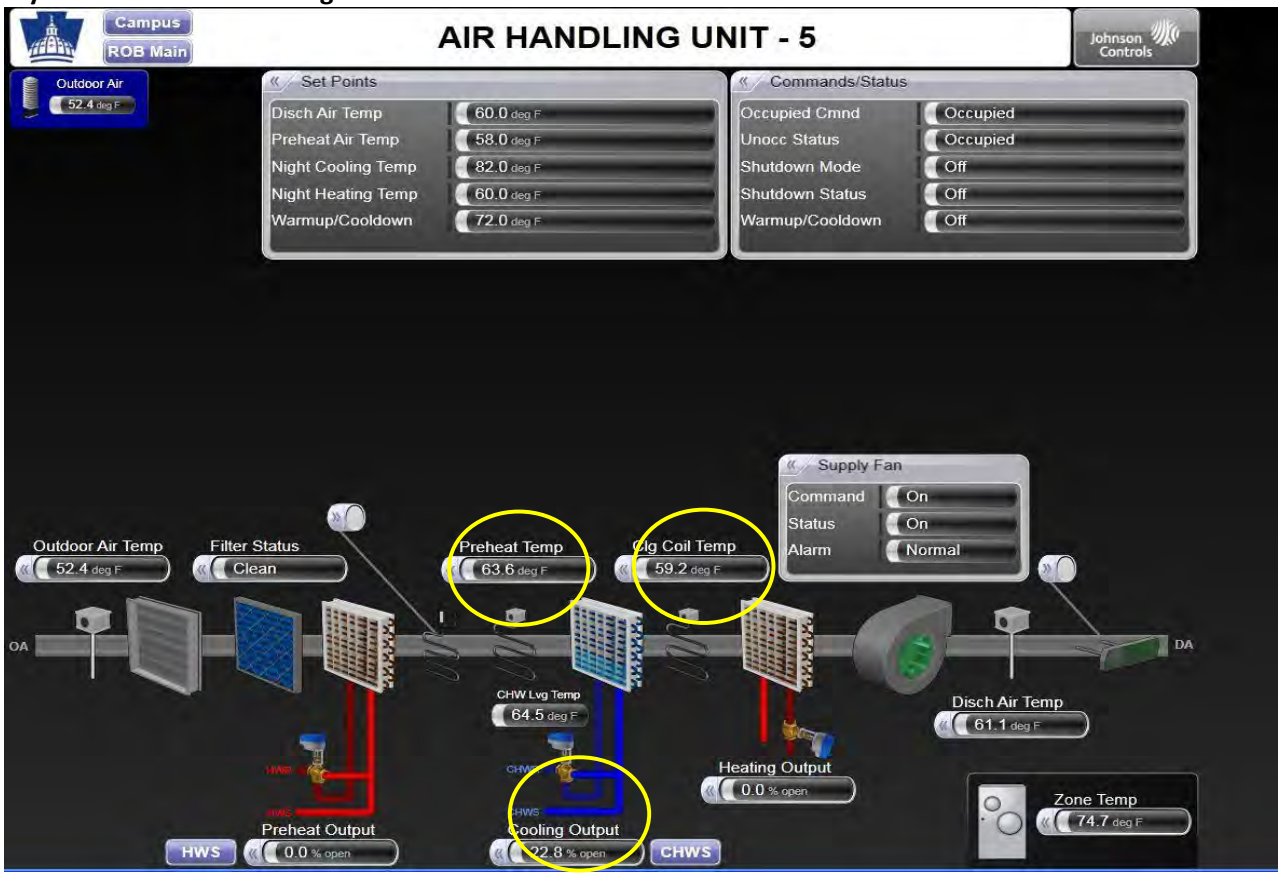


Savings shown are summed for AHU-1, -8, -21 through -25, -42 through -45 excl -44

note(s): typical

possible scope expansion(s): CO2 DCV; no data on some systems OAT (F): 32

Ryan Annex Office Building **AHUs**

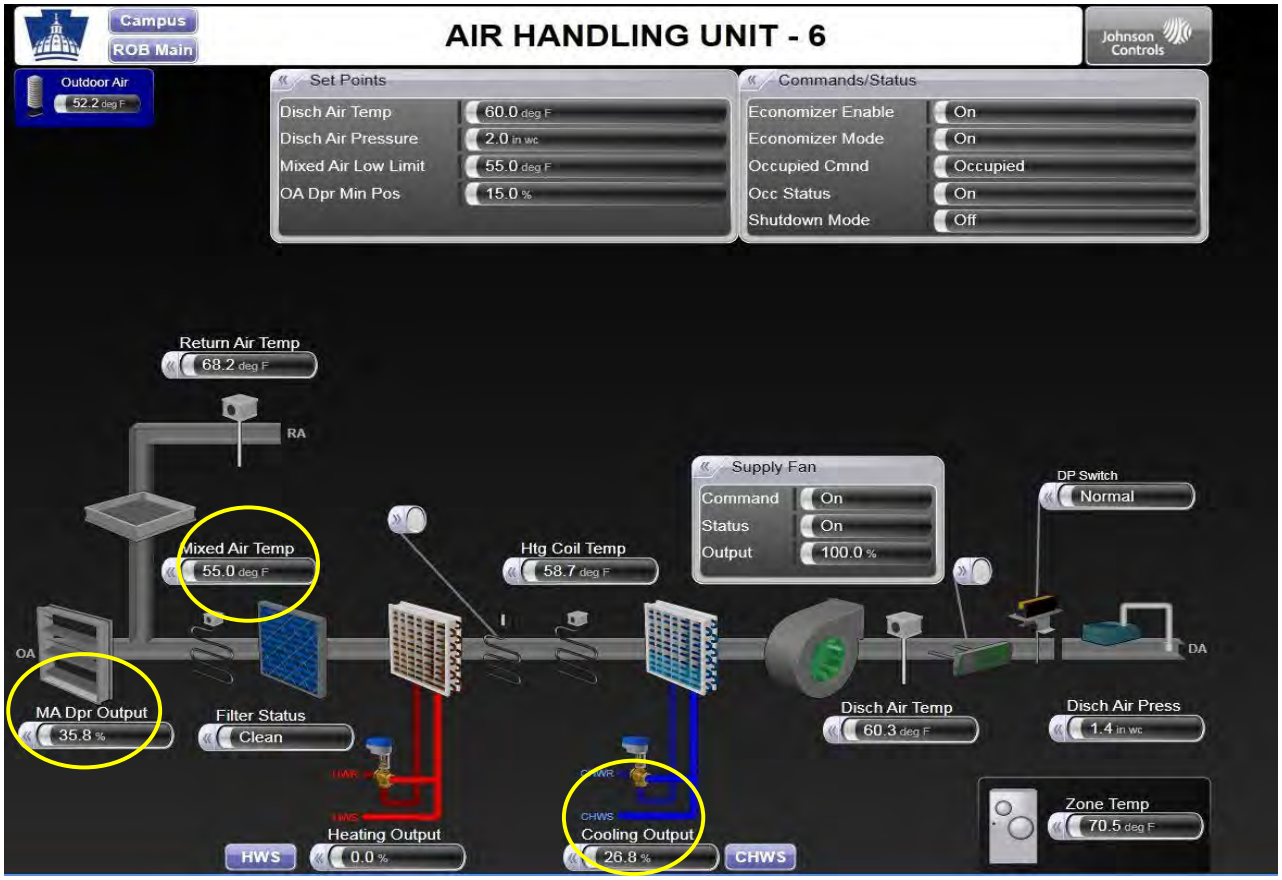


Savings shown are summed for AHU-1, -4 and -5

note(s): typical; preheat valve

possible scope expansion(s): CO2 DCV OAT (F): 52

Ryan Annex Office Building **AHU-6**



note(s): economizer, sensor issues

possible scope expansion(s): CO2 DCV OAT (F): 52

SUMMARY OF NEW COOLING COIL LEAVING WATER TEMPERATURE SENSORS

Building		CHWR Temp Sensors		SIZE EXCLUSION	NO DATA
		existing	add new		
TEMPERATURE SENSORS COOLING COIL LEAVING WATER CRITERIA: TOTAL FLOW ≥ 7,500 CFM OA MINIMUM ≥ 2,000 CFM	East Wing	9	4	2	-
	Irvis	-	5	2	-
	Judicial	-	19	1	-
	Keystone	23	-	-	-
	North Office	-	2	-	-
	Ryan	7	1	-	-
	H&W	-	5	-	-
	L&I	5	4	-	-
	Main Capitol	-	2	28	16
	Finance	-	6	-	-
	Central Plant	-	2	-	-
Total		**44**	**50**	**33**	**16**

Keystone

Air Handling		CFM	Min OA CFM	CHWR Temp Sensors		SIZE EXCLUSION	NO DATA
				existing	add new		
1	AHU-N-1	38,000	17,500	1	-		
2	AHU-N-2	38,000	17,500	1	-		
3	AHU-N-3	38,000	17,500	1	-		
4	AHU-N-4	60,000	0	1	-		
5	AHU-N-5	38,000		1	-		
6	AHU-N-6	38,000	17,500	1	-		
7	AHU-N-7	38,000	17,500	1	-		
8	AHU-E-1	26,300	7,500	1	-		
9	AHU-E-2	26,300	7,500	1	-		
10	AHU-E-3	26,300	7,500	1	-		
11	AHU-E-4	35,000	0	1	-		
12	AHU-E-5	38,000	9,000	1	-		
13	AHU-E-6	38,000	9,000	1	-		
14	AHU-E-7	38,000	9,000	1	-		
15	AHU-W-1	26,300	7,500	1	-		
16	AHU-W-2	26,300	7,500	1	-		
17	AHU-W-3	26,300	7,500	1	-		
18	AHU-W-4	35,000	0	1	-		
19	AHU-W-5	38,000	9,000	1	-		
20	AHU-W-6	38,000	9,000	1	-		
21	AHU-W-7	38,000	9,000	1	-		
22	AHU-A-1	35,000	0	1	-		
23	AHU-A-2	35,000	0	1	-		
Total				23	-	-	-

East Wing

Air Handling		CFM	Min OA CFM	CHWR Temp Sensors		SIZE EXCLUSION	NO DATA
				existing	add new		
1	Plaza N East	35,000	5,600	1	-		
2	Plaza N West	35,000	5,600	1	-		
3	Plaza S East	35,000	5,600	1	-		
3A	East Wing Senate Video			1			
4	Plaza S West	35,000	5,600	1	-		

5	North Atrium	15,000	450	-	1		
6	Dome	15,000	750	-	1		
7	South Atrium	15,000	450	-	1		
8	Media	16,000	1,760	-	1		
9	Capitol Police	9,500	1,520	1	-		
10	Shops	5,000	400	-	-	1	
11	Processing	4,500	135	-	-	1	
12	IMCS Space	5,000	400	1	-		
13	IMCS Equipment	10,000	0	1	-		
14	Kitchen	14,000	14,000	1	-		
Total				9	4	2	-

East Wing

Air Handling		CFM	Min OA CFM	CHWR Temp Sensors		SIZE	NO
				existing	add new	EXCLUSION	DATA
AC-1	Ground thru 6th FL	49,000	9,800	-	1		
AC-2	Ground thru 6th FL	49,000	9,800	-	1		
AC-3	Basement	8,500	850	-	1		
AC-4	Basement	4,800	480	-	-	1	
AC-5	Basement	8,000	800	-	1		
AC-6	Basement	7,500	750	-	1		
AC-7	Snack Bar	3,800	950	-	-	1	
Total				-	5	2	-

Judicial - BUILT AFTER VARIPRIME CONVERSION

Air Handling		CFM	Min OA CFM	CHWR Temp Sensors		SIZE	NO
				existing	add new	EXCLUSION	DATA
AHU/B-1	Basement	3,650	1,380	-	1		
AHU/B-2	Basement	10,400	0	-	1		
AHU/B-3	Basement	1,410	530	-	-	1	
AHU/1-B	1st FL A/B Wing	20,880	6,300	-	1		
AHU/1-D	1st FL C Wing	23,035	7,490	-	1		
AHU/2-A	2nd FL C Wing	12,690	4,800	-	1		
AHU/2-B	2nd FL B Wing	15,470	5,190	-	1		
AHU/3-A	3rd FL C Wing	14,440	4,210	-	1		
AHU/3-B	3rd FL B Wing	16,760	5,590	-	1		
AHU/4-A	4th FL C Wing	11,810	3,790	-	1		
AHU/4-B	4th FL B Wing	17,730	4,700	-	1		
AHU/4-C	4th FL Courtroom	2,930	2,090	-	1		
AHU/4-D	4th FL Courtroom	2,930	2,090	-	1		
AHU/5-A	5th FL C Wing	14,450	4,380	-	1		
AHU/5-B	5th FL B Wing	15,465	5,170	-	1		
AHU/5-C	5th FL Courtroom	4,270	2,920	-	1		
AHU-6	6th FL	15,110	4,990	-	1		
AHU-7	7th FL	15,840	4,840	-	1		
AHU-8	8th FL	12,830	3,950	-	1		
AHU-9	9th FL	14,020	3,950	-	1		
Total				-	19	1	-

North Office

Air Handling		CFM	Min OA CFM	CHWR Temp Sensors		SIZE	NO
				existing	add new	EXCLUSION	DATA

AC-1	Basement thru 6th FL	69,650	23,681	-	1		
AC-2	Basement thru 6th FL	69,650	23,681	-	1		
Total				-	2	-	-

Ryan

Air Handling		CFM	Min OA CFM	CHWR Temp Sensors		SIZE EXCLUSION	NO DATA
				existing	add new		
1	Basement (East)	1,500	1,500	1	-		
2	Basement (East)	2,270	2,270	1	-		
3	Attic	2,270	2,270	1	-		
4	Basement (West)	2,340	1,550	1	-		
5	Basement (West)	2,080	2,080	1	-		
6	Attic	8,890	1,400	-	1		
7	Attic	1,400	1,400	1	-		
8	Basement	4,080	1,525	1	-		
Total				7	1	-	-

H&W

Air Handling		CFM	Min OA CFM	CHWR Temp Sensors		SIZE EXCLUSION	NO DATA
				existing	add new		
1	North Exterior	26,700	6,675	-	1		
2	East Interior	38,500	14,800	-	1		
3	South Exterior	22,500	5,625	-	1		
4	West Interior	41,300	15,800	-	1		
5	Annex	7,770	TBD	-	1		
Total				-	5	-	-

L&I

Air Handling		CFM	Min OA CFM	CHWR Temp Sensors		SIZE EXCLUSION	NO DATA
				existing	add new		
8	East Wing Interior	32,000	11,789	1	-		
9	East Wing Primary	5,800	5,800	1	-		
10	West Wing Primary	6,100	6,100	1	-		
11	West Wing Interior	14,060	5,180	1	-		
12	West Wing Interior	13,940	8,804	1	-		
2	North Primary	34,500	34,500	-	1		
3	South Primary	32,500	32,500	-	1		
4A & 4B	North Interior	54,000	15,632	-	1		
5A & 5B	South Interior	54,000	15,632	-	1		
Total				5	4	-	-

Main Capitol

Air Handling		CFM	Min OA CFM	CHWR Temp Sensors		SIZE EXCLUSION	NO DATA
				existing	add new		
1	AHU-1	2,500	75	-	-	1	
2	AHU-2	1,300	39	-	-	1	
3	AHU-3	2,900	290	-	-	1	
4	AHU-4	3,200	96	-	-	1	
5	AHU-5	3,150	378	-	-	1	
6	AHU-6	1,200	144	-	-	1	
7	AHU-7	2,500	75	-	-	1	
8	AHU-8	2,500	250	-	-	1	

	AHU-9						1
	AHU-10						1
	AHU-11						1
	AHU-12						1
	AHU-13						1
	AHU-14						1
	AHU-15						1
	AHU-16						1
	AHU-17						1
	AHU-18						1
9	AHU-19	19,315	2,897	-	1		
10	AHU-20	5,750	863	-	-	1	
11	AHU-21	6,780		-	-	1	
12	AHU-22	6,780		-	-	1	
13	AHU-23	5,875	881	-	-	1	
14	AHU-24	5,875	588	-	-	1	
15	AHU-25	3,500	525	-	-	1	
	AHU-26						1
16	AHU-27	3,925	393	-	-	1	
	AHU-28						1
17	AHU-29	5,875	1,469	-	-	1	
18	AHU-30	5,875	881	-	-	1	
19	AHU-31	6,780	1,695	-	-	1	
20	AHU-32	6,780	678	-	-	1	
	AHU-33						1
	AHU-34						1
21	AHU-35	1,700		-	-	1	
22	AHU-36	3,500		-	-	1	
23	AHU-37	4,000		-	-	1	
24	AHU-38	4,000		-	-	1	
25	AHU-39	2,500	75	-	-	1	
26	AHU-40	2,500		-	-	1	
27	AHU-41	2,500		-	-	1	
28	AHU-42	3,325	499	-	-	1	
29	AHU-43			-	-		1
30	AHU-44	400	12	-	-	1	
31	AHU-45			-	-		1
32	AHU-A	28,350	4,253	-	1		
Total				-	2	28	16

Finance

Air Handling		CFM	Min OA CFM	CHWR Temp Sensors		SIZE	NO
				existing	add new	EXCLUSION	DATA
Fan A	basement west	11536	274	-	1		
Fan B	basement east	7516	2,381	-	1		
C1&2	low flrs east	25924	***8,555***	-	1		
D1&2	low flrs west	20648	***6,814***	-	1		
E1&2	uppr flrs east	40592	***13,395***	-	1		
F1&2	uppr flrs west	47200	***15,576***	-	1		
Total				-	6	-	-

Central Plant

Air Handling		CFM	Min OA CFM	CHWR Temp Sensors	SIZE	NO

				existing	add new	EXCLUSION	DATA
AC-1	basement west	10,000	1,000		1		
AC-2	basement east	10,000		-	1		
Total				-	2	-	-

Appendix B
Piping Insulation Savings Analysis

Insulation Project Savings

	I-Star Results			
	steam $ savings	steam MLB savings	CHW ton-hr savings	VAV fan kWh savings
net project	$ 118,110	4,921	410,105	164,042

re-calc steam savings at $24.64/MLB:	$ 121,260		
chiller plant all-in cooling rate (kW/ton):	0.5030		
electric rate:	$ 0.075546	$	0.075546
electricity savings - condensate pipe/fittings:	$ 15,584	$	12,393
net total savings:	$ 149,237	/ year	
plant steady-state load reduction - 8760 hours:	46.8	tons	

I-Star Energy Solutions

is pleased to present

The Efficiency Network

with an

I-STAR™

Mechanical Insulation Assessment

of the

Harrisburg Capital

(Revised 4/30/18)

I-STAR™ Innovation – Savings Through Assessment and Remediation.

Executive Summary 1

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South Office 12

PJC 13

Forum 14

Cooling Tower 15

Tunnels - HHW 16

Damaged/Inadequate 17

Systems 18

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I-STAR™ Mechanical Insulation Assessment

Presented to

The Efficiency Network

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Use of the 3E Plus program for an assessment of the economic thickness guidelines for all insulations does not ensure or guarantee compliance with any energy code in your geographic location. Consult local authorities before finalizing your installation plans. The use of the 3E Plus program to calculate heat transfer does not ensure or guarantee specific dollars savings or energy savings. This program was designed for the industrial process, environmental managers and the insulation industry. It is a valuable tool for calculating and selecting the insulation thickness needed to reduce heat transfer, and maintain a safe insulated surface temperature for personnel protection and condensation control.

Each insulation and jacket material manufacturer has specific recommendations for the installation of its product. Consult your manufacturer for specific details.

All the information printed in this report is based on the given input information. Actual values will vary depending on the actual service conditions. The system of mathematical heat flux equations used in this analysis is applicable for most systems normally insulated with bulk-type insulations. The thermal performance equations are based on laboratory conditions and may not represent actual conditions of use.

The Efficiency Network (TEN)
200 Barr Harbor Drive, Suite 400
West Conshohocken, PA 19428

Rev- April 30, 2018

Attention: **Robert Tobin**
Principal Project Manager
Cell: (267) 254-2122
Robert.Tobin@TENsaves.com

Subject: **I-STAR™ Mechanical Insulation Assessment Report**
Harrisburg Capital

Dear Mr. Tobin,

In accordance with the above referenced contract, we have completed our I-STAR™ Mechanical Insulation Assessment of the referenced facilities and are pleased to hereby present you with the accompanying I-STAR™ Report. The report includes detailed findings, conclusions regarding potential energy savings and emission reductions, cost and payback calculations, and a number of recommended work proposals and schedules. I look forward to reviewing these personally with you and others on your team, and answering any questions that you may have about them.

The report begins with an Executive Summary which summarizes the work to be done and the potential energy savings and environmental emission reductions for the entire scope of the project.

The above savings would result from the installation of insulation in the areas that we surveyed. We have also included thermal and digital images to assist with the evaluation process.

A proposed remediation contract is enclosed for your consideration. This covers those items that we believe, based on our assessment results, would be the most practical, beneficial, and provide the quickest return on investment as an initial scope of work. We appreciate your confidence in us and look forward to providing you with these services.

Thank you for the opportunity to perform this appraisal of your insulation requirements. Please do not hesitate to contact me at (717) 989-6909 or andymartin@irexcorp.com if you have any questions or require additional information regarding your I-STAR™ Mechanical Insulation Assessment.

Respectfully submitted,

Andrew Martin

Andrew Martin, *CEM, CIEA, CIT, BPI*
I-Star Energy Solutions
(717) 989-6909
andymartin@irexcorp.com
www.istarenergysolutions.com

Executive Summary

I-Star Energy Solutions, LLC evaluated the performance of eight different systems consisting of piping and equipment at seven major work areas at your facility. Specifically identified and assessed were systems that were not insulated. Segments of insulation that was damaged or inadequate in terms of type or thickness were quantified but not assessed due to the inability to accurately access heat loss. This included systems that were insulated with fiberglass and mineral fiber insulations, cellular insulations, and granular insulations like calcium silicate and expanded perlite.

Your opportunity for energy savings and emissions reductions is substantial. Our calculations yielded the following major conclusions:

Energy Savings ($):	**118,110**
Energy Reduction (KBtus):	**4.922E+06**
CO2 Reduction (lbs):	**574,917**
NOx Reduction (lbs):	**1,154**
[redacted]	
[redacted]	
[redacted]	
[redacted]	

The data in the above table is based on our site survey and the drawings and other information that you made available to us. We calculated the quantities of each category of insulation and the estimated Btu and dollar cost of: a.) Operating the systems in their current condition and, b.) Operating the systems after the installation of the appropriate type and thickness of insulation. We also calculated the emissions savings associated with the recommended upgrades.

Calculations

Simple Payback: Simple Payback is the amount of time it will take to recover installation costs based on annual energy cost savings. The equation for simple payback is the initial installation cost divided by annual energy cost savings. The equation is:

$$\text{Simple Payback} = \frac{\text{Installation Costs}}{\text{Annual Energy Savings}}$$

IRR: The Internal Rate of Return, or IRR, is the discount rate that makes the net present value (NPV) of all cash flows (both costs and savings) from a particular project equal to zero. IRR ignores external factors such as inflation and the interest rate. The equation used for IRR is:

$$\text{IRR} = (\text{Low Rate}) + \left\{\frac{(\text{NPV of cash flows @ low rate})}{(\text{NPV of cash flows @ low rate} - \text{NPV of cash flows @ high rate})}\right\} \times (\text{high rate} - \text{low rate})$$

Both the high and low rates must be determined through trial and error by using the equation for NPV:

$$NPV = \sum_{n=0}^{N} \frac{C_n}{(1+r)^n}$$

- n = time period
- c = cash flow
- r = interest rate

The low rate will always be determined by estimating a ***positive*** NPV close to zero, while the high rate will always be determined by estimating a ***negative*** NPV close to zero.

We have conservatively assumed the useful life of insulation to be 20 years; therefore, we have projected your energy savings to also extend 20 years for the purposes of this equation. We have not included any fuel escalation projections in our calculations.

NPV: The Net Present Value, or NPV, of a project's range of cash flows (in this instance, cost and savings), adjusts future earnings to reflect their value in present day dollars. The formula being used for NPV is:

$$NPV = \sum_{n=0}^{N} \frac{C_n}{(1+r)^n}$$

For the purposes of this equation, we have assumed the following:

- $n = 20$
- $r = 8\%$

We have conservatively assumed the useful life of insulation to be 20 years; therefore, we have projected your energy savings to also extend 20 years for the purposes of this equation.

Clarifications

The preceding information does not include any allowance incentives, for emission reductions, nor does it include the following additional advantages to you of upgrading your mechanical insulation systems as recommended:

a. Potential tax benefits and credits from energy conservation investments
b. Enhanced personnel protection, noise control and fire safety
c. Condensation prevention and freeze protection
d. Reduced corrosion potential
e. Reduced equipment wear and tear
f. Reduced ongoing insulation maintenance expense
g. Improved process flows
h. More attractive and comfortable working environment

Insulation is applied as a safeguard to protect personnel from burns. Insulation is used to reduce ambient temperatures to prevent personnel from working under stressful high temperature conditions. "*ASTM Standard Practice C 1057*" contains a Standard Practice for Determination of Skin Contact Temperature from heated surfaces. The Standard Industry Practice is to use 140°F as the maximum temperature of a heated surface that may be contacted by working personnel.

Design of Insulation Systems is a process that must utilize numerous criteria to determine the best materials, applications and temperature changes. We have evaluated the mechanical systems and the design requirements in order to provide solutions to best integrate the often conflicting demands of initial investment, durability, value and life cycle costs. We have tried to minimize the variation of temperature in processes and to minimize energy use. In fluid systems the temperature drop can be calculated using the following equation;

$$(T_i - T_f) = (T_i - T_a) \bullet \left[1 - e^{-\left[(U \bullet P \bullet L)/(m \bullet Cp)\right]}\right] \quad (1)$$

T_i = initial (entering) fluid temperature, °F

T_f = final (leaving) fluid temperature, °F

T_a = ambient temperature, °F

U = overall heat transfer coefficient, Btu/(hr·ft²·°F)

P = outside perimeter of pipe or duct, ft

L = length of pipe or duct run, ft

m = flow rate of fluid, lb_m/hr

C_p = specific heat of fluid, Btu/(lb_m·°F)

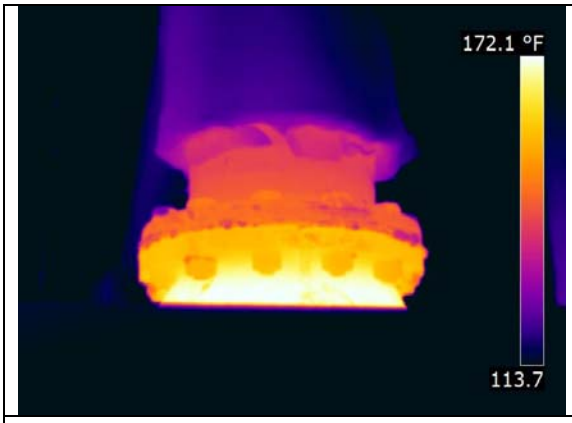
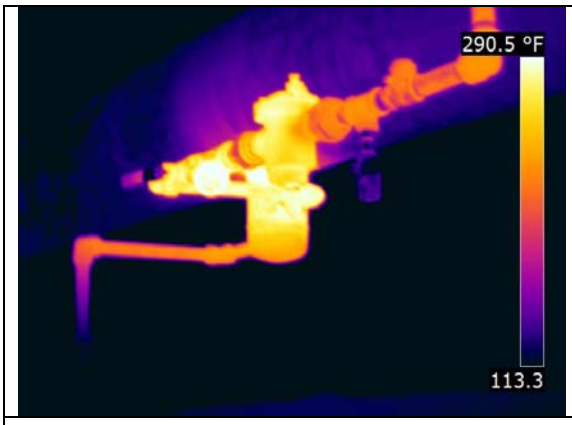
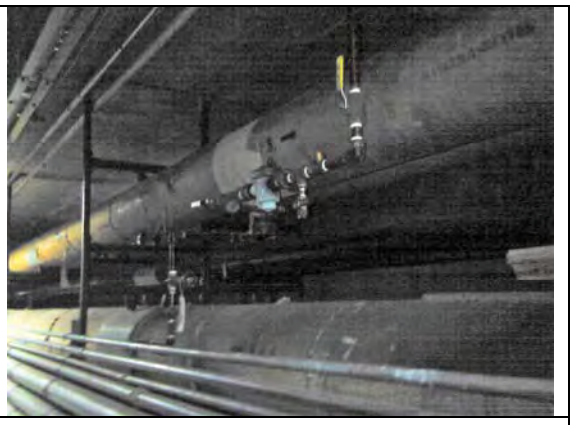
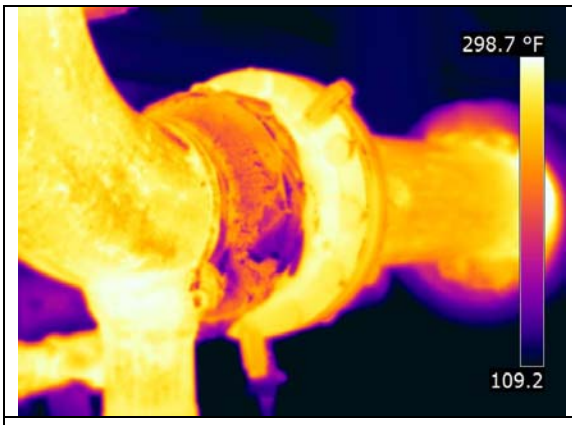
We did not note any asbestos content, lead-based paint or other hazardous materials in our survey. However, this is a possibility with older insulation materials, which need to be affirmatively identified or sample tested prior to repair or removal. Should any such materials be identified, another advantage of performing the recommended upgrades would be to reduce the possibility that anyone would be harmed from their continuing use. At your request, should you wish to abate any asbestos containing materials I-Star Energy Solutions, LLC can provide a quote.

Insulation thickness was determined by optimization calculations from the 3EPLUS program, if sufficient information was provided, and/or in conjunction with evaluation of existing job site conditions, (see table A).

Additional information

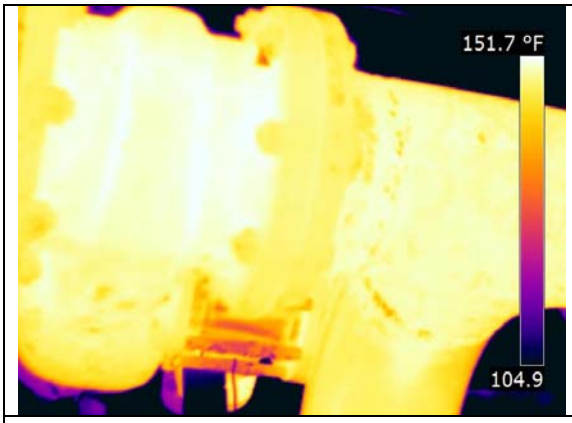
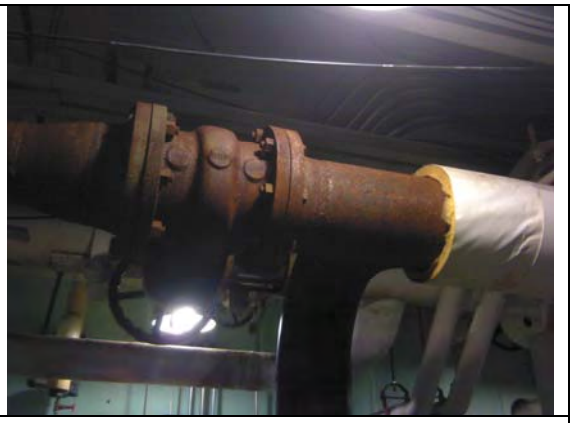
Central Plant Tunnels

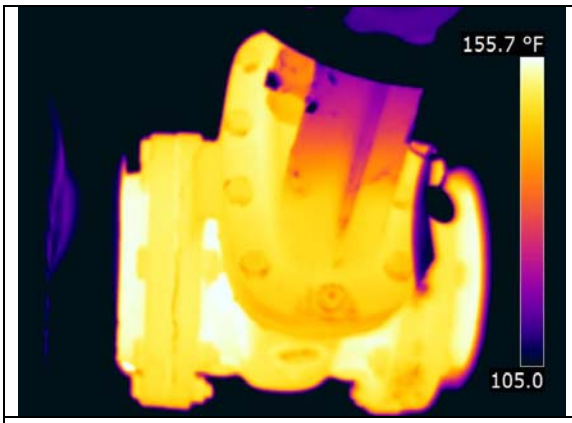
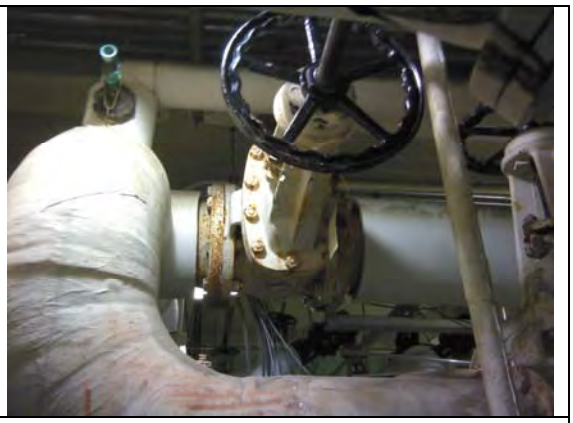
The mechanical systems at this site appeared to be generally well insulated. However, we found un-insulated piping and equipment such as valves, strainers, end caps, traps and flange pairs in the main North and South tunnels. These devices should be insulated to reduce energy loss. Potentially hazardous material was noted at this site.

		
Energy loss from un-insulated flanges		Un-insulated flanges
		
Energy loss from un-insulated trap, valves and pipe		Un-insulated trap, valves and pipe
		
Energy loss from bare flange/pipe		Un-insulated flanges and pipe

B09

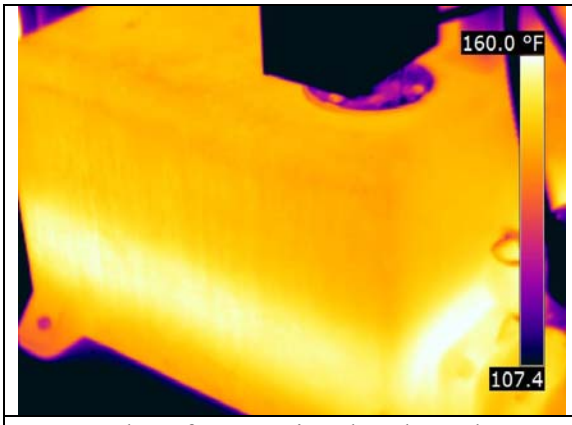
The mechanical systems at this site appeared to be generally well insulated. However, we found un-insulated piping and equipment such as valves, strainers, bonnets, traps, pumps and flange pairs in the heat exchanger area and pump area. These devices should be insulated to reduce energy loss. (due to time constraints, only uninsulated items 4" and larger were accounted for in this room)

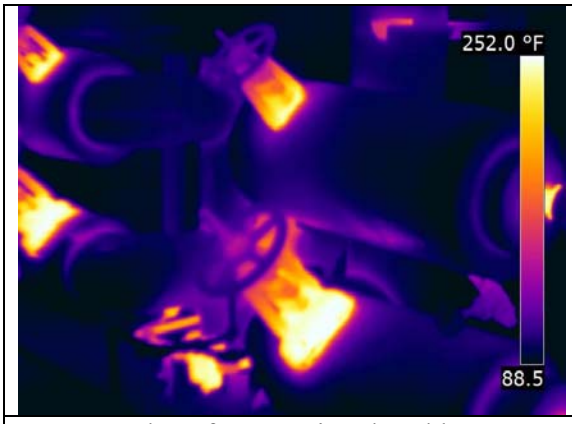
		
Energy loss from un-insulated flange valve and pipe		Un-insulated flange valve and pipe

		
Energy loss from un-insulated flange valve		Un-insulated flange valve

East Wing

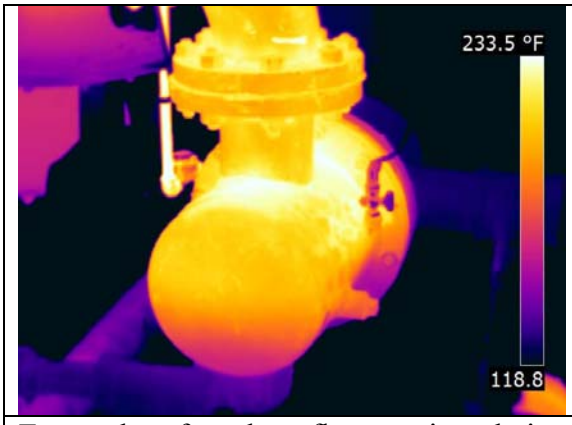
The mechanical systems at this site appeared to be generally well insulated, with some areas in poor condition. However, we found un-insulated piping and equipment such as valves, strainers, reducers, bonnets, traps, pumps and flange pairs in the heat exchanger area, North and South P2, M87, AHU areas and steam stations. These devices should be insulated to reduce energy loss.

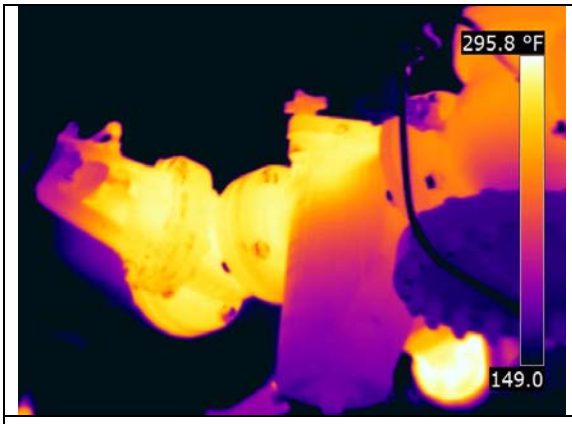
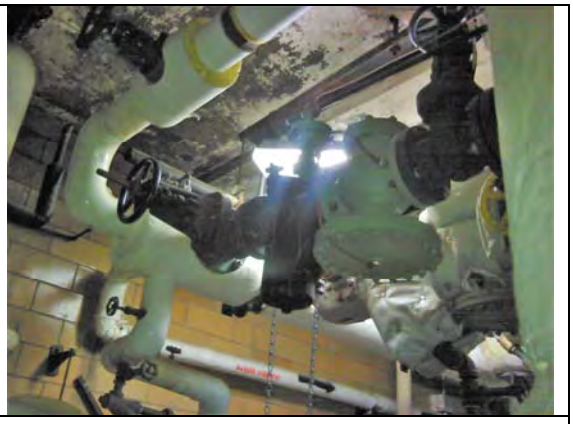
		
Energy loss from un-insulated condensate tank		Un-insulated condensate tank

		
Energy loss from un-insulated bonnets		Un-insulated bonnets

Finance

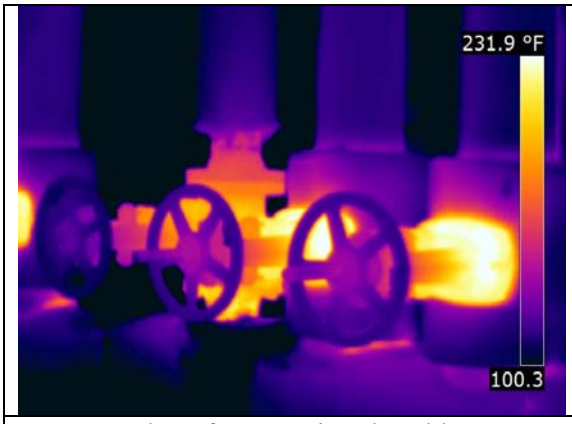
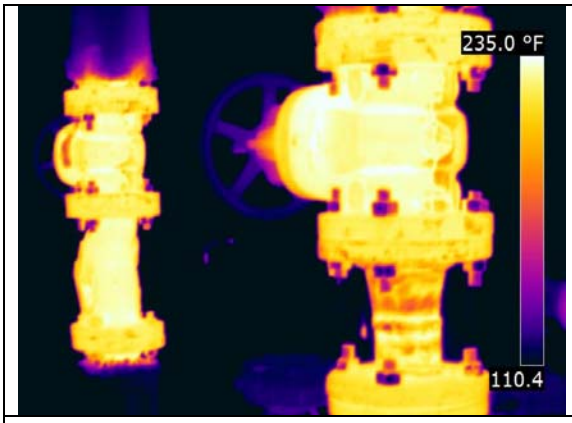
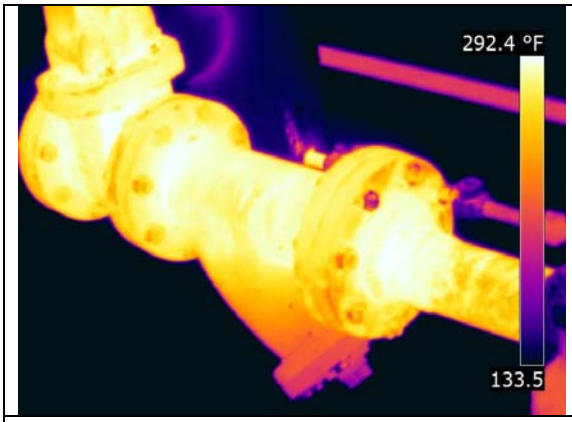
The mechanical systems at this site were generally well insulated. However, we found un-insulated piping and equipment such as valves, strainers, end caps, bonnets, traps, pumps and flange pairs in the steam room. These devices should be insulated to reduce energy loss.

		
Energy loss from bare flange pair and pipe		Un-insulated flanged pair and pipe

		
Energy loss from bare valves and flanges		Un-insulated valves and flanges

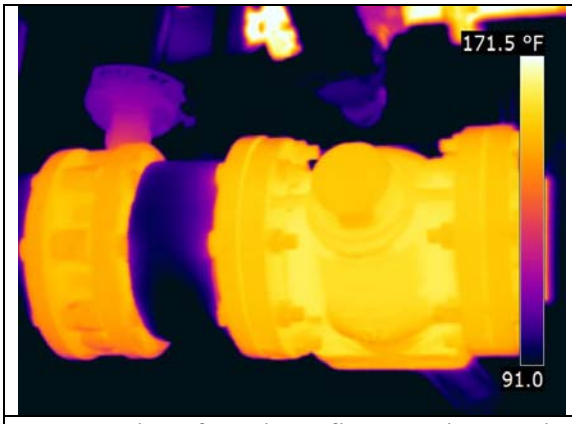
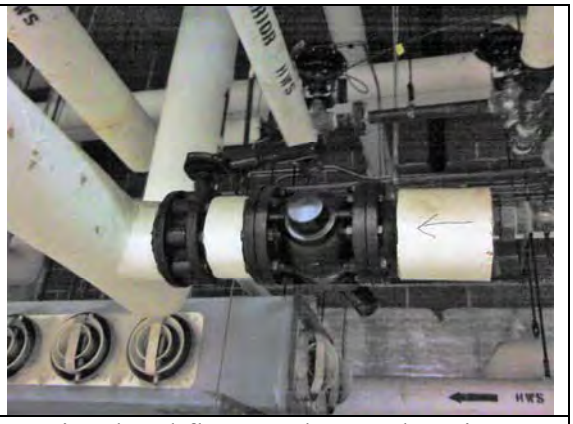
Main Capital

The mechanical systems at this site were well insulated. However, we found un-insulated piping and equipment such as valves, strainers, reducers, end caps, bonnets, traps, pumps and flange pairs in the mechanical areas of the sub-basement. These devices should be insulated to reduce energy loss.

		
Energy loss from un-insulated bonnets		Un-insulated bonnets
		
Energy loss from bare valves and flanges		Un-insulated valves and flanges
		
Energy loss from bare valve, strainer and flanges		Un-insulated valve, strainer and flanges

North Office

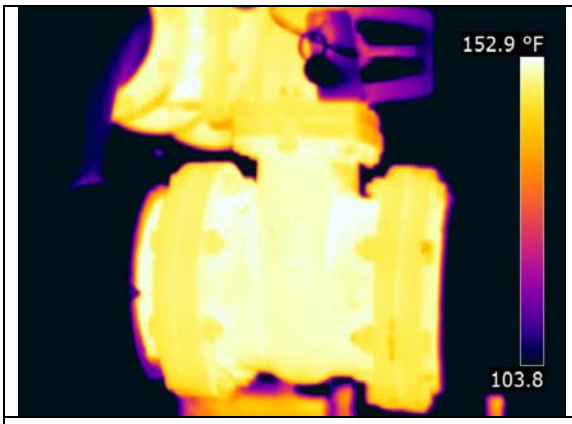
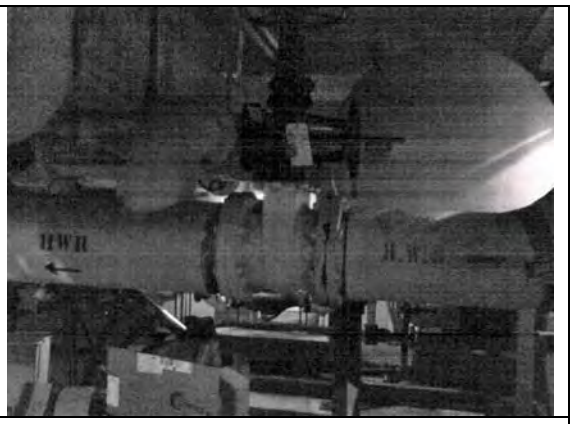
The mechanical systems at this site were generally well insulated. However, we found un-insulated piping and equipment such as valves, strainers, bonnets, traps, pumps and flange pairs in the mechanical area next to G16, B31/33-Steam Station. These devices should be insulated to reduce energy loss.

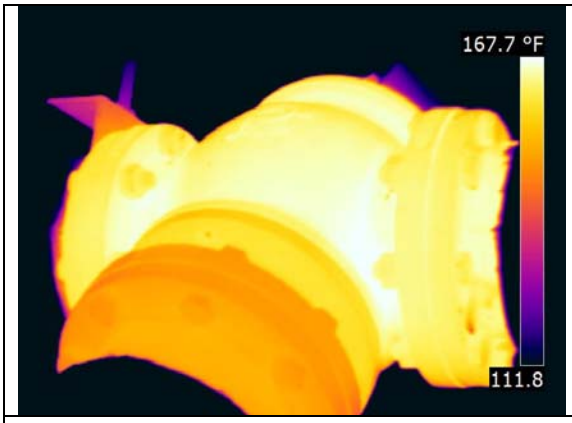
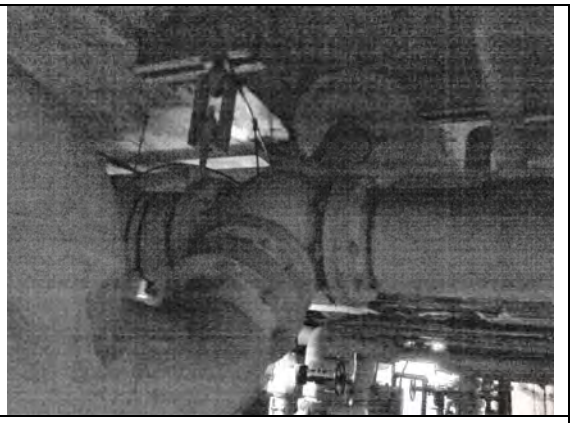
		
Energy loss from bare flange valves and equipment		Un-insulated flange valves and equipment

Energy loss from bare pipe and flange pairs		Un-insulated pipe and flange pairs

South Office

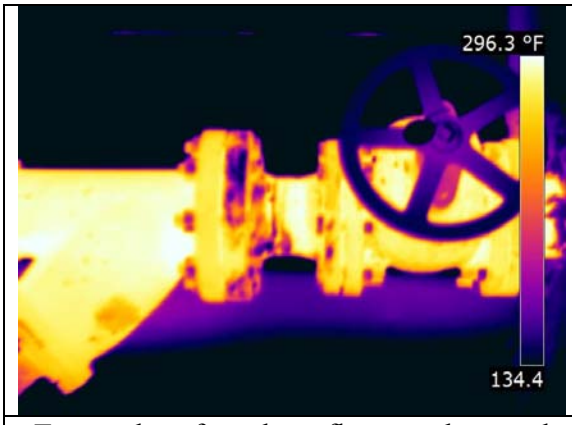
The mechanical systems at this site were well insulated. However, we found un-insulated piping and equipment such as valves, strainers, end caps, bonnets, pumps and flange pairs in the mechanical areas, pump areas, heat exchanger area and converter area. These devices should be insulated to reduce energy loss. The present condition of the Fan Room was poor with large areas of mold. Potentially hazardous material was noted in this room and the MER room.

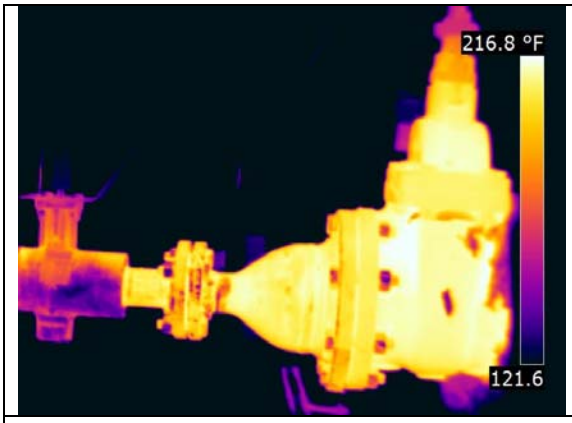
		
Energy loss from un-insulated flange valve, flange pairs		Un-insulated flange valve, flange pairs

		
Energy loss from bare flange pairs		Un-insulated flange pairs

PJC

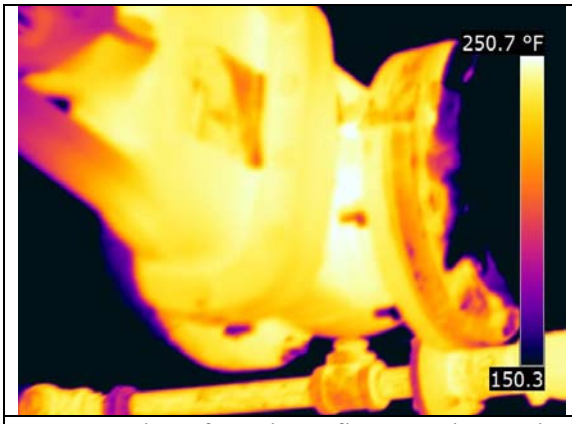
The mechanical systems at this site were generally well insulated. However, we found un-insulated piping and equipment such as valves, strainers, bonnets, traps, pumps and flange pairs in the steam station 1 and 2, STC and HHW mechanical areas. These devices should be insulated to reduce energy loss.

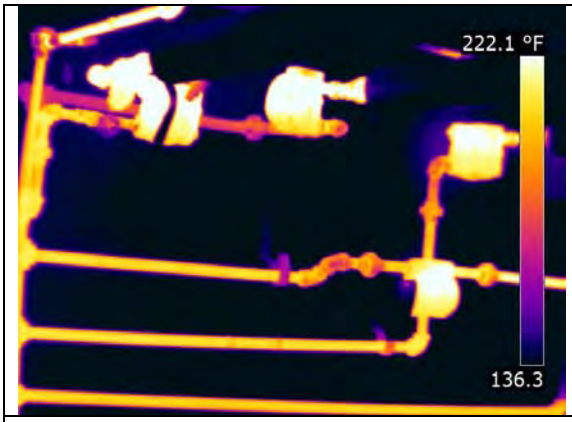
		
Energy loss from bare flange valves and pipe and strainer		Un-insulated flange valves and pipe and strainer

		
Energy loss from bare pipe, flange valve, flange pairs		Un-insulated pipe, flange valve, flange pairs

Forum

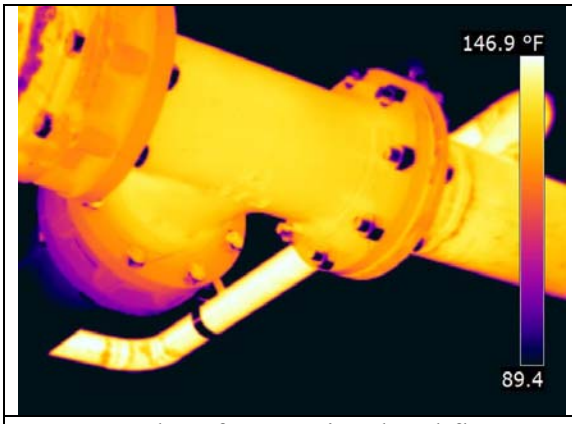
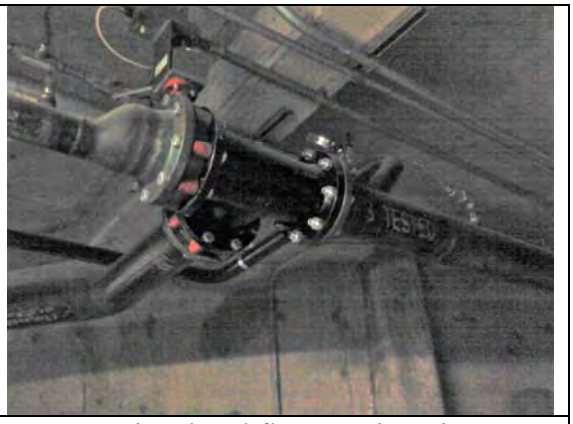
The mechanical systems at this site were generally well insulated. However, we found un-insulated piping and equipment such as valves, strainers, reducers, bonnets, traps and flange pairs in the mechanical equipment room. These devices should be insulated to reduce energy loss.

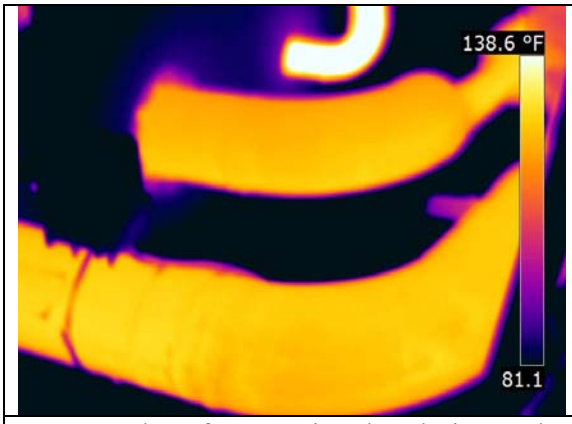
		
Energy loss from bare flange valve and pipe		Un-insulated flange valve, pipe, fittings

		
Energy loss from bare pipe, traps, fittings		Un-insulated pipe, traps, fittings

Cooling Tower

The mechanical systems at this site appeared to be generally well insulated. However, we found un-insulated piping and equipment such as valves, reducers and flange pairs in the mechanical equipment area. These devices should be insulated to reduce energy loss.

		
Energy loss from un-insulated flange pairs, pipe		Un-insulated flange pairs, pipe

		
Energy loss from un-insulated pipe and flange pairs		Un-insulated pipe and flange pairs

We look forward to explaining and discussing our findings and recommendations, and to answer any questions that you and others in your organization participating in the decision may have.

Suspect Materials

It was noted by our team that fittings, joints and some piping may contain possible hazardous material located in the Central Plant Tunnels, South Office and throughout the Mechanical Rooms.

Table A: Minimum Suggested Insulation Requirements

PIPING INSULATION

PIPING	TYPE	PIPE SIZE	TYPE "A" INSULATION THICKNESS	TYPE "B & C" INSULATION THICKNESS
Interior Domestic Hot Water Supply & Return	A	½" – 1 ¼"	1 ½ "	
Interior Domestic Hot Water Supply & Return	A	1 ½" – 10"	2"	
Interior Heating Hot Water Exposed & Concealed	A	½" – 1 ¼"	1 ½ "	
Interior Heating Hot Water Exposed & Concealed	A	1 ½" – 10"	2"	
Interior Steam Piping Exposed and Concealed	A	½" – 3 ½"	2 ½"	
Interior Steam Piping Exposed & Concealed	A	4" – 10"	3"	
Interior Steam Condensate Exposed & Concealed	A	½" – 1 ¼"	1 ½ "	
Interior Steam Condensate Exposed & Concealed	A	1 ½" – 10"	2"	
Chilled Water Piping Exposed & Concealed	A	All	1 ½ "	
Removable blankets on all Steam Traps and Pumps, regardless of size; and Heating items 2 ½" and larger: Flanged Pairs, Flanged Valves; Strainers	B	All		See Spec

TEN will revisit thickness with I-Star to conform with 2009 IECC.

Insulation Type:

A. Type A: Knauf 1000° Pipe Insulation, ASTM C547, Class 1, k value of 0.23 at 75 degrees F, with All Service Jacketing (ASJ) or equal.

Fittings:

All fittings with Type A Pipe Insulation will be Proto Fitting Covers manufactured from 20-mil thick high-impact, ultra-violet-resistant PVC, or equal.

Jacket:

All type A Pipe insulation includes a Foil and Paper Jacket: Laminated glass-fiber-reinforced, flame retardant kraft paper and aluminum foil – white exterior, Kraft reinforce foil vapor barrier with self-sealing adhesive joints.

Accessories:

All Type A Pipe Insulation terminations will be neatly finished with Childers Vi-Cryl CP-11 Mastic, or equal.

B. Type B: Removable insulation jackets

For Box Type Jackets:

- High-temperature insulation blanket with no binder
- Insulation must be hydrophobic
- Estimation of Maximum Use Temperature 1000°F (538°C)

For Non Box Type Jackets:

- Glass mat, 1" @ 5.0 LB/CF.
- Estimation of Maximum Use Temperature 1000°F (538°C)

Construction:

1. Double sewn lock stitch with a minimum 4 to 6 stitches per inch. Jackets shall be sewn with two (2) parallel rows of stitching using Teflon Coated Fiberglass Thread. The thread must be able to withstand the skin temperatures without degradation.

2. No raw cut jacket edges shall be exposed.

3. Jackets shall be fastened using hook and loop (Velcro) straps and 1" Slide Buckles.

4. All stitching will be done with Teflon Coated Fiberglass Thread.

5. Provide a permanently attached Aluminum or stainless steel nameplate on each jacket to identify its location, size and tag number.

6. The insulation shall be designed to minimize the convection current in the space between the hot metal surface and the inner layer of insulation. To this end, during jacket fabrication, the layers of insulating mat shall be placed in an overlapping pattern.

7. All jacket pieces which match mating seams must include an extended 2" flap constructed from the exterior fabric and shall be secured using hook & loop closure (i.e. Velcro ^{TM}) parallel to the seam.

8. Insulation must be sewn as integral part of the jacket to prevent shifting of the insulation. Insulation pins are not an allowable method of preventing the insulation from shifting and will not be used.

EQUIPMENT INSULATION

Equipment	Insulation Type	Insulation Thickness
Interior Exposed Above Ambient Temperature Equipment, Tanks, Condensate Receivers, HEX	Fiberglass/ w ASJ Jacketing	2”

Insulation Type:

A. Type A: Knauf Fiberglass, Kwikflex Pipe & Tank Insulation, ASTM C 1393, Types I,II, IIIA, IIIB Category 2, ASTM , flame spread rating is <25 and smoke developed rating is <50 as tested by ASTM E84,k value of 0.24 at 75 degrees F, with All Service Jacketing, or equal.

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Savings Summary

Project Name: Harrisburg-Capital Building

Building/Phase Name	Effective Lineal Footage (sq)	NON-INSULATED		INSULATED		SAVINGS	
		Total Bare Fuel Cost per Year	Total Bare KBtu Heat Loss per Year	Total Insulated Fuel Cost per Year	Total Insulated KBtu Heat Loss per Year	Total Insulated Cost Savings per Year	Total Insulated KBtu Savings per Year
Central Plant Tunnels	282.4	$ 32,394.21	1.350E+06	$ 1,918.64	7.990E+04	$ 30,475.57	1.270E+06
B09	82.7	$ 6,329.19	2.637E+05	$ 451.62	1.881E+04	$ 5,877.56	2.449E+05
East Wing	332.4	$ 14,471.55	6.031E+05	$ 1,174.81	4.898E+04	$ 13,296.74	5.541E+05
Finance	86.8	$ 5,060.88	2.108E+05	$ 341.05	1.422E+04	$ 4,719.82	1.966E+05
Main Capital	500.2	$ 26,380.53	1.099E+06	$ 1,832.27	7.634E+04	$ 24,548.26	1.023E+06
North Office	247.6	$ 9,177.28	3.824E+05	$ 765.12	3.187E+04	$ 8,412.17	3.505E+05
South Office	289.3	$ 22,100.77	9.212E+05	$ 1,430.99	5.971E+04	$ 20,669.78	8.615E+05
PJC	82.3	$ 7,089.87	2.954E+05	$ 457.92	1.909E+04	$ 6,631.95	2.763E+05
Forum	56.3	$ 2,787.85	1.162E+05	$ 197.31	8.218E+03	$ 2,590.53	1.079E+05
Cooling Tower	-	$ -	0.000E+00	$ -	0.000E+00	$ -	0.000E+00
Tunnel-Heating Hot Water	11.0	$ 956.76	3.986E+04	$ 69.22	2.885E+03	$ 887.54	3.698E+04
	1,971.1	$ 126,748.88	5.282E+06	$ 8,638.95	3.600E+05	$ 118,109.93	4.922E+06

I-Star Energy Solutions-Confidential

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Savings Summary

Project Name: Harrisburg-Capital Building

Building/Phase Name	Effective Lineal Footage (sq)	ENVIRONMENTAL EMISSIONS								
		Annual CO2 Emissions LBS Insulated	Annual CO2 Emissions LBS Bare	Annual CO2 Emission Reduction	Annual NOx Emissions LBS Insulated	Annual NOx Emissions LBS Bare	Annual NOx Emission Reduction	Annual CE Emissions LBS Insulated	Annual CE Emissions LBS Bare	Annual CE Emission Reduction
Central Plant Tunnels	282.4	9,310	157,298	147,988	19	315	297	-	-	-
B09	82.7	2,192	30,729	28,537	4	62	57	-	-	-
East Wing	332.4	5,778	70,842	65,063	12	142	131	-	-	-
Finance	86.8	1,657	24,570	22,913	3	49	46	-	-	-
Main Capital	500.2	8,896	128,091	119,195	18	257	239	-	-	-
North Office	247.6	3,714	44,558	40,844	7	89	82	-	-	-
South Office	289.3	7,078	108,369	101,291	14	218	203	-	-	-
PJC	82.3	2,225	34,424	32,199	4	69	65	-	-	-
Forum	56.3	958	13,535	12,577	2	27	25	-	-	-
Cooling Tower	-	-	-	-	-	-	-	-	-	-
Tunnel-Heating Hot Water	11.0	336	4,645	4,309	1	9	9	-	-	-
	1,971.1	42,145	617,061	574,917	85	1,238	1,154	-	-	-

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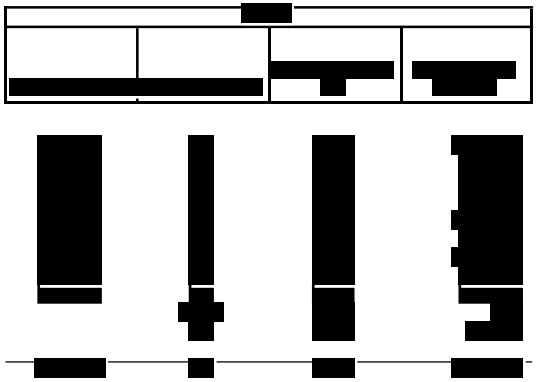
Investment Analysis

Project Name: Harrisburg-Capital Building

Building/Phase Name	Lineal Footage (ft)	NON-INSULATED		INSULATED		SAVINGS		
		Total Bare Fuel Cost per Year	Total Bare KBtu Heat Loss per Year	Total Insulated Fuel Cost per Year	Total Insulated KBtu Heat Loss per Year	Total Insulated Cost Savings per Year	Total Insulated KBtu Savings per Year	
Central Plant Tunnels	282.416	$ 32,394.21	1.350E+06	$ 1,918.64	7.990E+04	**$ 30,475.57**	**1.270E+06**	
B09	82.74	$ 6,329.19	2.637E+05	$ 451.62	1.881E+04	**$ 5,877.56**	**2.449E+05**	
East Wing	332.4096	$ 14,471.55	6.031E+05	$ 1,174.81	4.898E+04	**$ 13,296.74**	**5.541E+05**	
Finance	86.819	$ 5,060.88	2.108E+05	$ 341.05	1.422E+04	**$ 4,719.82**	**1.966E+05**	
Main Capital	500.1555	$ 26,380.53	1.099E+06	$ 1,832.27	7.634E+04	**$ 24,548.26**	**1.023E+06**	
North Office	247.632	$ 9,177.28	3.824E+05	$ 765.12	3.187E+04	**$ 8,412.17**	**3.505E+05**	
South Office	289.3418	$ 22,100.77	9.212E+05	$ 1,430.99	5.971E+04	**$ 20,669.78**	**8.615E+05**	
PJC	82.2699	$ 7,089.87	2.954E+05	$ 457.92	1.909E+04	**$ 6,631.95**	**2.763E+05**	
Forum	56.314	$ 2,787.85	1.162E+05	$ 197.31	8.218E+03	**$ 2,590.53**	**1.079E+05**	
Cooling Tower	0	$ -	0.000E+00	$ -	0.000E+00	**$ -**	**0.000E+00**	
Tunnel-Heating Hot Water	11	$ 956.76	3.986E+04	$ 69.22	2.885E+03	**$ 887.54**	**3.698E+04**	
		$ 126,748.88	5.282E+06	$ 8,638.95	3.600E+05	**$ 118,109.93**	**4.922E+06**	



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Project Name: **Harrisburg-Capital Building**

3E Inputs and Assumptions

System	Process Temp	Ambient Temp	Wind Speed	Fuel Name	Heat Content	Fuel Cost ($)	Fuel Cost Unit	Plant Efficiency	Annual Hours of Operation	Insulation Layer 1	Outer Jacket Mat'l
Domestic Hot Water	120	78	0	Steam	1000	24	Klbs	100%	8760	1000F Mineral Fiber PIPE, Type IV, C547-11	All Service Jacket
Heating Hot Water	170	78	0	Steam	1000	24	Klbs	100%	8760	1000F Mineral Fiber PIPE, Type IV, C547-11	All Service Jacket
Steam Condensate	190	78	0	Steam	1000	24	Klbs	100%	8760	1000F Mineral Fiber PIPE, Type IV, C547-11	All Service Jacket
Low Pressure Steam	227	78	0	Steam	1000	24	Klbs	100%	8760	1000F Mineral Fiber PIPE, Type IV, C547-11	All Service Jacket
Medium Pressure Steam	274	78	0	Steam	1000	24	Klbs	100%	8760	1000F Mineral Fiber PIPE, Type IV, C547-11	All Service Jacket
High Pressure Steam	298	78	0	Steam	1000	24	Klbs	100%	8760	1000F Mineral Fiber PIPE, Type IV, C547-11	All Service Jacket
Boiler Feed Water	190	78	0	Steam	1000	24	Klbs	100%	8760	1000F Mineral Fiber PIPE, Type IV, C547-11	All Service Jacket
Chilled Water	48	78	0	Electricity	3412	0.075546	kwh	100%	8760	1000F Mineral Fiber PIPE, Type IV, C547-11	All Service Jacket
Steam Condensate(60)	190	60	0	Steam	1000	24	Klbs	100%	8760	1000F Mineral Fiber PIPE, Type IV, C547-11	All Service Jacket

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Project Name: Harrisburg-Capital Building

Pipe/Equipment Summary

Building/Phase Name	Scope of Work							
	Pipe (LF)/Equip (sq/ft)	Fittings (#)	Valves / Strainers (#)	Flange Pairs (#)	Bonnets (#)	In-Line Pumps (#)	Centrifugal Pumps (#)	Steam Traps (#)
Central Plant Tunnels	154.5	94	48	11	1	0	0	7
B09	6.0	5	18	3	4	0	2	0
East Wing	57.0	129	90	16	16	3	0	24
Finance	12.0	40	21	1	10	0	0	8
Main Capital	245.0	89	86	9	24	0	0	18
North Office	37.5	49	69	13	6	6	2	7
South Office	38.5	60	62	32	9	0	4	5
PJC	6.5	9	12	5	13	0	2	5
Forum	14.0	19	10	1	3	0	0	9
Cooling Tower	0.0	0	0	0	0	0	0	0
Tunnel-Heating Hot Water	1.0	2	2	4	0	0	0	0
	572.0	496.0	418.0	95.0	86.0	9.0	10.0	83.0

Revised-4/30/18
Harrisburg-Capital Building
Central Plant Tunnels

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SUMMARY OF ESTIMATE

		INSULATED				NON-INSULATED		ENVIRONMENTAL EMISSIONS								
Effective Lineal Footage (sq)		Total Insulated Cost per Year	Total Insulated KBtu Heat Loss per Year	Total Insulated Cost Savings per Year	Total Insulated KBtu Heat Savings per Year	Total Bare Fuel Cost per Year	Total Bare KBtu Heat Loss per Year	Annual CO2 Emissions LBS Insulated	Annual CO2 Emissions LBS Bare	Annual CO2 Emission Reduction	Annual NOX Emissions LBS Insulated	Annual NOX Emissions LBS Bare	Annual NOX Emission Reduction	Annual CE Emissions LBS Insulated	Annual CE Emissions LBS Bare	Annual CE Emission Reduction
282.4	High Pressure Steam	$ 1,918.64	7.990E+04	$ 30,475.57	1.270E+06	$ 32,394.21	1.350E+06	9,310	157,298	147,988	19	315	297	-	-	-
282.4	TOTAL Central Plant Tunnels	$ 1,918.64	7.990E+04	$ 30,475.57	1.270E+06	$ 32,394.21	1.350E+06	9,310	157,298	147,988	19	315	297	-	-	-

Revised-4/30/18
Harrisburg-Capital Building
B09

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SUMMARY OF ESTIMATE

		INSULATED				NON-INSULATED		ENVIRONMENTAL EMISSIONS								
Effective Lineal Footage (sq)		Total Insulated Cost per Year	Total Insulated KBtu Heat Loss per Year	Total Insulated Cost Savings per Year	Total Insulated KBtu Heat Savings per Year	Total Bare Fuel Cost per Year	Total Bare KBtu Heat Loss per Year	Annual CO2 Emissions LBS Insulated	Annual CO2 Emissions LBS Bare	Annual CO2 Emission Reduction	Annual NOX Emissions LBS Insulated	Annual NOX Emissions LBS Bare	Annual NOX Emission Reduction	Annual CE Emissions LBS Insulated	Annual CE Emissions LBS Bare	Annual CE Emission Reduction
71.2	Heating Hot Water	$ 373.08	1.555E+04	$ 4,489.51	1.870E+05	$ 4,862.59	2.026E+05	1,812	23,608	21,796	4	47	44	-	-	-
11.5	Low Pressure Steam	$ 78.55	3.266E+03	$ 1,388.05	5.785E+04	$ 1,466.60	6.111E+04	381	7,121	6,741	1	14	14	-	-	-
82.7	TOTAL B09	$ 451.62	1.881E+04	$ 5,877.56	2.449E+05	$ 6,329.19	2.637E+05	2,192	30,729	28,537	4	62	57	-	-	-

Revised-4/30/18
Harrisburg-Capital Building
East Wing

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SUMMARY OF ESTIMATE

		INSULATED				NON-INSULATED		ENVIRONMENTAL EMISSIONS								
Effective Lineal Footage (sq)		Total Insulated Cost per Year	Total Insulated KBtu Heat Loss per Year	Total Insulated Cost Savings per Year	Total Insulated KBtu Heat Savings per Year	Total Bare Fuel Cost per Year	Total Bare KBtu Heat Loss per Year	Annual CO2 Emissions LBS Insulated	Annual CO2 Emissions LBS Bare	Annual CO2 Emission Reduction	Annual NOX Emissions LBS Insulated	Annual NOX Emissions LBS Bare	Annual NOX Emission Reduction	Annual CE Emissions LBS Insulated	Annual CE Emissions LBS Bare	Annual CE Emission Reduction
38.1	Domestic Hot Water	$ 58.05	2.423E+03	$ 420.09	1.751E+04	$ 478.14	1.993E+04	282	2,323	2,040	1	5	4	-	-	-
29.5	Heating Hot Water	$ 201.66	8.399E+03	$ 2,615.60	1.090E+05	$ 2,817.26	1.174E+05	979	13,679	12,700	2	27	25	-	-	-
155.0	Low Pressure Steam	$ 468.37	1.953E+04	$ 5,190.29	2.162E+05	$ 5,658.66	2.357E+05	2,275	27,471	25,196	5	55	51	-	-	-
62.8	Medium Pressure Steam	$ 237.22	9.887E+03	$ 2,539.09	1.058E+05	$ 2,776.31	1.157E+05	1,152	13,483	12,331	2	27	25	-	-	-
42.3	High Pressure Steam	$ 204.47	8.513E+03	$ 2,496.62	1.040E+05	$ 2,701.09	1.126E+05	992	13,116	12,124	2	26	24	-	-	-
4.8	Chilled Water	$ 5.03	2.299E+02	$ 35.06	1.581E+03	$ 40.09	1.811E+03	98	770	673	0	2	2	-	-	-
332.4	TOTAL East Wing	$ 1,174.81	4.898E+04	$ 13,296.74	5.541E+05	$ 14,471.55	6.031E+05	5,778	70,842	65,063	12	142	131	-	-	-

Revised-4/30/18
Harrisburg-Capital Building
Finance

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SUMMARY OF ESTIMATE

		INSULATED				NON-INSULATED		ENVIRONMENTAL EMISSIONS								
Effective Lineal Footage (sq)		Total Insulated Cost per Year	Total Insulated KBtu Heat Loss per Year	Total Insulated Cost Savings per Year	Total Insulated KBtu Heat Savings per Year	Total Bare Fuel Cost per Year	Total Bare KBtu Heat Loss per Year	Annual CO2 Emissions LBS Insulated	Annual CO2 Emissions LBS Bare	Annual CO2 Emission Reduction	Annual NOX Emissions LBS Insulated	Annual NOX Emissions LBS Bare	Annual NOX Emission Reduction	Annual CE Emissions LBS Insulated	Annual CE Emissions LBS Bare	Annual CE Emission Reduction
86.8	Low Pressure Steam	$ 341.05	1.422E+04	$ 4,719.82	1.966E+05	$ 5,060.88	2.108E+05	1,657	24,570	22,913	3	49	46	-	-	-
86.8	**TOTAL Finance**	$ 341.05	1.422E+04	$ 4,719.82	1.966E+05	$ 5,060.88	2.108E+05	1,657	24,570	22,913	3	49	46	-	-	-

Revised-4/30/18
Harrisburg-Capital Building
Main Capital

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SUMMARY OF ESTIMATE

		INSULATED				NON-INSULATED		ENVIRONMENTAL EMISSIONS								
Effective Lineal Footage (sq)		Total Insulated Cost per Year	Total Insulated KBtu Heat Loss per Year	Total Insulated Cost Savings per Year	Total Insulated KBtu Heat Savings per Year	Total Bare Fuel Cost per Year	Total Bare KBtu Heat Loss per Year	Annual CO2 Emissions LBS Insulated	Annual CO2 Emissions LBS Bare	Annual CO2 Emission Reduction	Annual NOX Emissions LBS Insulated	Annual NOX Emissions LBS Bare	Annual NOX Emission Reduction	Annual CE Emissions LBS Insulated	Annual CE Emissions LBS Bare	Annual CE Emission Reduction
230.2	Heating Hot Water	$ 571.34	2.375E+04	$ 5,405.46	2.253E+05	$ 5,976.80	2.491E+05	2,768	29,027	26,259	6	58	53	-	-	-
207.3	Low Pressure Steam	$ 834.54	3.482E+04	$ 12,179.68	5.074E+05	$ 13,014.22	5.422E+05	4,058	63,185	59,127	8	127	119	-	-	-
31.4	Medium Pressure Steam	$ 188.10	7.843E+03	$ 2,930.40	1.221E+05	$ 3,118.50	1.299E+05	914	15,142	14,228	2	30	29	-	-	-
31.3	High Pressure Steam	$ 238.29	9.928E+03	$ 4,032.73	1.680E+05	$ 4,271.02	1.780E+05	1,157	20,737	19,580	2	42	39	-	-	-
500.2	TOTAL Main Capital	$ 1,832.27	7.634E+04	$ 24,548.26	1.023E+06	$ 26,380.53	1.099E+06	8,896	128,091	119,195	18	257	239	-	-	-

Revised-4/30/18
Harrisburg-Capital Building
North Office

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SUMMARY OF ESTIMATE

		INSULATED				NON-INSULATED		ENVIRONMENTAL EMISSIONS								
Effective Lineal Footage (sq)		Total Insulated Cost per Year	Total Insulated KBtu Heat Loss per Year	Total Insulated Cost Savings per Year	Total Insulated KBtu Heat Savings per Year	Total Bare Fuel Cost per Year	Total Bare KBtu Heat Loss per Year	Annual CO2 Emissions LBS Insulated	Annual CO2 Emissions LBS Bare	Annual CO2 Emission Reduction	Annual NOX Emissions LBS Insulated	Annual NOX Emissions LBS Bare	Annual NOX Emission Reduction	Annual CE Emissions LBS Insulated	Annual CE Emissions LBS Bare	Annual CE Emission Reduction
176.1	Heating Hot Water	$ 529.37	2.204E+04	$ 5,499.28	2.292E+05	$ 6,028.65	2.512E+05	2,569	29,273	26,705	5	59	54	-	-	-
68.1	Low Pressure Steam	$ 222.20	9.266E+03	$ 2,789.30	1.162E+05	$ 3,011.50	1.255E+05	1,080	14,619	13,539	2	29	27	-	-	-
3.5	High Pressure Steam	$ 13.55	5.635E+02	$ 123.59	5.152E+03	$ 137.13	5.716E+03	66	666	600	0	1	1	-	-	-
247.6	TOTAL North Office	$ 765.12	3.187E+04	$ 8,412.17	3.505E+05	$ 9,177.28	3.824E+05	3,714	44,558	40,844	7	89	82	-	-	-

Revised-4/30/18
Harrisburg-Capital Building
South Office

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SUMMARY OF ESTIMATE

		INSULATED				NON-INSULATED		ENVIRONMENTAL EMISSIONS								
Effective Lineal Footage (sq)		Total Insulated Cost per Year	Total Insulated KBtu Heat Loss per Year	Total Insulated Cost Savings per Year	Total Insulated KBtu Heat Savings per Year	Total Bare Fuel Cost per Year	Total Bare KBtu Heat Loss per Year	Annual CO2 Emissions LBS Insulated	Annual CO2 Emissions LBS Bare	Annual CO2 Emission Reduction	Annual NOX Emissions LBS Insulated	Annual NOX Emissions LBS Bare	Annual NOX Emission Reduction	Annual CE Emissions LBS Insulated	Annual CE Emissions LBS Bare	Annual CE Emission Reduction
147.3	Heating Hot Water	$ 656.54	2.739E+04	$ 7,628.52	3.178E+05	$ 8,285.06	3.452E+05	3,191	40,226	37,035	6	81	74	-	-	-
131.6	Low Pressure Steam	$ 765.84	3.194E+04	$ 12,976.47	5.407E+05	$ 13,742.31	5.727E+05	3,721	66,731	63,010	7	134	126	-	-	-
10.5	Chilled Water	$ 8.61	3.885E+02	$ 64.79	2.930E+03	$ 73.40	3.318E+03	165	1,412	1,247	0	3	3	-	-	-
289.3	TOTAL South Office	$ 1,430.99	5.971E+04	$ 20,669.78	8.615E+05	$ 22,100.77	9.212E+05	7,078	108,369	101,291	14	218	203	-	-	-

Revised-4/30/18
Harrisburg-Capital Building
PJC

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SUMMARY OF ESTIMATE

		INSULATED				NON-INSULATED		ENVIRONMENTAL EMISSIONS								
Effective Lineal Footage (sq)		Total Insulated Cost per Year	Total Insulated KBtu Heat Loss per Year	Total Insulated Cost Savings per Year	Total Insulated KBtu Heat Savings per Year	Total Bare Fuel Cost per Year	Total Bare KBtu Heat Loss per Year	Annual CO2 Emissions LBS Insulated	Annual CO2 Emissions LBS Bare	Annual CO2 Emission Reduction	Annual NOX Emissions LBS Insulated	Annual NOX Emissions LBS Bare	Annual NOX Emission Reduction	Annual CE Emissions LBS Insulated	Annual CE Emissions LBS Bare	Annual CE Emission Reduction
33.2	Heating Hot Water	$ 188.96	7.892E+03	$ 2,318.46	9.658E+04	$ 2,507.41	1.045E+05	920	12,175	11,255	2	24	23	-	-	-
37.2	Low Pressure Steam	$ 164.16	6.836E+03	$ 2,469.05	1.029E+05	$ 2,633.21	1.097E+05	797	12,785	11,988	2	26	24	-	-	-
11.9	High Pressure Steam	$ 104.81	4.366E+03	$ 1,844.45	7.685E+04	$ 1,949.25	8.122E+04	509	9,464	8,956	1	19	18	-	-	-
82.3	TOTAL PJC	$ 457.92	1.909E+04	$ 6,631.95	2.763E+05	$ 7,089.87	2.954E+05	2,225	34,424	32,199	4	69	65	-	-	-

Revised-4/30/18
Harrisburg-Capital Building
Forum

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566

Phone #: (717) 989-6909
Email: andymartin@irexcorp.com

SUMMARY OF ESTIMATE

		INSULATED				NON-INSULATED		ENVIRONMENTAL EMISSIONS								
Effective Lineal Footage (sq)		Total Insulated Cost per Year	Total Insulated KBtu Heat Loss per Year	Total Insulated Cost Savings per Year	Total Insulated KBtu Heat Savings per Year	Total Bare Fuel Cost per Year	Total Bare KBtu Heat Loss per Year	Annual CO2 Emissions LBS Insulated	Annual CO2 Emissions LBS Bare	Annual CO2 Emission Reduction	Annual NOX Emissions LBS Insulated	Annual NOX Emissions LBS Bare	Annual NOX Emission Reduction	Annual CE Emissions LBS Insulated	Annual CE Emissions LBS Bare	Annual CE Emission Reduction
56.3	Low Pressure Steam	$ 197.31	8.218E+03	$ 2,590.53	1.079E+05	$ 2,787.85	1.162E+05	958	13,535	12,577	2	27	25	-	-	-
56.3	**TOTAL Forum**	$ 197.31	8.218E+03	$ 2,590.53	1.079E+05	$ 2,787.85	1.162E+05	958	13,535	12,577	2	27	25	-	-	-

Revised-4/30/18
Harrisburg-Capital Building
Cooling Tower

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566

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Email: andymartin@irexcorp.com

SUMMARY OF ESTIMATE

		INSULATED				NON-INSULATED		ENVIRONMENTAL EMISSIONS								
Effective Lineal Footage (sq)		Total Insulated Cost per Year	Total Insulated KBtu Heat Loss per Year	Total Insulated Cost Savings per Year	Total Insulated KBtu Heat Savings per Year	Total Bare Fuel Cost per Year	Total Bare KBtu Heat Loss per Year	Annual CO2 Emissions LBS Insulated	Annual CO2 Emissions LBS Bare	Annual CO2 Emission Reduction	Annual NOX Emissions LBS Insulated	Annual NOX Emissions LBS Bare	Annual NOX Emission Reduction	Annual CE Emissions LBS Insulated	Annual CE Emissions LBS Bare	Annual CE Emission Reduction
-	TOTAL Cooling Tower	$ -	0.000E+00	$ -	0.000E+00	$ -	0.000E+00	-	-	-	-	-	-	-	-	-

Revised-4/30/18
Harrisburg-Capital Building
Tunnel-Heating Hot Water

I-Star Energy Solutions
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Email: andymartin@irexcorp.com

SUMMARY OF ESTIMATE

		INSULATED				NON-INSULATED		ENVIRONMENTAL EMISSIONS								
Effective Lineal Footage (sq)		Total Insulated Cost per Year	Total Insulated KBtu Heat Loss per Year	Total Insulated Cost Savings per Year	Total Insulated KBtu Heat Savings per Year	Total Bare Fuel Cost per Year	Total Bare KBtu Heat Loss per Year	Annual CO2 Emissions LBS Insulated	Annual CO2 Emissions LBS Bare	Annual CO2 Emission Reduction	Annual NOX Emissions LBS Insulated	Annual NOX Emissions LBS Bare	Annual NOX Emission Reduction	Annual CE Emissions LBS Insulated	Annual CE Emissions LBS Bare	Annual CE Emission Reduction
11.0	Heating Hot Water	$ 69.22	2.885E+03	$ 887.54	3.698E+04	$ 956.76	3.986E+04	336	4,645	4,309	1	9	9	-	-	-
11.0	**TOTAL Tunnel-Heating Hot Water**	$ 69.22	2.885E+03	$ 887.54	3.698E+04	$ 956.76	3.986E+04	336	4,645	4,309	1	9	9	-	-	-

Revised-4/30/18

Harrisburg-Capital Building
Damaged Insulation

I-Star Energy Solutions
104 Fite Way, Suite C
Quarryville, PA 17566
Phone #: (717) 989-6909 **Email: andymartin@irexcorp.com**

Work Area/ Equipment	System Name	Pipe/Equip Info	Insulation Thickness	ENTER TAKE-OFF AMOUNTS								Effective Lineal Ft./Sq
		Size (in.)/Eq.(Type)	Size (in.)	Pipe (ft.)/Equ (sq)	Fittings (#)	Valves/Strainers (#)	Flange Pairs (#)	Bonnets (#)	In-line Pumps (#)	Centrifugal Pumps (#)	Steam Traps (#)	
CP Tunnel	High Pressure Steam	6	3.0	15	0	0	0					15.0
East Wing N P2	Low Pressure Steam	8	3.0	0	1	0	1					3.1
Main Cap sub bsmt	Heating Hot Water	6	2.0	0	1	0	1					2.7
Main Cap sub bsmt	Low Pressure Steam	16	3.0	0	1	0	1					4.9
East Wing N P2 HEX	Low Pressure Steam	Tank Shell	2	11								11.2
Main Cap sub bsmt Condensate Rec	Low Pressure Steam	Tank Shell	2	12								11.9
TOTAL				38	3	0	3	0	0	0	0	48.7

	Pipe (ft.)/Equ (sq)	Fittings (#)						
Heating Hot Water	0	1	0	1	0	0	0	0
Low Pressure Steam	23	2	0	2	0	0	0	0
High Pressure Steam	15	0	0	0	0	0	0	0
	38	3	0	3	0	0	0	0

Damaged insulation: This included damage to the outside jacketing or vapor barrier, the consequences of which could range from unsightly appearance and greater likelihood of additional damage to a compromised vapor barrier or a thermally compromised insulation system. In total, we identified 6 separate areas of approximately 48.7 lineal feet of piping where the insulation was damaged to different degrees. In many cases, the thermal efficiency of the insulation system in these areas was already compromised, as can be seen from the following thermal images taken during a walkthrough of your facility:

I-Star Energy Solutions-Confidential

3E PLUS ENERGY TABLE: COST @ $/FT/YR

PROJECT NAME: Harrisburg-Capital Building

SYSTEM: Domestic Hot Water

BARE SURFACE EMITTANCE:	0.8		FUEL NAME:	Steam	
PROCESS TEMP:	120	deg F	HEAT CONTENT:	1000	BTU per lb
AMBIENT TEMP:	78	deg F	FUEL COST:	24	US $ per Klbs
WIND SPEED:	0	MPH	EFFICIENCY:	100%	
INSULATION LAYER 1:	1000F Mineral Fiber PIPE, Type IV, C547-11		OUTER JACKET MAT'L:	All Service Jacket	
			OUTER SURFACE EMITTANCE:	0.9	
			HOURS OF OPERATION:	8760	

PIPE SIZE	INSULATION THICKNESS												
	BARE	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1/4													
1/2	4.05	1.23	0.87	0.71	0.63	0.55	0.52	0.49	0.47	0.45	0.44	0.42	0.41
3/4	4.91	1.39	1.05	0.82	0.72	0.62	0.58	0.54	0.52	0.5	0.48	0.46	0.45
1	5.98	1.63	1.09	0.9	0.78	0.7	0.65	0.61	0.58	0.55	0.53	0.51	0.49
1 1/4	7.35	2.02	1.4	1	0.92	0.81	0.74	0.69	0.65	0.61	0.59	0.56	0.54
1 1/2	8.31	2.27	1.42	1.13	0.9	0.81	0.75	0.7	0.66	0.63	0.6	0.58	0.56
2	10.17	2.51	1.66	1.29	1.09	0.97	0.88	0.82	0.76	0.72	0.68	0.65	0.63
2 1/2	12.12	2.92	1.91	1.33	1.15	1.03	0.94	0.87	0.81	0.77	0.73	0.7	0.67
3													
3 1/2													
4	18.38	4.43	2.7	2.05	1.7	1.47	1.29	1.18	1.09	1.01	0.95	0.91	0.87
5													
6													
7													
8													
10													
12													
14													
16													
18													
20													
22													
24													
26													
28													
30													
32													
34													
36													
38													
40													
Flat Surface Vertical													
Duct-Tank Flat Top													
Duct-Tank Flat Bottom													
Duct-Rect Horizontal													
Duct-Rect Vertical													
Tank Shell	14.36	3.32	1.89	1.32	1.02	0.83	0.7	0.6	0.53	0.47	0.43	0.39	0.36

I-Star Energy Solutions-Confidential

3E PLUS ENERGY TABLE: HEAT LOSS(HOT SYSTEMS) HEAT GAIN (COLD SYSTEMS) @ KBTU/FT/YR

PROJECT NAME: **Harrisburg-Capital Building**

SYSTEM: **Domestic Hot Water**

BARE SURFACE EMITTANCE: 0.8
PROCESS TEMP: 120 deg F
AMBIENT TEMP: 78 deg F
WIND SPEED: 0 MPH
INSULATION LAYER 1: 1000F Mineral Fiber PIPE, Type IV, C547-11

FUEL NAME: Steam
HEAT CONTENT: 1000 BTU per lb
FUEL COST: 24 US $ per Klbs
EFFICIENCY: 100%
OUTER JACKET MAT'L: All Service Jacket
OUTER SURFACE EMITTANCE: 0.9
HOURS OF OPERATION: 8760

PIPE SIZE	INSULATION THICKNESS												
	BARE	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1/4													
1/2	169	51	36	30	26	23	22	21	20	19	18	18	17
3/4	204	58	44	34	30	26	24	23	22	21	20	19	19
1	249	68	46	37	32	29	27	25	24	23	22	21	20
1 1/4	307	84	58	42	38	34	31	29	27	26	24	24	23
1 1/2	346	94	59	47	37	34	31	29	28	26	25	24	23
2	424	105	69	54	45	40	37	34	32	30	29	27	26
2 1/2	505	122	80	55	48	43	39	36	34	32	30	29	28
3													
3 1/2													
4	766	185	113	86	71	61	54	49	46	42	40	38	36
5													
6													
7													
8													
10													
12													
14													
16													
18													
20													
22													
24													
26													
28													
30													
32													
34													
36													
38													
40													
Flat Surface Vertical													
Duct-Tank Flat Top													
Duct-Tank Flat Bottom													
Duct-Rect Horizontal													
Duct-Rect Vertical													
Tank Shell	598	138	79	55	42	35	29	25	22	20	18	16	15

I-Star Energy Solutions-Confidential

3E PLUS ENERGY TABLE: SAVINGS @ $/FT/YR

PROJECT NAME: **Harrisburg-Capital Building**

SYSTEM: **Domestic Hot Water**

BARE SURFACE EMITTANCE: 0.8
PROCESS TEMP: 120 deg F
AMBIENT TEMP: 78 deg F
WIND SPEED: 0 MPH
INSULATION LAYER 1: 1000F Mineral Fiber PIPE, Type IV, C547-11

FUEL NAME: Steam
HEAT CONTENT: 1000 BTU per lb
FUEL COST: 24 US $ per Klbs
EFFICIENCY: 100%
OUTER JACKET MAT'L: All Service Jacket
OUTER SURFACE EMITTANCE: 0.9
HOURS OF OPERATION: 8760

PIPE SIZE	INSULATION THICKNESS												
	BARE	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1/4	0	0	0	0	0	0	0	0	0	0	0	0	0
1/2	0	2.82	3.18	3.34	3.42	3.5	3.53	3.56	3.58	3.6	3.61	3.63	3.64
3/4	0	3.52	3.86	4.09	4.19	4.29	4.33	4.37	4.39	4.41	4.43	4.45	4.46
1	0	4.35	4.89	5.08	5.2	5.28	5.33	5.37	5.4	5.43	5.45	5.47	5.49
1 1/4	0	5.33	5.95	6.35	6.43	6.54	6.61	6.66	6.7	6.74	6.76	6.79	6.81
1 1/2	0	6.04	6.89	7.18	7.41	7.5	7.56	7.61	7.65	7.68	7.71	7.73	7.75
2	0	7.66	8.51	8.88	9.08	9.2	9.29	9.35	9.41	9.45	9.49	9.52	9.54
2 1/2	0	9.2	10.21	10.79	10.97	11.09	11.18	11.25	11.31	11.35	11.39	11.42	11.45
3	0	0	0	0	0	0	0	0	0	0	0	0	0
3 1/2	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	13.95	15.68	16.33	16.68	16.91	17.09	17.2	17.29	17.37	17.43	17.47	17.51
5	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0
32	0	0	0	0	0	0	0	0	0	0	0	0	0
34	0	0	0	0	0	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0	0	0	0	0	0
38	0	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0	0	0
Flat Surface Vertical	0	0	0	0	0	0	0	0	0	0	0	0	0
Duct-Tank Flat Top	0	0	0	0	0	0	0	0	0	0	0	0	0
Duct-Tank Flat Bottom	0	0	0	0	0	0	0	0	0	0	0	0	0
Duct-Rect Horizontal	0	0	0	0	0	0	0	0	0	0	0	0	0
Duct-Rect Vertical	0	0	0	0	0	0	0	0	0	0	0	0	0
Tank Shell	0	11.04	12.47	13.04	13.34	13.53	13.66	13.76	13.83	13.89	13.93	13.97	14

I-Star Energy Solutions-Confidential

3E PLUS ENVIRONMENT TABLE: CO2 @ LB/FT/YR

PROJECT NAME: **Harrisburg-Capital Building**

SYSTEM: **Domestic Hot Water**

BARE SURFACE EMITTANCE: 0.8
PROCESS TEMP: 120 deg F
AMBIENT TEMP: 78 deg F
WIND SPEED: 0 MPH
INSULATION LAYER 1: 1000F Mineral Fiber PIPE, Type IV, C547-11

FUEL NAME: Steam
HEAT CONTENT: 1000 BTU per lb
FUEL COST: 24 US $ per Klbs
EFFICIENCY: 100%
OUTER JACKET MAT'L: All Service Jacket
OUTER SURFACE EMITTANCE: 0.9
HOURS OF OPERATION: 8760

PIPE SIZE	INSULATION THICKNESS												
	BARE	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1/4													
1/2	19.6936	5.943	4.1951	3.4959	3.0298	2.6802	2.5637	2.4471	2.3306	2.2141	2.0975	2.0975	1.981
3/4	23.7721	6.7587	5.1273	3.962	3.4959	3.0298	2.7967	2.6802	2.5637	2.4471	2.3306	2.2141	2.2141
1	29.016	7.924	5.3604	4.3116	3.729	3.3794	3.1463	2.9132	2.7967	2.6802	2.5637	2.4471	2.3306
1 1/4	35.7747	9.7885	6.7587	4.8943	4.4281	3.962	3.6124	3.3794	3.1463	3.0298	2.7967	2.7967	2.6802
1 1/2	40.3194	10.9538	6.8753	5.4769	4.3116	3.962	3.6124	3.3794	3.2628	3.0298	2.9132	2.7967	2.6802
2	49.4087	12.2356	8.0406	6.2926	5.2438	4.6612	4.3116	3.962	3.729	3.4959	3.3794	3.1463	3.0298
2 1/2	58.8476	14.2167	9.3224	6.4092	5.5934	5.0108	4.5447	4.1951	3.962	3.729	3.4959	3.3794	3.2628
3													
3 1/2													
4	89.262	21.558	13.1679	10.0216	8.2736	7.1083	6.2926	5.71	5.3604	4.8943	4.6612	4.4281	4.1951
5													
6													
7													
8													
10													
12													
14													
16													
18													
20													
22													
24													
26													
28													
30													
32													
34													
36													
38													
40													
Flat Surface Vertical													
Duct-Tank Flat Top													
Duct-Tank Flat Bottom													
Duct-Rect Horizontal													
Duct-Rect Vertical													
Tank Shell	69.6849	16.0811	9.2059	6.4092	4.8943	4.0786	3.3794	2.9132	2.5637	2.3306	2.0975	1.8645	1.748

I-Star Energy Solutions-Confidential

3E PLUS ENVIRONMENT TABLE: NOx @ LB/FT/YR

PROJECT NAME: Harrisburg-Capital Building

SYSTEM: Domestic Hot Water

BARE SURFACE EMITTANCE: 0.8
PROCESS TEMP: 120 deg F
AMBIENT TEMP: 78 deg F
WIND SPEED: 0 MPH
INSULATION LAYER 1: 1000F Mineral Fiber PIPE, Type IV, C547-11

FUEL NAME: Steam
HEAT CONTENT: 1000 BTU per lb
FUEL COST: 24 US $ per Klbs
EFFICIENCY: 100%
OUTER JACKET MAT'L: All Service Jacket
OUTER SURFACE EMITTANCE: 0.9
HOURS OF OPERATION: 8760

PIPE SIZE	INSULATION THICKNESS												
	BARE	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1/4													
1/2	0.0395	0.0119	0.0084	0.007	0.0061	0.0054	0.0051	0.0049	0.0047	0.0044	0.0042	0.0042	0.004
3/4	0.0477	0.0136	0.0103	0.0079	0.007	0.0061	0.0056	0.0054	0.0051	0.0049	0.0047	0.0044	0.0044
1	0.0582	0.0159	0.0108	0.0086	0.0075	0.0068	0.0063	0.0058	0.0056	0.0054	0.0051	0.0049	0.0047
1 1/4	0.0718	0.0196	0.0136	0.0098	0.0089	0.0079	0.0072	0.0068	0.0063	0.0061	0.0056	0.0056	0.0054
1 1/2	0.0809	0.022	0.0138	0.011	0.0086	0.0079	0.0072	0.0068	0.0065	0.0061	0.0058	0.0056	0.0054
2	0.0991	0.0245	0.0161	0.0126	0.0105	0.0093	0.0086	0.0079	0.0075	0.007	0.0068	0.0063	0.0061
2 1/2	0.118	0.0285	0.0187	0.0129	0.0112	0.0101	0.0091	0.0084	0.0079	0.0075	0.007	0.0068	0.0065
3													
3 1/2													
4	0.179	0.0432	0.0264	0.0201	0.0166	0.0143	0.0126	0.0115	0.0108	0.0098	0.0093	0.0089	0.0084
5													
6													
7													
8													
10													
12													
14													
16													
18													
20													
22													
24													
26													
28													
30													
32													
34													
36													
38													
40													
Flat Surface Vertical													
Duct-Tank Flat Top													
Duct-Tank Flat Bottom													
Duct-Rect Horizontal													
Duct-Rect Vertical													
Tank Shell	0.1398	0.0323	0.0185	0.0129	0.0098	0.0082	0.0068	0.0058	0.0051	0.0047	0.0042	0.0037	0.0035

I-Star Energy Solutions-Confidential

3E PLUS ENERGY TABLE: COST @ $/FT/YR

PROJECT NAME: Harrisburg-Capital Building

SYSTEM: Heating Hot Water

BARE SURFACE EMITTANCE: 0.8
PROCESS TEMP: 170 deg F
AMBIENT TEMP: 78 deg F
WIND SPEED: 0 MPH
INSULATION LAYER 1: 1000F Mineral Fiber PIPE, Type IV, C547-11

FUEL NAME: Steam
HEAT CONTENT: 1000 BTU per lb
FUEL COST: 24 US $ per Klbs
EFFICIENCY: 100%
OUTER JACKET MAT'L: All Service Jacket
OUTER SURFACE EMITTANCE: 0.9
HOURS OF OPERATION: 8760

PIPE SIZE	INSULATION THICKNESS												
	BARE	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1/4													
1/2	10.41	2.86	2.02	1.64	1.45	1.27	1.19	1.13	1.08	1.04	1.01	0.98	0.94
3/4	12.64	3.24	2.43	1.9	1.65	1.42	1.32	1.25	1.19	1.14	1.1	1.06	1.03
1	15.42	3.8	2.52	2.06	1.79	1.61	1.49	1.4	1.32	1.26	1.21	1.17	1.12
1 1/4	19	4.71	3.25	2.31	2.12	1.87	1.71	1.59	1.5	1.41	1.35	1.3	1.24
1 1/2	21.47	5.3	3.29	2.61	2.07	1.87	1.73	1.62	1.52	1.45	1.39	1.33	1.28
2	26.32	5.85	3.84	2.98	2.51	2.23	2.03	1.88	1.74	1.65	1.57	1.49	1.44
2 1/2	31.39	6.82	4.42	3.06	2.65	2.37	2.16	1.99	1.87	1.77	1.67	1.6	1.54
3	37.67	8.69	5.23	3.94	3.28	2.86	2.57	2.33	2.17	2.03	1.9	1.81	1.74
3 1/2													
4	47.67	10.36	6.25	4.74	3.91	3.39	2.98	2.72	2.51	2.31	2.19	2.08	1.99
5													
6	68.71	15.83	9.25	6.74	5.29	4.52	3.98	3.5	3.22	2.99	2.8	2.65	2.51
7													
8	88.35	20.32	11.07	8.13	6.53	5.34	4.7	4.23	3.87	3.57	3.34	3.14	2.97
10	109.11	24.96	14.19	9.52	7.67	6.49	5.67	5.06	4.6	4.23	3.93	3.68	3.47
12	128.6	24.65	15.09	11.09	8.89	7.48	6.51	5.8	5.25	4.82	4.46	4.17	3.92
14													
16													
18													
20													
22													
24													
26													
28													
30													
32													
34													
36													
38													
40													
Flat Surface Vertical													
Duct-Tank Flat Top													
Duct-Tank Flat Bottom													
Duct-Rect Horizontal													
Duct-Rect Vertical													
Tank Shell	37.39	7.79	4.39	3.06	2.35	1.91	1.61	1.39	1.22	1.09	0.99	0.9	0.83

I-Star Energy Solutions-Confidential

3E PLUS ENERGY TABLE: HEAT LOSS(HOT SYSTEMS) HEAT GAIN (COLD SYSTEMS) @ KBTU/FT/YR

PROJECT NAME: **Harrisburg-Capital Building**

SYSTEM: **Heating Hot Water**

BARE SURFACE EMITTANCE: 0.8
PROCESS TEMP: 170 deg F
AMBIENT TEMP: 78 deg F
WIND SPEED: 0 MPH
INSULATION LAYER 1: 1000F Mineral Fiber PIPE, Type IV, C547-11

FUEL NAME: Steam
HEAT CONTENT: 1000 BTU per lb
FUEL COST: 24 US $ per Klbs
EFFICIENCY: 100%
OUTER JACKET MAT'L: All Service Jacket
OUTER SURFACE EMITTANCE: 0.9
HOURS OF OPERATION: 8760

PIPE SIZE	INSULATION THICKNESS												
	BARE	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1/4													
1/2	434	119	84	68	61	53	50	47	45	43	42	41	39
3/4	527	135	101	79	69	59	55	52	50	47	46	44	43
1	643	158	105	86	75	67	62	58	55	52	50	49	47
1 1/4	792	196	135	96	88	78	71	66	62	59	56	54	52
1 1/2	895	221	137	109	86	78	72	67	63	60	58	55	53
2	1097	244	160	124	105	93	84	78	73	69	66	62	60
2 1/2	1308	284	184	127	110	99	90	83	78	74	70	67	64
3	1570	362	218	164	137	119	107	97	90	85	79	76	73
3 1/2													
4	1986	432	261	198	163	141	124	113	105	96	91	87	83
5													
6	2863	660	386	281	221	188	166	146	134	125	117	110	105
7													
8	3681	847	461	339	272	222	196	176	161	149	139	131	124
10	4546	1040	591	397	320	270	236	211	192	176	164	154	145
12	5358	1027	629	462	370	312	271	242	219	201	186	174	164
14													
16													
18													
20													
22													
24													
26													
28													
30													
32													
34													
36													
38													
40													
Flat Surface Vertical													
Duct-Tank Flat Top													
Duct-Tank Flat Bottom													
Duct-Rect Horizontal													
Duct-Rect Vertical													
Tank Shell	1558	325	183	128	98	80	67	58	51	45	41	37	34

I-Star Energy Solutions-Confidential

3E PLUS ENERGY TABLE: SAVINGS @ $/FT/YR

PROJECT NAME: **Harrisburg-Capital Building**

SYSTEM: **Heating Hot Water**

BARE SURFACE EMITTANCE: 0.8
PROCESS TEMP: 170 deg F
AMBIENT TEMP: 78 deg F
WIND SPEED: 0 MPH
INSULATION LAYER 1: 1000F Mineral Fiber PIPE, Type IV, C547-11

FUEL NAME: Steam
HEAT CONTENT: 1000 BTU per lb
FUEL COST: 24 US $ per Klbs
EFFICIENCY: 100%
OUTER JACKET MAT'L: All Service Jacket
OUTER SURFACE EMITTANCE: 0.9
HOURS OF OPERATION: 8760

PIPE SIZE	INSULATION THICKNESS												
	BARE	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1/4	0	0	0	0	0	0	0	0	0	0	0	0	0
1/2	0	7.55	8.39	8.77	8.96	9.14	9.22	9.28	9.33	9.37	9.4	9.43	9.47
3/4	0	9.4	10.21	10.74	10.99	11.22	11.32	11.39	11.45	11.5	11.54	11.58	11.61
1	0	11.62	12.9	13.36	13.63	13.81	13.93	14.02	14.1	14.16	14.21	14.25	14.3
1 1/4	0	14.29	15.75	16.69	16.88	17.13	17.29	17.41	17.5	17.59	17.65	17.7	17.76
1 1/2	0	16.17	18.18	18.86	19.4	19.6	19.74	19.85	19.95	20.02	20.08	20.14	20.19
2	0	20.47	22.48	23.34	23.81	24.09	24.29	24.44	24.58	24.67	24.75	24.83	24.88
2 1/2	0	24.57	26.97	28.33	28.74	29.02	29.23	29.4	29.52	29.62	29.72	29.79	29.85
3	0	28.98	32.44	33.73	34.39	34.81	35.1	35.34	35.5	35.64	35.77	35.86	35.93
3 1/2	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	37.31	41.42	42.93	43.76	44.28	44.69	44.95	45.16	45.36	45.48	45.59	45.68
5	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	52.88	59.46	61.97	63.42	64.19	64.73	65.21	65.49	65.72	65.91	66.06	66.2
7	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	68.03	77.28	80.22	81.82	83.01	83.65	84.12	84.48	84.78	85.01	85.21	85.38
10	0	84.15	94.92	99.59	101.44	102.62	103.44	104.05	104.51	104.88	105.18	105.43	105.64
12	0	103.95	113.51	117.51	119.71	121.12	122.09	122.8	123.35	123.78	124.14	124.43	124.68
14	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0
32	0	0	0	0	0	0	0	0	0	0	0	0	0
34	0	0	0	0	0	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0	0	0	0	0	0
38	0	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0	0	0
Flat Surface Vertical	0	0	0	0	0	0	0	0	0	0	0	0	0
Duct-Tank Flat Top	0	0	0	0	0	0	0	0	0	0	0	0	0
Duct-Tank Flat Bottom	0	0	0	0	0	0	0	0	0	0	0	0	0
Duct-Rect Horizontal	0	0	0	0	0	0	0	0	0	0	0	0	0
Duct-Rect Vertical	0	0	0	0	0	0	0	0	0	0	0	0	0
Tank Shell	0	29.6	33	34.33	35.04	35.48	35.78	36	36.17	36.3	36.4	36.49	36.56

I-Star Energy Solutions-Confidential

3E PLUS ENVIRONMENT TABLE: CO2 @ LB/FT/YR

PROJECT NAME: **Harrisburg-Capital Building**

SYSTEM: **Heating Hot Water**

BARE SURFACE EMITTANCE: 0.8
PROCESS TEMP: 170 deg F
AMBIENT TEMP: 78 deg F
WIND SPEED: 0 MPH
INSULATION LAYER 1: 1000F Mineral Fiber PIPE, Type IV, C547-11

FUEL NAME: Steam
HEAT CONTENT: 1000 BTU per lb
FUEL COST: 24 US $ per Klbs
EFFICIENCY: 100%
OUTER JACKET MAT'L: All Service Jacket
OUTER SURFACE EMITTANCE: 0.9
HOURS OF OPERATION: 8760

PIPE SIZE	INSULATION THICKNESS												
	BARE	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1/4													
1/2	50.574	13.8671	9.7885	7.924	7.1083	6.1761	5.8265	5.4769	5.2438	5.0108	4.8943	4.7777	4.5447
3/4	61.4113	15.7316	11.7695	9.2059	8.0406	6.8753	6.4092	6.0596	5.8265	5.4769	5.3604	5.1273	5.0108
1	74.9288	18.4117	12.2356	10.0216	8.7398	7.8075	7.2249	6.7587	6.4092	6.0596	5.8265	5.71	5.4769
1 1/4	92.2918	22.8399	15.7316	11.1869	10.2546	9.0893	8.2736	7.691	7.2249	6.8753	6.5257	6.2926	6.0596
1 1/2	104.2943	25.7531	15.9646	12.7018	10.0216	9.0893	8.3902	7.8075	7.3414	6.9918	6.7587	6.4092	6.1761
2	127.8334	28.4333	18.6448	14.4497	12.2356	10.8373	9.7885	9.0893	8.5067	8.0406	7.691	7.2249	6.9918
2 1/2	152.4212	33.0945	21.4415	14.7993	12.8183	11.5365	10.4877	9.672	9.0893	8.6232	8.1571	7.8075	7.4579
3	182.9521	42.1839	25.4035	19.1109	15.9646	13.8671	12.4687	11.3034	10.4877	9.905	9.2059	8.8563	8.5067
3 1/2													
4	231.4286	50.341	30.4143	23.0729	18.9944	16.4307	14.4497	13.1679	12.2356	11.1869	10.6042	10.1381	9.672
5													
6	333.6254	76.9098	44.9806	32.7449	25.7531	21.9076	19.344	17.0134	15.615	14.5662	13.634	12.8183	12.2356
7													
8	428.9469	98.7009	53.7203	39.5037	31.6962	25.8697	22.8399	20.5093	18.7613	17.363	16.1977	15.2654	14.4497
10	529.7454	121.1912	68.8692	46.2624	37.2896	31.4631	27.5011	24.5878	22.3738	20.5093	19.1109	17.9456	16.8968
12	624.3677	119.6763	73.2974	53.8369	43.1161	36.3574	31.5796	28.2003	25.5201	23.4225	21.6746	20.2762	19.1109
14													
16													
18													
20													
22													
24													
26													
28													
30													
32													
34													
36													
38													
40													
Flat Surface Vertical													
Duct-Tank Flat Top													
Duct-Tank Flat Bottom													
Duct-Rect Horizontal													
Duct-Rect Vertical													
Tank Shell	181.5537	37.8722	21.325	14.9158	11.4199	9.3224	7.8075	6.7587	5.943	5.2438	4.7777	4.3116	3.962

I-Star Energy Solutions-Confidential

3E PLUS ENVIRONMENT TABLE: NOx @ LB/FT/YR

PROJECT NAME: Harrisburg-Capital Building

SYSTEM: Heating Hot Water

BARE SURFACE EMITTANCE: 0.8
PROCESS TEMP: 170 deg F
AMBIENT TEMP: 78 deg F
WIND SPEED: 0 MPH
INSULATION LAYER 1: 1000F Mineral Fiber PIPE, Type IV, C547-11

FUEL NAME: Steam
HEAT CONTENT: 1000 BTU per lb
FUEL COST: 24 US $ per Klbs
EFFICIENCY: 100%
OUTER JACKET MAT'L: All Service Jacket
OUTER SURFACE EMITTANCE: 0.9
HOURS OF OPERATION: 8760

PIPE SIZE	INSULATION THICKNESS												
	BARE	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1/4													
1/2	0.1014	0.0278	0.0196	0.0159	0.0143	0.0124	0.0117	0.011	0.0105	0.0101	0.0098	0.0096	0.0091
3/4	0.1232	0.0316	0.0236	0.0185	0.0161	0.0138	0.0129	0.0122	0.0117	0.011	0.0108	0.0103	0.0101
1	0.1503	0.0369	0.0245	0.0201	0.0175	0.0157	0.0145	0.0136	0.0129	0.0122	0.0117	0.0115	0.011
1 1/4	0.1851	0.0458	0.0316	0.0224	0.0206	0.0182	0.0166	0.0154	0.0145	0.0138	0.0131	0.0126	0.0122
1 1/2	0.2092	0.0517	0.032	0.0255	0.0201	0.0182	0.0168	0.0157	0.0147	0.014	0.0136	0.0129	0.0124
2	0.2564	0.057	0.0374	0.029	0.0245	0.0217	0.0196	0.0182	0.0171	0.0161	0.0154	0.0145	0.014
2 1/2	0.3057	0.0664	0.043	0.0297	0.0257	0.0231	0.021	0.0194	0.0182	0.0173	0.0164	0.0157	0.015
3	0.367	0.0846	0.051	0.0383	0.032	0.0278	0.025	0.0227	0.021	0.0199	0.0185	0.0178	0.0171
3 1/2													
4	0.4642	0.101	0.061	0.0463	0.0381	0.033	0.029	0.0264	0.0245	0.0224	0.0213	0.0203	0.0194
5													
6	0.6692	0.1543	0.0902	0.0657	0.0517	0.0439	0.0388	0.0341	0.0313	0.0292	0.0273	0.0257	0.0245
7													
8	0.8604	0.198	0.1077	0.0792	0.0636	0.0519	0.0458	0.0411	0.0376	0.0348	0.0325	0.0306	0.029
10	1.0625	0.2431	0.1381	0.0928	0.0748	0.0631	0.0552	0.0493	0.0449	0.0411	0.0383	0.036	0.0339
12	1.2523	0.24	0.147	0.108	0.0865	0.0729	0.0633	0.0566	0.0512	0.047	0.0435	0.0407	0.0383
14													
16													
18													
20													
22													
24													
26													
28													
30													
32													
34													
36													
38													
40													
Flat Surface Vertical													
Duct-Tank Flat Top													
Duct-Tank Flat Bottom													
Duct-Rect Horizontal													
Duct-Rect Vertical													
Tank Shell	0.3642	0.076	0.0428	0.0299	0.0229	0.0187	0.0157	0.0136	0.0119	0.0105	0.0096	0.0086	0.0079

I-Star Energy Solutions-Confidential

3E PLUS ENERGY TABLE: COST @ $/FT/YR

PROJECT NAME: Harrisburg-Capital Building

SYSTEM: Steam Condensate

BARE SURFACE EMITTANCE: 0.8
PROCESS TEMP: 190 deg F
AMBIENT TEMP: 78 deg F
WIND SPEED: 0 MPH
INSULATION LAYER 1: 1000F Mineral Fiber PIPE, Type IV, C547-11

FUEL NAME: Steam
HEAT CONTENT: 1000 BTU per lb
FUEL COST: 24 US $ per Klbs
EFFICIENCY: 100%
OUTER JACKET MAT'L: All Service Jacket
OUTER SURFACE EMITTANCE: 0.9
HOURS OF OPERATION: 8760

PIPE SIZE	INSULATION THICKNESS												
	BARE	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1/4													
1/2	13.3	3.56	2.51	2.04	1.81	1.58	1.48	1.41	1.35	1.29	1.25	1.21	1.17
3/4	16.16	4.04	3.02	2.36	2.05	1.76	1.64	1.55	1.48	1.41	1.36	1.32	1.27
1	19.73	4.73	3.14	2.56	2.22	2	1.85	1.73	1.64	1.56	1.5	1.45	1.39
1 1/4	24.32	5.88	4.04	2.86	2.63	2.33	2.13	1.98	1.86	1.75	1.68	1.61	1.54
1 1/2	27.49	6.6	4.09	3.24	2.57	2.33	2.15	2.01	1.89	1.8	1.72	1.65	1.59
2	33.71	7.29	4.78	3.7	3.12	2.77	2.52	2.33	2.16	2.05	1.95	1.85	1.79
2 1/2	40.2	8.51	5.49	3.8	3.29	2.94	2.69	2.47	2.32	2.2	2.07	1.99	1.92
3	48.27	10.84	6.5	4.89	4.08	3.56	3.19	2.89	2.69	2.53	2.36	2.25	2.16
3 1/2													
4	61.09	12.92	7.78	5.9	4.86	4.21	3.7	3.37	3.12	2.87	2.72	2.58	2.47
5													
6	88.09	19.76	11.52	8.39	6.58	5.61	4.94	4.35	3.99	3.71	3.48	3.28	3.12
7													
8	113.3	25.37	13.78	10.1	8.12	6.63	5.84	5.25	4.8	4.44	4.14	3.9	3.69
10													
12													
14													
16													
18													
20													
22													
24													
26													
28													
30													
32													
34													
36													
38													
40													
Flat Surface Vertical													
Duct-Tank Flat Top													
Duct-Tank Flat Bottom													
Duct-Rect Horizontal													
Duct-Rect Vertical													
Tank Shell	48	9.73	5.46	3.81	2.92	2.37	2	1.73	1.52	1.36	1.22	1.12	1.03

I-Star Energy Solutions-Confidential

3E PLUS ENERGY TABLE: HEAT LOSS(HOT SYSTEMS) HEAT GAIN (COLD SYSTEMS) @ KBTU/FT/YR

PROJECT NAME: Harrisburg-Capital Building

SYSTEM: Steam Condensate

BARE SURFACE EMITTANCE: 0.8
PROCESS TEMP: 190 deg F
AMBIENT TEMP: 78 deg F
WIND SPEED: 0 MPH
INSULATION LAYER 1: 1000F Mineral Fiber PIPE, Type IV, C547-11

FUEL NAME: Steam
HEAT CONTENT: 1000 BTU per lb
FUEL COST: 24 US $ per Klbs
EFFICIENCY: 100%
OUTER JACKET MAT'L: All Service Jacket
OUTER SURFACE EMITTANCE: 0.9
HOURS OF OPERATION: 8760

PIPE SIZE	INSULATION THICKNESS												
	BARE	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1/4													
1/2	554	148	105	85	75	66	62	59	56	54	52	50	49
3/4	674	168	126	98	86	73	69	65	62	59	57	55	53
1	822	197	131	107	93	83	77	72	68	65	62	60	58
1 1/4	1013	245	168	119	110	97	89	82	77	73	70	67	64
1 1/2	1145	275	170	135	107	97	89	84	79	75	72	69	66
2	1405	304	199	154	130	115	105	97	90	85	81	77	74
2 1/2	1675	355	229	158	137	123	112	103	97	92	86	83	80
3	2011	452	271	204	170	148	133	121	112	105	98	94	90
3 1/2													
4	2545	538	324	246	203	175	154	141	130	120	113	108	103
5													
6	3670	824	480	349	274	234	206	181	166	155	145	137	130
7													
8	4721	1057	574	421	338	276	243	219	200	185	173	162	154
10													
12													
14													
16													
18													
20													
22													
24													
26													
28													
30													
32													
34													
36													
38													
40													
Flat Surface Vertical													
Duct-Tank Flat Top													
Duct-Tank Flat Bottom													
Duct-Rect Horizontal													
Duct-Rect Vertical													
Tank Shell	2000	405	228	159	122	99	83	72	63	56	51	47	43

I-Star Energy Solutions-Confidential

3E PLUS ENERGY TABLE: SAVINGS @ $/FT/YR

PROJECT NAME: Harrisburg-Capital Building

SYSTEM: Steam Condensate

BARE SURFACE EMITTANCE: 0.8
PROCESS TEMP: 190 deg F
AMBIENT TEMP: 78 deg F
WIND SPEED: 0 MPH
INSULATION LAYER 1: 1000F Mineral Fiber PIPE, Type IV, C547-11

FUEL NAME: Steam
HEAT CONTENT: 1000 BTU per lb
FUEL COST: 24 US $ per Klbs
EFFICIENCY: 100%
OUTER JACKET MAT'L: All Service Jacket
OUTER SURFACE EMITTANCE: 0.9
HOURS OF OPERATION: 8760

PIPE SIZE	INSULATION THICKNESS												
	BARE	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1/4	0	0	0	0	0	0	0	0	0	0	0	0	0
1/2	0	9.74	10.79	11.26	11.49	11.72	11.82	11.89	11.95	12.01	12.05	12.09	12.13
3/4	0	12.12	13.14	13.8	14.11	14.4	14.52	14.61	14.68	14.75	14.8	14.84	14.89
1	0	15	16.59	17.17	17.51	17.73	17.88	18	18.09	18.17	18.23	18.28	18.34
1 1/4	0	18.44	20.28	21.46	21.69	21.99	22.19	22.34	22.46	22.57	22.64	22.71	22.78
1 1/2	0	20.89	23.4	24.25	24.92	25.16	25.34	25.48	25.6	25.69	25.77	25.84	25.9
2	0	26.42	28.93	30.01	30.59	30.94	31.19	31.38	31.55	31.66	31.76	31.86	31.92
2 1/2	0	31.69	34.71	36.4	36.91	37.26	37.51	37.73	37.88	38	38.13	38.21	38.28
3	0	37.43	41.77	43.38	44.19	44.71	45.08	45.38	45.58	45.74	45.91	46.02	46.11
3 1/2	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	48.17	53.31	55.19	56.23	56.88	57.39	57.72	57.97	58.22	58.37	58.51	58.62
5	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	68.33	76.57	79.7	81.51	82.48	83.15	83.74	84.1	84.38	84.61	84.81	84.97
7	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	87.93	99.52	103.2	105.18	106.67	107.46	108.05	108.5	108.86	109.16	109.4	109.61
10	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0
32	0	0	0	0	0	0	0	0	0	0	0	0	0
34	0	0	0	0	0	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0	0	0	0	0	0
38	0	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0	0	0
Flat Surface Vertical	0	0	0	0	0	0	0	0	0	0	0	0	0
Duct-Tank Flat Top	0	0	0	0	0	0	0	0	0	0	0	0	0
Duct-Tank Flat Bottom	0	0	0	0	0	0	0	0	0	0	0	0	0
Duct-Rect Horizontal	0	0	0	0	0	0	0	0	0	0	0	0	0
Duct-Rect Vertical	0	0	0	0	0	0	0	0	0	0	0	0	0
Tank Shell	0	38.27	42.54	44.19	45.08	45.63	46	46.27	46.48	46.64	46.78	46.88	46.97

I-Star Energy Solutions-Confidential

3E PLUS ENVIRONMENT TABLE: CO2 @ LB/FT/YR

PROJECT NAME: Harrisburg-Capital Building

SYSTEM: Steam Condensate

BARE SURFACE EMITTANCE: 0.8
PROCESS TEMP: 190 deg F
AMBIENT TEMP: 78 deg F
WIND SPEED: 0 MPH
INSULATION LAYER 1: 1000F Mineral Fiber PIPE, Type IV, C547-11

FUEL NAME: Steam
HEAT CONTENT: 1000 BTU per lb
FUEL COST: 24 US $ per Klbs
EFFICIENCY: 100%
OUTER JACKET MAT'L: All Service Jacket
OUTER SURFACE EMITTANCE: 0.9
HOURS OF OPERATION: 8760

PIPE SIZE	INSULATION THICKNESS												
	BARE	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1/4													
1/2	64.5576	17.2464	12.2356	9.905	8.7398	7.691	7.2249	6.8753	6.5257	6.2926	6.0596	5.8265	5.71
3/4	78.5412	19.577	14.6828	11.4199	10.0216	8.5067	8.0406	7.5744	7.2249	6.8753	6.6422	6.4092	6.1761
1	95.7877	22.9564	15.2654	12.4687	10.8373	9.672	8.9728	8.3902	7.924	7.5744	7.2249	6.9918	6.7587
1 1/4	118.0449	28.5498	19.577	13.8671	12.8183	11.3034	10.3712	9.5555	8.9728	8.5067	8.1571	7.8075	7.4579
1 1/2	133.4268	32.0458	19.8101	15.7316	12.4687	11.3034	10.3712	9.7885	9.2059	8.7398	8.3902	8.0406	7.691
2	163.7246	35.4251	23.1895	17.9456	15.1489	13.401	12.2356	11.3034	10.4877	9.905	9.4389	8.9728	8.6232
2 1/2	195.1877	41.3682	26.6854	18.4117	15.9646	14.3332	13.0514	12.0026	11.3034	10.7208	10.0216	9.672	9.3224
3	234.3418	52.6716	31.5796	23.7721	19.8101	17.2464	15.4985	14.1001	13.0514	12.2356	11.4199	10.9538	10.4877
3 1/2													
4	296.5688	62.6931	37.7557	28.6664	23.6556	20.3928	17.9456	16.4307	15.1489	13.9836	13.1679	12.5852	12.0026
5													
6	427.6651	96.0207	55.9344	40.669	31.9292	27.268	24.0052	21.0919	19.344	18.0622	16.8968	15.9646	15.1489
7													
8	550.1381	123.1722	66.8882	49.0591	39.3871	32.1623	28.3168	25.5201	23.306	21.558	20.1597	18.8779	17.9456
10													
12													
14													
16													
18													
20													
22													
24													
26													
28													
30													
32													
34													
36													
38													
40													
Flat Surface Vertical													
Duct-Tank Flat Top													
Duct-Tank Flat Bottom													
Duct-Rect Horizontal													
Duct-Rect Vertical													
Tank Shell	233.06	47.1946	26.5688	18.5283	14.2167	11.5365	9.672	8.3902	7.3414	6.5257	5.943	5.4769	5.0108

I-Star Energy Solutions-Confidential

3E PLUS ENVIRONMENT TABLE: NOx @ LB/FT/YR

PROJECT NAME: Harrisburg-Capital Building

SYSTEM: Steam Condensate

BARE SURFACE EMITTANCE: 0.8
PROCESS TEMP: 190 deg F
AMBIENT TEMP: 78 deg F
WIND SPEED: 0 MPH
INSULATION LAYER 1: 1000F Mineral Fiber PIPE, Type IV, C547-11

FUEL NAME: Steam
HEAT CONTENT: 1000 BTU per lb
FUEL COST: 24 US $ per Klbs
EFFICIENCY: 100%
OUTER JACKET MAT'L: All Service Jacket
OUTER SURFACE EMITTANCE: 0.9
HOURS OF OPERATION: 8760

PIPE SIZE	INSULATION THICKNESS												
	BARE	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1/4													
1/2	0.1295	0.0346	0.0245	0.0199	0.0175	0.0154	0.0145	0.0138	0.0131	0.0126	0.0122	0.0117	0.0115
3/4	0.1575	0.0393	0.0294	0.0229	0.0201	0.0171	0.0161	0.0152	0.0145	0.0138	0.0133	0.0129	0.0124
1	0.1921	0.046	0.0306	0.025	0.0217	0.0194	0.018	0.0168	0.0159	0.0152	0.0145	0.014	0.0136
1 1/4	0.2368	0.0573	0.0393	0.0278	0.0257	0.0227	0.0208	0.0192	0.018	0.0171	0.0164	0.0157	0.015
1 1/2	0.2676	0.0643	0.0397	0.0316	0.025	0.0227	0.0208	0.0196	0.0185	0.0175	0.0168	0.0161	0.0154
2	0.3284	0.0711	0.0465	0.036	0.0304	0.0269	0.0245	0.0227	0.021	0.0199	0.0189	0.018	0.0173
2 1/2	0.3915	0.083	0.0535	0.0369	0.032	0.0287	0.0262	0.0241	0.0227	0.0215	0.0201	0.0194	0.0187
3	0.47	0.1056	0.0633	0.0477	0.0397	0.0346	0.0311	0.0283	0.0262	0.0245	0.0229	0.022	0.021
3 1/2													
4	0.5948	0.1257	0.0757	0.0575	0.0474	0.0409	0.036	0.033	0.0304	0.028	0.0264	0.0252	0.0241
5													
6	0.8578	0.1926	0.1122	0.0816	0.064	0.0547	0.0481	0.0423	0.0388	0.0362	0.0339	0.032	0.0304
7													
8	1.1034	0.2471	0.1342	0.0984	0.079	0.0645	0.0568	0.0512	0.0467	0.0432	0.0404	0.0379	0.036
10													
12													
14													
16													
18													
20													
22													
24													
26													
28													
30													
32													
34													
36													
38													
40													
Flat Surface Vertical													
Duct-Tank Flat Top													
Duct-Tank Flat Bottom													
Duct-Rect Horizontal													
Duct-Rect Vertical													
Tank Shell	0.4675	0.0947	0.0533	0.0372	0.0285	0.0231	0.0194	0.0168	0.0147	0.0131	0.0119	0.011	0.0101

I-Star Energy Solutions-Confidential

3E PLUS ENERGY TABLE: COST @ $/FT/YR

PROJECT NAME: **Harrisburg-Capital Building**

SYSTEM: **Low Pressure Steam**

BARE SURFACE EMITTANCE: 0.8
PROCESS TEMP: 227 deg F
AMBIENT TEMP: 78 deg F
WIND SPEED: 0 MPH
INSULATION LAYER 1: 1000F Mineral Fiber PIPE, Type IV, C547-11

FUEL NAME: Steam
HEAT CONTENT: 1000 BTU per lb
FUEL COST: 24 US $ per Klbs
EFFICIENCY: 100%
OUTER JACKET MAT'L: All Service Jacket
OUTER SURFACE EMITTANCE: 0.9
HOURS OF OPERATION: 8760

PIPE SIZE	INSULATION THICKNESS												
	BARE	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1/4													
1/2	19.15	4.94	3.47	2.82	2.49	2.18	2.04	1.94	1.86	1.78	1.72	1.67	1.62
3/4	23.29	5.61	4.18	3.26	2.84	2.43	2.27	2.14	2.04	1.95	1.88	1.82	1.76
1	28.44	6.57	4.34	3.55	3.07	2.76	2.55	2.39	2.27	2.15	2.07	2	1.92
1 1/4	35.09	8.16	5.59	3.96	3.64	3.21	2.94	2.73	2.56	2.42	2.31	2.22	2.13
1 1/2	39.68	9.18	5.66	4.48	3.55	3.21	2.96	2.77	2.6	2.48	2.38	2.27	2.2
2	48.7	10.13	6.62	5.12	4.31	3.82	3.47	3.21	2.99	2.83	2.7	2.56	2.46
2 1/2	58.11	11.82	7.61	5.25	4.54	4.06	3.71	3.41	3.2	3.04	2.86	2.75	2.65
3	69.79	15.08	9.01	6.77	5.63	4.91	4.41	3.99	3.71	3.49	3.26	3.11	2.98
3 1/2													
4	88.38	17.97	10.78	8.15	6.72	5.81	5.11	4.66	4.31	3.97	3.75	3.56	3.41
5	108.01	22.63	13.44	9.93	8.05	6.76	5.99	5.42	4.89	4.56	4.29	4.06	3.87
6	127.53	27.51	15.96	11.6	9.09	7.75	6.83	6	5.51	5.12	4.8	4.53	4.31
7													
8	164.09	35.32	19.09	13.98	11.23	9.16	8.07	7.25	6.63	6.13	5.72	5.38	5.09
10	202.74	43.4	24.49	16.38	13.17	11.13	9.72	8.68	7.89	7.25	6.74	6.31	5.95
12	239.03	42.73	26.02	19.08	15.27	12.85	11.17	9.95	9	8.26	7.65	7.15	6.73
14	261.66	56.2	31.33	22.19	17.41	14.47	12.47	11.02	9.93	9.06	8.37	7.79	7.31
16	297.82	63.84	35.47	24.86	19.58	16.23	13.95	12.3	11.05	10.07	9.28	8.63	8.08
18	333.92	71.46	39.6	27.87	21.75	17.99	15.43	13.58	12.18	11.08	10.19	9.46	8.85
20	369.96	79.09	43.72	30.71	23.92	19.74	16.91	14.86	13.3	12.08	11.1	10.29	9.61
22													
24	441.92	94.33	51.97	36.39	28.25	23.25	19.86	17.4	15.54	14.08	12.91	11.94	11.13
26													
28													
30													
32													
34													
36													
38													
40													
Flat Surface Vertical													
Duct-Tank Flat Top													
Duct-Tank Flat Bottom													
Duct-Rect Horizontal													
Duct-Rect Vertical													
Tank Shell	69.66	13.55	7.57	5.27	4.04	3.28	2.76	2.38	2.1	1.87	1.69	1.54	1.42

I-Star Energy Solutions-Confidential

3E PLUS ENERGY TABLE: HEAT LOSS(HOT SYSTEMS) HEAT GAIN (COLD SYSTEMS) @ KBTU/FT/YR

PROJECT NAME: Harrisburg-Capital Building

SYSTEM: Low Pressure Steam

BARE SURFACE EMITTANCE: 0.8
PROCESS TEMP: 227 deg F
AMBIENT TEMP: 78 deg F
WIND SPEED: 0 MPH
INSULATION LAYER 1: 1000F Mineral Fiber PIPE, Type IV, C547-11

FUEL NAME: Steam
HEAT CONTENT: 1000 BTU per lb
FUEL COST: 24 US $ per Klbs
EFFICIENCY: 100%
OUTER JACKET MAT'L: All Service Jacket
OUTER SURFACE EMITTANCE: 0.9
HOURS OF OPERATION: 8760

PIPE SIZE	INSULATION THICKNESS												
	BARE	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1/4													
1/2	798	206	145	117	104	91	85	81	77	74	72	70	67
3/4	970	234	174	136	118	101	95	89	85	81	78	76	73
1	1185	274	181	148	128	115	106	100	94	90	86	83	80
1 1/4	1462	340	233	165	152	134	122	114	107	101	96	93	89
1 1/2	1653	382	236	187	148	134	124	116	109	103	99	95	92
2	2029	422	276	213	180	159	145	134	125	118	112	107	103
2 1/2	2421	493	317	219	189	169	155	142	134	127	119	114	110
3	2908	628	375	282	235	205	184	166	155	145	136	130	124
3 1/2													
4	3682	749	449	340	280	242	213	194	180	165	156	149	142
5	4500	943	560	414	336	282	250	226	204	190	179	169	161
6	5314	1146	665	483	379	323	284	250	230	213	200	189	180
7													
8	6837	1472	795	582	468	382	336	302	276	255	238	224	212
10	8447	1808	1020	683	549	464	405	362	329	302	281	263	248
12	9960	1780	1084	795	636	535	466	414	375	344	319	298	280
14	10900	2342	1306	924	725	603	520	459	414	378	349	325	305
16	12410	2660	1478	1036	816	676	581	513	461	420	387	360	337
18	13910	2978	1650	1161	906	750	643	566	508	462	425	394	369
20	15420	3295	1822	1280	997	823	705	619	554	503	462	429	400
22													
24	18410	3931	2166	1516	1177	969	827	725	648	587	538	498	464
26													
28													
30													
32													
34													
36													
38													
40													
Flat Surface Vertical													
Duct-Tank Flat Top													
Duct-Tank Flat Bottom													
Duct-Rect Horizontal													
Duct-Rect Vertical													
Tank Shell	2902	564	316	220	168	137	115	99	87	78	70	64	59

I-Star Energy Solutions-Confidential

3E PLUS ENERGY TABLE: SAVINGS @ $/FT/YR

PROJECT NAME: **Harrisburg-Capital Building**

SYSTEM: **Low Pressure Steam**

BARE SURFACE EMITTANCE: 0.8
PROCESS TEMP: 227 deg F
AMBIENT TEMP: 78 deg F
WIND SPEED: 0 MPH
INSULATION LAYER 1: 1000F Mineral Fiber PIPE, Type IV, C547-11

FUEL NAME: Steam
HEAT CONTENT: 1000 BTU per lb
FUEL COST: 24 US $ per Klbs
EFFICIENCY: 100%
OUTER JACKET MAT'L: All Service Jacket
OUTER SURFACE EMITTANCE: 0.9
HOURS OF OPERATION: 8760

PIPE SIZE	INSULATION THICKNESS												
	BARE	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1/4	0	0	0	0	0	0	0	0	0	0	0	0	0
1/2	0	14.21	15.68	16.33	16.66	16.97	17.11	17.21	17.29	17.37	17.43	17.48	17.53
3/4	0	17.68	19.11	20.03	20.45	20.86	21.02	21.15	21.25	21.34	21.41	21.47	21.53
1	0	21.87	24.1	24.89	25.37	25.68	25.89	26.05	26.17	26.29	26.37	26.44	26.52
1 1/4	0	26.93	29.5	31.13	31.45	31.88	32.15	32.36	32.53	32.67	32.78	32.87	32.96
1 1/2	0	30.5	34.02	35.2	36.13	36.47	36.72	36.91	37.08	37.2	37.3	37.41	37.48
2	0	38.57	42.08	43.58	44.39	44.88	45.23	45.49	45.71	45.87	46	46.14	46.24
2 1/2	0	46.29	50.5	52.86	53.57	54.05	54.4	54.7	54.91	55.07	55.25	55.36	55.46
3	0	54.71	60.78	63.02	64.16	64.88	65.38	65.8	66.08	66.3	66.53	66.68	66.81
3 1/2	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	70.41	77.6	80.23	81.66	82.57	83.27	83.72	84.07	84.41	84.63	84.82	84.97
5	0	85.38	94.57	98.08	99.96	101.25	102.02	102.59	103.12	103.45	103.72	103.95	104.14
6	0	100.02	111.57	115.93	118.44	119.78	120.7	121.53	122.02	122.41	122.73	123	123.22
7	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	128.77	145	150.11	152.86	154.93	156.02	156.84	157.46	157.96	158.37	158.71	159
10	0	159.34	178.25	186.36	189.57	191.61	193.02	194.06	194.85	195.49	196	196.43	196.79
12	0	196.3	213.01	219.95	223.76	226.18	227.86	229.08	230.03	230.77	231.38	231.88	232.3
14	0	205.46	230.33	239.47	244.25	247.19	249.19	250.64	251.73	252.6	253.29	253.87	254.35
16	0	233.98	262.35	272.96	278.24	281.59	283.87	285.52	286.77	287.75	288.54	289.19	289.74
18	0	262.46	294.32	306.05	312.17	315.93	318.49	320.34	321.74	322.84	323.73	324.46	325.07
20	0	290.87	326.24	339.25	346.04	350.22	353.05	355.1	356.66	357.88	358.86	359.67	360.35
22	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	347.59	389.95	405.53	413.67	418.67	422.06	424.52	426.38	427.84	429.01	429.98	430.79
26	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0
32	0	0	0	0	0	0	0	0	0	0	0	0	0
34	0	0	0	0	0	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0	0	0	0	0	0
38	0	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0	0	0
Flat Surface Vertical	0	0	0	0	0	0	0	0	0	0	0	0	0
Duct-Tank Flat Top	0	0	0	0	0	0	0	0	0	0	0	0	0
Duct-Tank Flat Bottom	0	0	0	0	0	0	0	0	0	0	0	0	0
Duct-Rect Horizontal	0	0	0	0	0	0	0	0	0	0	0	0	0
Duct-Rect Vertical	0	0	0	0	0	0	0	0	0	0	0	0	0
Tank Shell	0	56.11	62.09	64.39	65.62	66.38	66.9	67.28	67.56	67.79	67.97	68.12	68.24

I-Star Energy Solutions-Confidential

3E PLUS ENVIRONMENT TABLE: CO2 @ LB/FT/YR

PROJECT NAME: Harrisburg-Capital Building

SYSTEM: Low Pressure Steam

BARE SURFACE EMITTANCE: 0.8
PROCESS TEMP: 227 deg F
AMBIENT TEMP: 78 deg F
WIND SPEED: 0 MPH
INSULATION LAYER 1: 1000F Mineral Fiber PIPE, Type IV, C547-11

FUEL NAME: Steam
HEAT CONTENT: 1000 BTU per lb
FUEL COST: 24 US $ per Klbs
EFFICIENCY: 100%
OUTER JACKET MAT'L: All Service Jacket
OUTER SURFACE EMITTANCE: 0.9
HOURS OF OPERATION: 8760

PIPE SIZE	INSULATION THICKNESS												
	BARE	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1/4													
1/2	92.9909	24.0052	16.8968	13.634	12.1191	10.6042	9.905	9.4389	8.9728	8.6232	8.3902	8.1571	7.8075
3/4	113.0341	27.268	20.2762	15.8481	13.7505	11.7695	11.0704	10.3712	9.905	9.4389	9.0893	8.8563	8.5067
1	138.088	31.9292	21.0919	17.2464	14.9158	13.401	12.3522	11.653	10.9538	10.4877	10.0216	9.672	9.3224
1 1/4	170.3669	39.6202	27.1515	19.2274	17.7126	15.615	14.2167	13.2844	12.4687	11.7695	11.1869	10.8373	10.3712
1 1/2	192.6241	44.5145	27.5011	21.7911	17.2464	15.615	14.4497	13.5175	12.7018	12.0026	11.5365	11.0704	10.7208
2	236.4394	49.1757	32.1623	24.8209	20.9754	18.5283	16.8968	15.615	14.5662	13.7505	13.0514	12.4687	12.0026
2 1/2	282.1191	57.4493	36.94	25.5201	22.0242	19.6936	18.0622	16.5473	15.615	14.7993	13.8671	13.2844	12.8183
3	338.8692	73.1808	43.6988	32.8615	27.3846	23.8886	21.4415	19.344	18.0622	16.8968	15.8481	15.1489	14.4497
3 1/2													
4	429.0634	87.281	52.322	39.6202	32.6284	28.2003	24.8209	22.6068	20.9754	19.2274	18.1787	17.363	16.5473
5	524.385	109.8878	65.2568	48.2434	39.1541	32.8615	29.1325	26.3358	23.7721	22.1407	20.8589	19.6936	18.7613
6	619.2404	133.5434	77.4924	56.284	44.1649	37.6392	33.0945	29.1325	26.8019	24.8209	23.306	22.0242	20.9754
7													
8	796.7156	171.5322	92.6414	67.8205	54.536	44.5145	39.1541	35.1921	32.1623	29.7152	27.7341	26.1027	24.7044
10	984.3289	210.6862	118.8606	79.59	63.975	54.0699	47.1946	42.1839	38.3384	35.1921	32.7449	30.6474	28.8994
12	1160.639	207.4234	126.3185	92.6414	74.1131	62.3436	54.303	48.2434	43.6988	40.0863	37.1731	34.7259	32.6284
14	1270.177	272.9133	152.1882	107.6737	84.4842	70.2676	60.5956	53.4873	48.2434	44.0483	40.669	37.8722	35.5416
16	1446.137	309.9698	172.2313	120.7251	95.0885	78.7743	67.7039	59.7799	53.7203	48.9426	45.0971	41.9508	39.2706
18	1620.932	347.0263	192.2745	135.2913	105.5762	87.3975	74.9288	65.956	59.1972	53.8369	49.5252	45.9128	42.9996
20	1796.893	383.9664	212.3177	149.1584	116.1804	95.9042	82.1536	72.1321	64.5576	58.6146	53.8369	49.9914	46.612
22													
24	2145.317	458.0794	252.404	176.6595	137.1558	112.9176	96.3703	84.4842	75.5114	68.4031	62.6931	58.0319	54.0699
26													
28													
30													
32													
34													
36													
38													
40													
Flat Surface Vertical													
Duct-Tank Flat Top													
Duct-Tank Flat Bottom													
Duct-Rect Horizontal													
Duct-Rect Vertical													
Tank Shell	338.17	65.7229	36.8235	25.6366	19.577	15.9646	13.401	11.5365	10.1381	9.0893	8.1571	7.4579	6.8753

I-Star Energy Solutions-Confidential

3E PLUS ENVIRONMENT TABLE: NOx @ LB/FT/YR

PROJECT NAME: Harrisburg-Capital Building

SYSTEM: Low Pressure Steam

BARE SURFACE EMITTANCE: 0.8
PROCESS TEMP: 227 deg F
AMBIENT TEMP: 78 deg F
WIND SPEED: 0 MPH
INSULATION LAYER 1: 1000F Mineral Fiber PIPE, Type IV, C547-11

FUEL NAME: Steam
HEAT CONTENT: 1000 BTU per lb
FUEL COST: 24 US $ per Klbs
EFFICIENCY: 100%
OUTER JACKET MAT'L: All Service Jacket
OUTER SURFACE EMITTANCE: 0.9
HOURS OF OPERATION: 8760

PIPE SIZE	INSULATION THICKNESS												
	BARE	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1/4													
1/2	0.1865	0.0481	0.0339	0.0273	0.0243	0.0213	0.0199	0.0189	0.018	0.0173	0.0168	0.0164	0.0157
3/4	0.2267	0.0547	0.0407	0.0318	0.0276	0.0236	0.0222	0.0208	0.0199	0.0189	0.0182	0.0178	0.0171
1	0.277	0.064	0.0423	0.0346	0.0299	0.0269	0.0248	0.0234	0.022	0.021	0.0201	0.0194	0.0187
1 1/4	0.3417	0.0795	0.0545	0.0386	0.0355	0.0313	0.0285	0.0266	0.025	0.0236	0.0224	0.0217	0.0208
1 1/2	0.3864	0.0893	0.0552	0.0437	0.0346	0.0313	0.029	0.0271	0.0255	0.0241	0.0231	0.0222	0.0215
2	0.4742	0.0986	0.0645	0.0498	0.0421	0.0372	0.0339	0.0313	0.0292	0.0276	0.0262	0.025	0.0241
2 1/2	0.5659	0.1152	0.0741	0.0512	0.0442	0.0395	0.0362	0.0332	0.0313	0.0297	0.0278	0.0266	0.0257
3	0.6797	0.1468	0.0876	0.0659	0.0549	0.0479	0.043	0.0388	0.0362	0.0339	0.0318	0.0304	0.029
3 1/2													
4	0.8606	0.1751	0.1049	0.0795	0.0654	0.0566	0.0498	0.0453	0.0421	0.0386	0.0365	0.0348	0.0332
5	1.0518	0.2204	0.1309	0.0968	0.0785	0.0659	0.0584	0.0528	0.0477	0.0444	0.0418	0.0395	0.0376
6	1.242	0.2679	0.1554	0.1129	0.0886	0.0755	0.0664	0.0584	0.0538	0.0498	0.0467	0.0442	0.0421
7													
8	1.598	0.3441	0.1858	0.136	0.1094	0.0893	0.0785	0.0706	0.0645	0.0596	0.0556	0.0524	0.0496
10	1.9743	0.4226	0.2384	0.1596	0.1283	0.1085	0.0947	0.0846	0.0769	0.0706	0.0657	0.0615	0.058
12	2.328	0.416	0.2534	0.1858	0.1487	0.125	0.1089	0.0968	0.0876	0.0804	0.0746	0.0697	0.0654
14	2.5477	0.5474	0.3053	0.216	0.1695	0.1409	0.1215	0.1073	0.0968	0.0883	0.0816	0.076	0.0713
16	2.9006	0.6217	0.3455	0.2421	0.1907	0.158	0.1358	0.1199	0.1077	0.0982	0.0905	0.0841	0.0788
18	3.2512	0.696	0.3857	0.2714	0.2118	0.1753	0.1503	0.1323	0.1187	0.108	0.0993	0.0921	0.0862
20	3.6041	0.7701	0.4259	0.2992	0.233	0.1924	0.1648	0.1447	0.1295	0.1176	0.108	0.1003	0.0935
22													
24	4.303	0.9188	0.5063	0.3543	0.2751	0.2265	0.1933	0.1695	0.1515	0.1372	0.1257	0.1164	0.1085
26													
28													
30													
32													
34													
36													
38													
40													
Flat Surface Vertical													
Duct-Tank Flat Top													
Duct-Tank Flat Bottom													
Duct-Rect Horizontal													
Duct-Rect Vertical													
Tank Shell	0.6783	0.1318	0.0739	0.0514	0.0393	0.032	0.0269	0.0231	0.0203	0.0182	0.0164	0.015	0.0138

I-Star Energy Solutions-Confidential

3E PLUS ENERGY TABLE: COST @ $/FT/YR

PROJECT NAME: Harrisburg-Capital Building

SYSTEM: Medium Pressure Steam

BARE SURFACE EMITTANCE:	0.8		FUEL NAME:	Steam	
PROCESS TEMP:	274	deg F	HEAT CONTENT:	1000	BTU per lb
AMBIENT TEMP:	78	deg F	FUEL COST:	24	US $ per Klbs
WIND SPEED:	0	MPH	EFFICIENCY:	100%	
INSULATION LAYER 1:	1000F Mineral Fiber PIPE, Type IV, C547-11		OUTER JACKET MAT'L:	All Service Jacket	
			OUTER SURFACE EMITTANCE:	0.9	
			HOURS OF OPERATION:	8760	

PIPE SIZE	INSULATION THICKNESS												
	BARE	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1/4													
1/2	27.49	6.85	4.8	3.89	3.44	3	2.82	2.68	2.56	2.46	2.38	2.31	2.23
3/4	33.47	7.78	5.79	4.51	3.92	3.36	3.13	2.96	2.82	2.69	2.59	2.51	2.42
1	40.93	9.11	6	4.9	4.24	3.81	3.52	3.3	3.13	2.97	2.85	2.76	2.65
1 1/4	50.55	11.34	7.74	5.47	5.03	4.44	4.05	3.76	3.54	3.34	3.19	3.07	2.94
1 1/2	57.18	12.75	7.83	6.2	4.9	4.44	4.09	3.83	3.59	3.43	3.28	3.13	3.03
2	70.24	14.06	9.16	7.07	5.95	5.28	4.8	4.44	4.12	3.9	3.72	3.53	3.4
2 1/2	83.86	16.42	10.53	7.26	6.27	5.61	5.12	4.71	4.42	4.19	3.95	3.79	3.65
3	100.78	20.96	12.47	9.35	7.78	6.78	6.09	5.51	5.12	4.81	4.5	4.29	4.12
3 1/2													
4	127.7	24.97	14.92	11.28	9.29	8.03	7.06	6.43	5.95	5.48	5.17	4.92	4.7
5													
6	184.43	38.28	22.11	16.05	12.57	10.71	9.43	8.29	7.61	7.07	6.63	6.26	5.94
7													
8													
10													
12													
14													
16													
18													
20													
22													
24													
26													
28													
30													
32													
34													
36													
38													
40													
Flat Surface Vertical													
Duct-Tank Flat Top													
Duct-Tank Flat Bottom													
Duct-Rect Horizontal													
Duct-Rect Vertical													
Tank Shell	101.02	18.86	10.5	7.29	5.59	4.53	3.82	3.29	2.9	2.59	2.34	2.13	1.96

I-Star Energy Solutions-Confidential

3E PLUS ENERGY TABLE: HEAT LOSS(HOT SYSTEMS) HEAT GAIN (COLD SYSTEMS) @ KBTU/FT/YR

PROJECT NAME: **Harrisburg-Capital Building**

SYSTEM: **Medium Pressure Steam**

BARE SURFACE EMITTANCE: 0.8
PROCESS TEMP: 274 deg F
AMBIENT TEMP: 78 deg F
WIND SPEED: 0 MPH
INSULATION LAYER 1: 1000F Mineral Fiber PIPE, Type IV, C547-11

FUEL NAME: Steam
HEAT CONTENT: 1000 BTU per lb
FUEL COST: 24 US $ per Klbs
EFFICIENCY: 100%
OUTER JACKET MAT'L: All Service Jacket
OUTER SURFACE EMITTANCE: 0.9
HOURS OF OPERATION: 8760

PIPE SIZE	INSULATION THICKNESS												
	BARE	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1/4													
1/2	1146	286	200	162	144	125	118	112	107	102	99	96	93
3/4	1395	324	241	188	163	140	131	123	117	112	108	105	101
1	1705	380	250	204	177	159	147	138	130	124	119	115	110
1 1/4	2106	473	323	228	210	185	169	157	148	139	133	128	122
1 1/2	2383	531	326	258	204	185	171	160	150	143	137	131	126
2	2927	586	382	295	248	220	200	185	172	163	155	147	142
2 1/2	3494	684	439	302	262	234	214	196	184	175	165	158	152
3	4199	873	520	390	324	283	254	230	214	201	187	179	172
3 1/2													
4	5321	1041	622	470	387	334	294	268	248	228	216	205	196
5													
6	7685	1595	921	669	524	446	393	345	317	295	276	261	248
7													
8													
10													
12													
14													
16													
18													
20													
22													
24													
26													
28													
30													
32													
34													
36													
38													
40													
Flat Surface Vertical													
Duct-Tank Flat Top													
Duct-Tank Flat Bottom													
Duct-Rect Horizontal													
Duct-Rect Vertical													
Tank Shell	4209	786	438	304	233	189	159	137	121	108	97	89	82

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3E PLUS ENERGY TABLE: SAVINGS @ $/FT/YR

PROJECT NAME: **Harrisburg-Capital Building**

SYSTEM: **Medium Pressure Steam**

BARE SURFACE EMITTANCE: 0.8
PROCESS TEMP: 274 deg F
AMBIENT TEMP: 78 deg F
WIND SPEED: 0 MPH
INSULATION LAYER 1: 1000F Mineral Fiber PIPE, Type IV, C547-11

FUEL NAME: Steam
HEAT CONTENT: 1000 BTU per lb
FUEL COST: 24 US $ per Klbs
EFFICIENCY: 100%
OUTER JACKET MAT'L: All Service Jacket
OUTER SURFACE EMITTANCE: 0.9
HOURS OF OPERATION: 8760

PIPE SIZE	INSULATION THICKNESS												
	BARE	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1/4	0	0	0	0	0	0	0	0	0	0	0	0	0
1/2	0	20.64	22.69	23.6	24.05	24.49	24.67	24.81	24.93	25.03	25.11	25.18	25.26
3/4	0	25.69	27.68	28.96	29.55	30.11	30.34	30.51	30.65	30.78	30.88	30.96	31.05
1	0	31.82	34.93	36.03	36.69	37.12	37.41	37.63	37.8	37.96	38.08	38.17	38.28
1 1/4	0	39.21	42.81	45.08	45.52	46.11	46.5	46.79	47.01	47.21	47.36	47.48	47.61
1 1/2	0	44.43	49.35	50.98	52.28	52.74	53.09	53.35	53.59	53.75	53.9	54.05	54.15
2	0	56.18	61.08	63.17	64.29	64.96	65.44	65.8	66.12	66.34	66.52	66.71	66.84
2 1/2	0	67.44	73.33	76.6	77.59	78.25	78.74	79.15	79.44	79.67	79.91	80.07	80.21
3	0	79.82	88.31	91.43	93	94	94.69	95.27	95.66	95.97	96.28	96.49	96.66
3 1/2	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	102.73	112.78	116.42	118.41	119.67	120.64	121.27	121.75	122.22	122.53	122.78	123
5	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	146.15	162.32	168.38	171.86	173.72	175	176.14	176.82	177.36	177.8	178.17	178.49
7	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0
32	0	0	0	0	0	0	0	0	0	0	0	0	0
34	0	0	0	0	0	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0	0	0	0	0	0
38	0	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0	0	0
Flat Surface Vertical	0	0	0	0	0	0	0	0	0	0	0	0	0
Duct-Tank Flat Top	0	0	0	0	0	0	0	0	0	0	0	0	0
Duct-Tank Flat Bottom	0	0	0	0	0	0	0	0	0	0	0	0	0
Duct-Rect Horizontal	0	0	0	0	0	0	0	0	0	0	0	0	0
Duct-Rect Vertical	0	0	0	0	0	0	0	0	0	0	0	0	0
Tank Shell	0	82.16	90.52	93.73	95.43	96.49	97.2	97.73	98.12	98.43	98.68	98.89	99.06

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3E PLUS ENVIRONMENT TABLE: CO2 @ LB/FT/YR

PROJECT NAME: Harrisburg-Capital Building

SYSTEM: Medium Pressure Steam

BARE SURFACE EMITTANCE: 0.8
PROCESS TEMP: 274 deg F
AMBIENT TEMP: 78 deg F
WIND SPEED: 0 MPH
INSULATION LAYER 1: 1000F Mineral Fiber PIPE, Type IV, C547-11

FUEL NAME: Steam
HEAT CONTENT: 1000 BTU per lb
FUEL COST: 24 US $ per Klbs
EFFICIENCY: 100%
OUTER JACKET MAT'L: All Service Jacket
OUTER SURFACE EMITTANCE: 0.9
HOURS OF OPERATION: 8760

PIPE SIZE	INSULATION THICKNESS												
	BARE	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1/4													
1/2	133.5434	33.3276	23.306	18.8779	16.7803	14.5662	13.7505	13.0514	12.4687	11.8861	11.5365	11.1869	10.8373
3/4	162.5593	37.7557	28.0837	21.9076	18.9944	16.3142	15.2654	14.3332	13.634	13.0514	12.5852	12.2356	11.7695
1	198.6837	44.2814	29.1325	23.7721	20.6258	18.5283	17.1299	16.0811	15.1489	14.4497	13.8671	13.401	12.8183
1 1/4	245.4122	55.1187	37.6392	26.5688	24.4713	21.558	19.6936	18.2952	17.2464	16.1977	15.4985	14.9158	14.2167
1 1/2	277.691	61.8774	37.9888	30.0647	23.7721	21.558	19.9266	18.6448	17.4795	16.6638	15.9646	15.2654	14.6828
2	341.0833	68.2866	44.5145	34.3764	28.8994	25.6366	23.306	21.558	20.0432	18.9944	18.0622	17.1299	16.5473
2 1/2	407.1558	79.7065	51.1567	35.1921	30.5309	27.268	24.9374	22.8399	21.4415	20.3928	19.2274	18.4117	17.7126
3	489.3094	101.7307	60.5956	45.4467	37.7557	32.978	29.5986	26.8019	24.9374	23.4225	21.7911	20.8589	20.0432
3 1/2													
4	620.0562	121.3077	72.4817	54.7691	45.0971	38.921	34.2598	31.23	28.8994	26.5688	25.1705	23.8886	22.8399
5													
6	895.533	185.8654	107.3241	77.9586	61.0617	51.9724	45.7963	40.2028	36.94	34.3764	32.1623	30.4143	28.8994
7													
8													
10													
12													
14													
16													
18													
20													
22													
24													
26													
28													
30													
32													
34													
36													
38													
40													
Flat Surface Vertical													
Duct-Tank Flat Top													
Duct-Tank Flat Bottom													
Duct-Rect Horizontal													
Duct-Rect Vertical													
Tank Shell	490.4748	91.5926	51.0401	35.4251	27.1515	22.0242	18.5283	15.9646	14.1001	12.5852	11.3034	10.3712	9.5555

I-Star Energy Solutions-Confidential

3E PLUS ENVIRONMENT TABLE: NOx @ LB/FT/YR

PROJECT NAME: Harrisburg-Capital Building

SYSTEM: Medium Pressure Steam

BARE SURFACE EMITTANCE: 0.8
PROCESS TEMP: 274 deg F
AMBIENT TEMP: 78 deg F
WIND SPEED: 0 MPH
INSULATION LAYER 1: 1000F Mineral Fiber PIPE, Type IV, C547-11

FUEL NAME: Steam
HEAT CONTENT: 1000 BTU per lb
FUEL COST: 24 US $ per Klbs
EFFICIENCY: 100%
OUTER JACKET MAT'L: All Service Jacket
OUTER SURFACE EMITTANCE: 0.9
HOURS OF OPERATION: 8760

PIPE SIZE	INSULATION THICKNESS												
	BARE	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1/4													
1/2	0.2679	0.0668	0.0467	0.0379	0.0337	0.0292	0.0276	0.0262	0.025	0.0238	0.0231	0.0224	0.0217
3/4	0.3261	0.0757	0.0563	0.0439	0.0381	0.0327	0.0306	0.0287	0.0273	0.0262	0.0252	0.0245	0.0236
1	0.3985	0.0888	0.0584	0.0477	0.0414	0.0372	0.0344	0.0323	0.0304	0.029	0.0278	0.0269	0.0257
1 1/4	0.4922	0.1106	0.0755	0.0533	0.0491	0.0432	0.0395	0.0367	0.0346	0.0325	0.0311	0.0299	0.0285
1 1/2	0.557	0.1241	0.0762	0.0603	0.0477	0.0432	0.04	0.0374	0.0351	0.0334	0.032	0.0306	0.0294
2	0.6841	0.137	0.0893	0.069	0.058	0.0514	0.0467	0.0432	0.0402	0.0381	0.0362	0.0344	0.0332
2 1/2	0.8167	0.1599	0.1026	0.0706	0.0612	0.0547	0.05	0.0458	0.043	0.0409	0.0386	0.0369	0.0355
3	0.9814	0.204	0.1215	0.0912	0.0757	0.0661	0.0594	0.0538	0.05	0.047	0.0437	0.0418	0.0402
3 1/2													
4	1.2437	0.2433	0.1454	0.1099	0.0905	0.0781	0.0687	0.0626	0.058	0.0533	0.0505	0.0479	0.0458
5													
6	1.7962	0.3728	0.2153	0.1564	0.1225	0.1042	0.0919	0.0806	0.0741	0.069	0.0645	0.061	0.058
7													
8													
10													
12													
14													
16													
18													
20													
22													
24													
26													
28													
30													
32													
34													
36													
38													
40													
Flat Surface Vertical													
Duct-Tank Flat Top													
Duct-Tank Flat Bottom													
Duct-Rect Horizontal													
Duct-Rect Vertical													
Tank Shell	0.9838	0.1837	0.1024	0.0711	0.0545	0.0442	0.0372	0.032	0.0283	0.0252	0.0227	0.0208	0.0192

I-Star Energy Solutions-Confidential

3E PLUS ENERGY TABLE: COST @ $/FT/YR

PROJECT NAME: Harrisburg-Capital Building

SYSTEM: High Pressure Steam

BARE SURFACE EMITTANCE:	0.8		FUEL NAME:	Steam	
PROCESS TEMP:	298	deg F	HEAT CONTENT:	1000	BTU per lb
AMBIENT TEMP:	78	deg F	FUEL COST:	24	US $ per Klbs
WIND SPEED:	0	MPH	EFFICIENCY:	100%	
INSULATION LAYER 1:	1000F Mineral Fiber PIPE, Type IV, C547-11		OUTER JACKET MAT'L:	All Service Jacket	
			OUTER SURFACE EMITTANCE:	0.9	
			HOURS OF OPERATION:	8760	

PIPE SIZE	INSULATION THICKNESS												
	BARE	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1/4													
1/2	32.17	7.9	5.53	4.48	3.96	3.46	3.25	3.08	2.95	2.83	2.73	2.65	2.57
3/4	39.18	8.97	6.67	5.19	4.51	3.87	3.61	3.4	3.24	3.09	2.98	2.89	2.79
1	47.94	10.51	6.92	5.64	4.88	4.39	4.05	3.8	3.6	3.42	3.28	3.17	3.05
1 1/4	59.23	13.09	8.92	6.3	5.79	5.11	4.66	4.33	4.07	3.84	3.67	3.53	3.38
1 1/2	67.03	14.71	9.02	7.13	5.64	5.11	4.71	4.41	4.14	3.94	3.78	3.61	3.49
2	82.36	16.23	10.55	8.15	6.85	6.07	5.52	5.11	4.75	4.49	4.28	4.06	3.91
2 1/2	98.36	18.94	12.13	8.36	7.22	6.46	5.9	5.42	5.09	4.82	4.54	4.36	4.2
3	118.24	24.2	14.37	10.77	8.96	7.81	7.01	6.34	5.9	5.54	5.18	4.94	4.74
3 1/2													
4	149.88	28.83	17.2	12.99	10.69	9.24	8.12	7.4	6.85	6.3	5.95	5.66	5.41
5	183.3	36.34	21.46	15.82	12.82	10.75	9.52	8.62	7.77	7.25	6.81	6.45	6.15
6	216.55	44.2	25.49	18.49	14.47	12.33	10.85	9.54	8.76	8.14	7.63	7.2	6.84
7													
8	278.83	56.79	30.48	22.28	17.87	14.57	12.82	11.53	10.53	9.74	9.09	8.55	8.09
10	344.68	69.78	39.13	26.1	20.97	17.71	15.46	13.8	12.53	11.53	10.71	10.03	9.46
12													
14													
16													
18													
20													
22													
24													
26													
28													
30													
32													
34													
36													
38													
40													
Flat Surface Vertical													
Duct-Tank Flat Top													
Duct-Tank Flat Bottom													
Duct-Rect Horizontal													
Duct-Rect Vertical													
Tank Shell	118.77	21.78	12.11	8.4	6.44	5.22	4.39	3.79	3.33	2.98	2.69	2.45	2.25

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3E PLUS ENERGY TABLE: HEAT LOSS(HOT SYSTEMS) HEAT GAIN (COLD SYSTEMS) @ KBTU/FT/YR

PROJECT NAME: **Harrisburg-Capital Building**

SYSTEM: **High Pressure Steam**

BARE SURFACE EMITTANCE: 0.8
PROCESS TEMP: 298 deg F
AMBIENT TEMP: 78 deg F
WIND SPEED: 0 MPH
INSULATION LAYER 1: 1000F Mineral Fiber PIPE, Type IV, C547-11

FUEL NAME: Steam
HEAT CONTENT: 1000 BTU per lb
FUEL COST: 24 US $ per Klbs
EFFICIENCY: 100%
OUTER JACKET MAT'L: All Service Jacket
OUTER SURFACE EMITTANCE: 0.9
HOURS OF OPERATION: 8760

PIPE SIZE	INSULATION THICKNESS												
	BARE	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1/4													
1/2	1340	329	231	187	165	144	135	129	123	118	114	111	107
3/4	1633	374	278	216	188	161	150	142	135	129	124	120	116
1	1997	438	288	235	203	183	169	158	150	142	137	132	127
1 1/4	2468	545	372	263	241	213	194	181	170	160	153	147	141
1 1/2	2793	613	376	297	235	213	196	184	172	164	157	150	145
2	3431	676	440	339	286	253	230	213	198	187	178	169	163
2 1/2	4098	789	506	348	301	269	246	226	212	201	189	182	175
3	4927	1008	599	449	373	325	292	264	246	231	216	206	197
3 1/2													
4	6245	1201	717	541	446	385	338	308	285	263	248	236	225
5	7638	1514	894	659	534	448	397	359	324	302	284	269	256
6	9023	1842	1062	770	603	514	452	398	365	339	318	300	285
7													
8	11620	2366	1270	928	745	607	534	480	439	406	379	356	337
10	14360	2908	1630	1088	874	738	644	575	522	480	446	418	394
12													
14													
16													
18													
20													
22													
24													
26													
28													
30													
32													
34													
36													
38													
40													
Flat Surface Vertical													
Duct-Tank Flat Top													
Duct-Tank Flat Bottom													
Duct-Rect Horizontal													
Duct-Rect Vertical													
Tank Shell	4949	908	504	350	268	218	183	158	139	124	112	102	94

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3E PLUS ENERGY TABLE: SAVINGS @ $/FT/YR

PROJECT NAME: **Harrisburg-Capital Building**

SYSTEM: **High Pressure Steam**

BARE SURFACE EMITTANCE: 0.8
PROCESS TEMP: 298 deg F
AMBIENT TEMP: 78 deg F
WIND SPEED: 0 MPH
INSULATION LAYER 1: 1000F Mineral Fiber PIPE, Type IV, C547-11

FUEL NAME: Steam
HEAT CONTENT: 1000 BTU per lb
FUEL COST: 24 US $ per Klbs
EFFICIENCY: 100%
OUTER JACKET MAT'L: All Service Jacket
OUTER SURFACE EMITTANCE: 0.9
HOURS OF OPERATION: 8760

PIPE SIZE	INSULATION THICKNESS												
	BARE	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1/4	0	0	0	0	0	0	0	0	0	0	0	0	0
1/2	0	24.27	26.64	27.69	28.21	28.71	28.92	29.09	29.22	29.34	29.44	29.52	29.6
3/4	0	30.21	32.51	33.99	34.67	35.31	35.57	35.78	35.94	36.09	36.2	36.29	36.39
1	0	37.43	41.02	42.3	43.06	43.55	43.89	44.14	44.34	44.52	44.66	44.77	44.89
1 1/4	0	46.14	50.31	52.93	53.44	54.12	54.57	54.9	55.16	55.39	55.56	55.7	55.85
1 1/2	0	52.32	58.01	59.9	61.39	61.92	62.32	62.62	62.89	63.09	63.25	63.42	63.54
2	0	66.13	71.81	74.21	75.51	76.29	76.84	77.25	77.61	77.87	78.08	78.3	78.45
2 1/2	0	79.42	86.23	90	91.14	91.9	92.46	92.94	93.27	93.54	93.82	94	94.16
3	0	94.04	103.87	107.47	109.28	110.43	111.23	111.9	112.34	112.7	113.06	113.3	113.5
3 1/2	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	121.05	132.68	136.89	139.19	140.64	141.76	142.48	143.03	143.58	143.93	144.22	144.47
5	0	146.96	161.84	167.48	170.48	172.55	173.78	174.68	175.53	176.05	176.49	176.85	177.15
6	0	172.35	191.06	198.06	202.08	204.22	205.7	207.01	207.79	208.41	208.92	209.35	209.71
7	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	222.04	248.35	256.55	260.96	264.26	266.01	267.3	268.3	269.09	269.74	270.28	270.74
10	0	274.9	305.55	318.58	323.71	326.97	329.22	330.88	332.15	333.15	333.97	334.65	335.22
12	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0
32	0	0	0	0	0	0	0	0	0	0	0	0	0
34	0	0	0	0	0	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0	0	0	0	0	0
38	0	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0	0	0
Flat Surface Vertical	0	0	0	0	0	0	0	0	0	0	0	0	0
Duct-Tank Flat Top	0	0	0	0	0	0	0	0	0	0	0	0	0
Duct-Tank Flat Bottom	0	0	0	0	0	0	0	0	0	0	0	0	0
Duct-Rect Horizontal	0	0	0	0	0	0	0	0	0	0	0	0	0
Duct-Rect Vertical	0	0	0	0	0	0	0	0	0	0	0	0	0
Tank Shell	0	96.99	106.66	110.37	112.33	113.55	114.38	114.98	115.44	115.79	116.08	116.32	116.52

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3E PLUS ENVIRONMENT TABLE: CO2 @ LB/FT/YR

PROJECT NAME: Harrisburg-Capital Building

SYSTEM: High Pressure Steam

BARE SURFACE EMITTANCE: 0.8
PROCESS TEMP: 298 deg F
AMBIENT TEMP: 78 deg F
WIND SPEED: 0 MPH
INSULATION LAYER 1: 1000F Mineral Fiber PIPE, Type IV, C547-11

FUEL NAME: Steam
HEAT CONTENT: 1000 BTU per lb
FUEL COST: 24 US $ per Klbs
EFFICIENCY: 100%
OUTER JACKET MAT'L: All Service Jacket
OUTER SURFACE EMITTANCE: 0.9
HOURS OF OPERATION: 8760

PIPE SIZE	INSULATION THICKNESS												
	BARE	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1/4													
1/2	156.1502	38.3384	26.9184	21.7911	19.2274	16.7803	15.7316	15.0324	14.3332	13.7505	13.2844	12.9348	12.4687
3/4	190.2935	43.5822	32.3953	25.1705	21.9076	18.7613	17.4795	16.5473	15.7316	15.0324	14.4497	13.9836	13.5175
1	232.7104	51.0401	33.5606	27.3846	23.6556	21.325	19.6936	18.4117	17.4795	16.5473	15.9646	15.382	14.7993
1 1/4	287.596	63.5088	43.3492	30.6474	28.0837	24.8209	22.6068	21.0919	19.8101	18.6448	17.8291	17.1299	16.4307
1 1/2	325.4683	71.4329	43.8153	34.6094	27.3846	24.8209	22.8399	21.4415	20.0432	19.1109	18.2952	17.4795	16.8968
2	399.8144	78.7743	51.2732	39.5037	33.3276	29.4821	26.8019	24.8209	23.0729	21.7911	20.7423	19.6936	18.9944
2 1/2	477.5399	91.9422	58.9642	40.5524	35.0755	31.3466	28.6664	26.3358	24.7044	23.4225	22.0242	21.2085	20.3928
3	574.1433	117.4622	69.8015	52.322	43.4657	37.8722	34.0268	30.7639	28.6664	26.9184	25.1705	24.0052	22.9564
3 1/2													
4	727.7299	139.9525	83.552	63.0427	51.9724	44.864	39.3871	35.8912	33.211	30.6474	28.8994	27.5011	26.2192
5	890.0562	176.4264	104.1778	76.7933	62.227	52.2054	46.2624	41.8343	37.7557	35.1921	33.0945	31.3466	29.8317
6	1051.45	214.6483	123.7549	89.7281	70.2676	59.8964	52.6716	46.3789	42.5334	39.5037	37.0565	34.959	33.211
7													
8	1354.079	275.71	147.9931	108.1398	86.8148	70.7337	62.227	55.9344	51.1567	47.3112	44.1649	41.4847	39.2706
10	1673.371	338.8692	189.9439	126.7846	101.8472	85.9991	75.0453	67.0048	60.8287	55.9344	51.9724	48.7095	45.9128
12													
14													
16													
18													
20													
22													
24													
26													
28													
30													
32													
34													
36													
38													
40													
Flat Surface Vertical													
Duct-Tank Flat Top													
Duct-Tank Flat Bottom													
Duct-Rect Horizontal													
Duct-Rect Vertical													
Tank Shell	576.707	105.8092	58.7311	40.7855	31.23	25.4035	21.325	18.4117	16.1977	14.4497	13.0514	11.8861	10.9538

I-Star Energy Solutions-Confidential

3E PLUS ENVIRONMENT TABLE: NOx @ LB/FT/YR

PROJECT NAME: Harrisburg-Capital Building

SYSTEM: High Pressure Steam

BARE SURFACE EMITTANCE: 0.8
PROCESS TEMP: 298 deg F
AMBIENT TEMP: 78 deg F
WIND SPEED: 0 MPH
INSULATION LAYER 1: 1000F Mineral Fiber PIPE, Type IV, C547-11

FUEL NAME: Steam
HEAT CONTENT: 1000 BTU per lb
FUEL COST: 24 US $ per Klbs
EFFICIENCY: 100%
OUTER JACKET MAT'L: All Service Jacket
OUTER SURFACE EMITTANCE: 0.9
HOURS OF OPERATION: 8760

PIPE SIZE	INSULATION THICKNESS												
	BARE	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1/4													
1/2	0.3132	0.0769	0.054	0.0437	0.0386	0.0337	0.0316	0.0302	0.0287	0.0276	0.0266	0.0259	0.025
3/4	0.3817	0.0874	0.065	0.0505	0.0439	0.0376	0.0351	0.0332	0.0316	0.0302	0.029	0.028	0.0271
1	0.4668	0.1024	0.0673	0.0549	0.0474	0.0428	0.0395	0.0369	0.0351	0.0332	0.032	0.0309	0.0297
1 1/4	0.5768	0.1274	0.0869	0.0615	0.0563	0.0498	0.0453	0.0423	0.0397	0.0374	0.0358	0.0344	0.033
1 1/2	0.6528	0.1433	0.0879	0.0694	0.0549	0.0498	0.0458	0.043	0.0402	0.0383	0.0367	0.0351	0.0339
2	0.8019	0.158	0.1028	0.0792	0.0668	0.0591	0.0538	0.0498	0.0463	0.0437	0.0416	0.0395	0.0381
2 1/2	0.9578	0.1844	0.1183	0.0813	0.0704	0.0629	0.0575	0.0528	0.0496	0.047	0.0442	0.0425	0.0409
3	1.1516	0.2356	0.14	0.1049	0.0872	0.076	0.0682	0.0617	0.0575	0.054	0.0505	0.0481	0.046
3 1/2													
4	1.4596	0.2807	0.1676	0.1264	0.1042	0.09	0.079	0.072	0.0666	0.0615	0.058	0.0552	0.0526
5	1.7852	0.3539	0.209	0.154	0.1248	0.1047	0.0928	0.0839	0.0757	0.0706	0.0664	0.0629	0.0598
6	2.1089	0.4305	0.2482	0.18	0.1409	0.1201	0.1056	0.093	0.0853	0.0792	0.0743	0.0701	0.0666
7													
8	2.7159	0.553	0.2968	0.2169	0.1741	0.1419	0.1248	0.1122	0.1026	0.0949	0.0886	0.0832	0.0788
10	3.3564	0.6797	0.381	0.2543	0.2043	0.1725	0.1505	0.1344	0.122	0.1122	0.1042	0.0977	0.0921
12													
14													
16													
18													
20													
22													
24													
26													
28													
30													
32													
34													
36													
38													
40													
Flat Surface Vertical													
Duct-Tank Flat Top													
Duct-Tank Flat Bottom													
Duct-Rect Horizontal													
Duct-Rect Vertical													
Tank Shell	1.1567	0.2122	0.1178	0.0818	0.0626	0.051	0.0428	0.0369	0.0325	0.029	0.0262	0.0238	0.022

I-Star Energy Solutions-Confidential

3E PLUS ENERGY TABLE: COST @ $/FT/YR

PROJECT NAME: Harrisburg-Capital Building

SYSTEM: Boiler Feed Water

BARE SURFACE EMITTANCE:	0.8		FUEL NAME:	Steam	
PROCESS TEMP:	190	deg F	HEAT CONTENT:	1000	BTU per lb
AMBIENT TEMP:	78	deg F	FUEL COST:	24	US $ per Klbs
WIND SPEED:	0	MPH	EFFICIENCY:	100%	
INSULATION LAYER 1:	1000F Mineral Fiber PIPE, Type IV, C547-11		OUTER JACKET MAT'L:	All Service Jacket	
			OUTER SURFACE EMITTANCE:	0.9	
			HOURS OF OPERATION:	8760	

PIPE SIZE	INSULATION THICKNESS												
	BARE	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1/4													
1/2	13.3	3.56	2.51	2.04	1.81	1.58	1.48	1.41	1.35	1.29	1.25	1.21	1.17
3/4	16.16	4.04	3.02	2.36	2.05	1.76	1.64	1.55	1.48	1.41	1.36	1.32	1.27
1	19.73	4.73	3.14	2.56	2.22	2	1.85	1.73	1.64	1.56	1.5	1.45	1.39
1 1/4	24.32	5.88	4.04	2.86	2.63	2.33	2.13	1.98	1.86	1.75	1.68	1.61	1.54
1 1/2	27.49	6.6	4.09	3.24	2.57	2.33	2.15	2.01	1.89	1.8	1.72	1.65	1.59
2	33.71	7.29	4.78	3.7	3.12	2.77	2.52	2.33	2.16	2.05	1.95	1.85	1.79
2 1/2	40.2	8.51	5.49	3.8	3.29	2.94	2.69	2.47	2.32	2.2	2.07	1.99	1.92
3	48.27	10.84	6.5	4.89	4.08	3.56	3.19	2.89	2.69	2.53	2.36	2.25	2.16
3 1/2													
4	61.09	12.92	7.78	5.9	4.86	4.21	3.7	3.37	3.12	2.87	2.72	2.58	2.47
5													
6													
7													
8													
10													
12	164.96	30.74	18.78	13.79	11.04	9.3	8.09	7.2	6.52	5.98	5.54	5.18	4.87
14													
16													
18													
20													
22													
24													
26													
28													
30													
32													
34													
36													
38													
40													
Flat Surface Vertical													
Duct-Tank Flat Top													
Duct-Tank Flat Bottom													
Duct-Rect Horizontal													
Duct-Rect Vertical													
Tank Shell	48	9.73	5.46	3.81	2.92	2.37	2	1.73	1.52	1.36	1.22	1.12	1.03

I-Star Energy Solutions-Confidential

3E PLUS ENERGY TABLE: HEAT LOSS(HOT SYSTEMS) HEAT GAIN (COLD SYSTEMS) @ KBTU/FT/YR

PROJECT NAME: **Harrisburg-Capital Building**

SYSTEM: **Boiler Feed Water**

BARE SURFACE EMITTANCE: 0.8
PROCESS TEMP: 190 deg F
AMBIENT TEMP: 78 deg F
WIND SPEED: 0 MPH
INSULATION LAYER 1: 1000F Mineral Fiber PIPE, Type IV, C547-11

FUEL NAME: Steam
HEAT CONTENT: 1000 BTU per lb
FUEL COST: 24 US $ per Klbs
EFFICIENCY: 100%
OUTER JACKET MAT'L: All Service Jacket
OUTER SURFACE EMITTANCE: 0.9
HOURS OF OPERATION: 8760

PIPE SIZE	INSULATION THICKNESS												
	BARE	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1/4													
1/2	554	148	105	85	75	66	62	59	56	54	52	50	49
3/4	674	168	126	98	86	73	69	65	62	59	57	55	53
1	822	197	131	107	93	83	77	72	68	65	62	60	58
1 1/4	1013	245	168	119	110	97	89	82	77	73	70	67	64
1 1/2	1145	275	170	135	107	97	89	84	79	75	72	69	66
2	1405	304	199	154	130	115	105	97	90	85	81	77	74
2 1/2	1675	355	229	158	137	123	112	103	97	92	86	83	80
3	2011	452	271	204	170	148	133	121	112	105	98	94	90
3 1/2													
4	2545	538	324	246	203	175	154	141	130	120	113	108	103
5													
6													
7													
8													
10													
12	6873	1281	783	575	460	387	337	300	272	249	231	216	203
14													
16													
18													
20													
22													
24													
26													
28													
30													
32													
34													
36													
38													
40													
Flat Surface Vertical													
Duct-Tank Flat Top													
Duct-Tank Flat Bottom													
Duct-Rect Horizontal													
Duct-Rect Vertical													
Tank Shell	2000	405	228	159	122	99	83	72	63	56	51	47	43

I-Star Energy Solutions-Confidential

3E PLUS ENERGY TABLE: SAVINGS @ $/FT/YR

PROJECT NAME: **Harrisburg-Capital Building**

SYSTEM: **Boiler Feed Water**

BARE SURFACE EMITTANCE: 0.8
PROCESS TEMP: 190 deg F
AMBIENT TEMP: 78 deg F
WIND SPEED: 0 MPH
INSULATION LAYER 1: 1000F Mineral Fiber PIPE, Type IV, C547-11

FUEL NAME: Steam
HEAT CONTENT: 1000 BTU per lb
FUEL COST: 24 US $ per Klbs
EFFICIENCY: 100%
OUTER JACKET MAT'L: All Service Jacket
OUTER SURFACE EMITTANCE: 0.9
HOURS OF OPERATION: 8760

PIPE SIZE	INSULATION THICKNESS												
	BARE	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1/4	0	0	0	0	0	0	0	0	0	0	0	0	0
1/2	0	9.74	10.79	11.26	11.49	11.72	11.82	11.89	11.95	12.01	12.05	12.09	12.13
3/4	0	12.12	13.14	13.8	14.11	14.4	14.52	14.61	14.68	14.75	14.8	14.84	14.89
1	0	15	16.59	17.17	17.51	17.73	17.88	18	18.09	18.17	18.23	18.28	18.34
1 1/4	0	18.44	20.28	21.46	21.69	21.99	22.19	22.34	22.46	22.57	22.64	22.71	22.78
1 1/2	0	20.89	23.4	24.25	24.92	25.16	25.34	25.48	25.6	25.69	25.77	25.84	25.9
2	0	26.42	28.93	30.01	30.59	30.94	31.19	31.38	31.55	31.66	31.76	31.86	31.92
2 1/2	0	31.69	34.71	36.4	36.91	37.26	37.51	37.73	37.88	38	38.13	38.21	38.28
3	0	37.43	41.77	43.38	44.19	44.71	45.08	45.38	45.58	45.74	45.91	46.02	46.11
3 1/2	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	48.17	53.31	55.19	56.23	56.88	57.39	57.72	57.97	58.22	58.37	58.51	58.62
5	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	134.22	146.18	151.17	153.92	155.66	156.87	157.76	158.44	158.98	159.42	159.78	160.09
14	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0
32	0	0	0	0	0	0	0	0	0	0	0	0	0
34	0	0	0	0	0	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0	0	0	0	0	0
38	0	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0	0	0
Flat Surface Vertical	0	0	0	0	0	0	0	0	0	0	0	0	0
Duct-Tank Flat Top	0	0	0	0	0	0	0	0	0	0	0	0	0
Duct-Tank Flat Bottom	0	0	0	0	0	0	0	0	0	0	0	0	0
Duct-Rect Horizontal	0	0	0	0	0	0	0	0	0	0	0	0	0
Duct-Rect Vertical	0	0	0	0	0	0	0	0	0	0	0	0	0
Tank Shell	0	38.27	42.54	44.19	45.08	45.63	46	46.27	46.48	46.64	46.78	46.88	46.97

I-Star Energy Solutions-Confidential

3E PLUS ENVIRONMENT TABLE: CO2 @ LB/FT/YR

PROJECT NAME: Harrisburg-Capital Building

SYSTEM: Boiler Feed Water

BARE SURFACE EMITTANCE: 0.8
PROCESS TEMP: 190 deg F
AMBIENT TEMP: 78 deg F
WIND SPEED: 0 MPH
INSULATION LAYER 1: 1000F Mineral Fiber PIPE, Type IV, C547-11

FUEL NAME: Steam
HEAT CONTENT: 1000 BTU per lb
FUEL COST: 24 US $ per Klbs
EFFICIENCY: 100%
OUTER JACKET MAT'L: All Service Jacket
OUTER SURFACE EMITTANCE: 0.9
HOURS OF OPERATION: 8760

PIPE SIZE	INSULATION THICKNESS												
	BARE	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1/4													
1/2	64.5576	17.2464	12.2356	9.905	8.7398	7.691	7.2249	6.8753	6.5257	6.2926	6.0596	5.8265	5.71
3/4	78.5412	19.577	14.6828	11.4199	10.0216	8.5067	8.0406	7.5744	7.2249	6.8753	6.6422	6.4092	6.1761
1	95.7877	22.9564	15.2654	12.4687	10.8373	9.672	8.9728	8.3902	7.924	7.5744	7.2249	6.9918	6.7587
1 1/4	118.0449	28.5498	19.577	13.8671	12.8183	11.3034	10.3712	9.5555	8.9728	8.5067	8.1571	7.8075	7.4579
1 1/2	133.4268	32.0458	19.8101	15.7316	12.4687	11.3034	10.3712	9.7885	9.2059	8.7398	8.3902	8.0406	7.691
2	163.7246	35.4251	23.1895	17.9456	15.1489	13.401	12.2356	11.3034	10.4877	9.905	9.4389	8.9728	8.6232
2 1/2	195.1877	41.3682	26.6854	18.4117	15.9646	14.3332	13.0514	12.0026	11.3034	10.7208	10.0216	9.672	9.3224
3	234.3418	52.6716	31.5796	23.7721	19.8101	17.2464	15.4985	14.1001	13.0514	12.2356	11.4199	10.9538	10.4877
3 1/2													
4	296.5688	62.6931	37.7557	28.6664	23.6556	20.3928	17.9456	16.4307	15.1489	13.9836	13.1679	12.5852	12.0026
5													
6													
7													
8													
10													
12	800.9107	149.2749	91.243	67.0048	53.6038	45.0971	39.2706	34.959	31.6962	29.016	26.9184	25.1705	23.6556
14													
16													
18													
20													
22													
24													
26													
28													
30													
32													
34													
36													
38													
40													
Flat Surface Vertical													
Duct-Tank Flat Top													
Duct-Tank Flat Bottom													
Duct-Rect Horizontal													
Duct-Rect Vertical													
Tank Shell	233.06	47.1946	26.5688	18.5283	14.2167	11.5365	9.672	8.3902	7.3414	6.5257	5.943	5.4769	5.0108

I-Star Energy Solutions-Confidential

3E PLUS ENVIRONMENT TABLE: NOx @ LB/FT/YR

PROJECT NAME: Harrisburg-Capital Building

SYSTEM: Boiler Feed Water

BARE SURFACE EMITTANCE: 0.8
PROCESS TEMP: 190 deg F
AMBIENT TEMP: 78 deg F
WIND SPEED: 0 MPH
INSULATION LAYER 1: 1000F Mineral Fiber PIPE, Type IV, C547-11

FUEL NAME: Steam
HEAT CONTENT: 1000 BTU per lb
FUEL COST: 24 US $ per Klbs
EFFICIENCY: 100%
OUTER JACKET MAT'L: All Service Jacket
OUTER SURFACE EMITTANCE: 0.9
HOURS OF OPERATION: 8760

PIPE SIZE	INSULATION THICKNESS												
	BARE	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1/4													
1/2	0.1295	0.0346	0.0245	0.0199	0.0175	0.0154	0.0145	0.0138	0.0131	0.0126	0.0122	0.0117	0.0115
3/4	0.1575	0.0393	0.0294	0.0229	0.0201	0.0171	0.0161	0.0152	0.0145	0.0138	0.0133	0.0129	0.0124
1	0.1921	0.046	0.0306	0.025	0.0217	0.0194	0.018	0.0168	0.0159	0.0152	0.0145	0.014	0.0136
1 1/4	0.2368	0.0573	0.0393	0.0278	0.0257	0.0227	0.0208	0.0192	0.018	0.0171	0.0164	0.0157	0.015
1 1/2	0.2676	0.0643	0.0397	0.0316	0.025	0.0227	0.0208	0.0196	0.0185	0.0175	0.0168	0.0161	0.0154
2	0.3284	0.0711	0.0465	0.036	0.0304	0.0269	0.0245	0.0227	0.021	0.0199	0.0189	0.018	0.0173
2 1/2	0.3915	0.083	0.0535	0.0369	0.032	0.0287	0.0262	0.0241	0.0227	0.0215	0.0201	0.0194	0.0187
3	0.47	0.1056	0.0633	0.0477	0.0397	0.0346	0.0311	0.0283	0.0262	0.0245	0.0229	0.022	0.021
3 1/2													
4	0.5948	0.1257	0.0757	0.0575	0.0474	0.0409	0.036	0.033	0.0304	0.028	0.0264	0.0252	0.0241
5													
6													
7													
8													
10													
12	1.6064	0.2994	0.183	0.1344	0.1075	0.0905	0.0788	0.0701	0.0636	0.0582	0.054	0.0505	0.0474
14													
16													
18													
20													
22													
24													
26													
28													
30													
32													
34													
36													
38													
40													
Flat Surface Vertical													
Duct-Tank Flat Top													
Duct-Tank Flat Bottom													
Duct-Rect Horizontal													
Duct-Rect Vertical													
Tank Shell	0.4675	0.0947	0.0533	0.0372	0.0285	0.0231	0.0194	0.0168	0.0147	0.0131	0.0119	0.011	0.0101

I-Star Energy Solutions-Confidential

3E PLUS ENERGY TABLE: COST @ $/FT/YR

PROJECT NAME: Harrisburg-Capital Building

SYSTEM: Chilled Water

				Unit of Measure
BARE SURFACE EMITTANCE:	0.8	FUEL NAME:	Electricity	
PROCESS TEMP:	48 deg F	HEAT CONTENT:	3412	BTU per kwh
AMBIENT TEMP:	78 deg F	FUEL COST:	0.075546	US $ per kwh
WIND SPEED:	0 MPH	EFFICIENCY:	100%	
INSULATION LAYER 1:	1000F Mineral Fiber PIPE, Type IV, C547-11	OUTER JACKET MAT'L:	All Service Jacket	
		OUTER SURFACE EMITTANCE:	0.9	
		HOURS OF OPERATION:	8760	

PIPE SIZE	INSULATION THICKNESS												
	BARE	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1/4													
1/2	2.35	0.75	0.54	0.44	0.39	0.34	0.32	0.3	0.29	0.28	0.27	0.26	0.25
3/4	2.85	0.86	0.65	0.51	0.44	0.38	0.36	0.34	0.32	0.31	0.3	0.29	0.28
1													
1 1/4													
1 1/2													
2	5.87	1.54	1.02	0.8	0.67	0.6	0.54	0.5	0.47	0.44	0.42	0.4	0.39
2 1/2	6.99	1.79	1.18	0.82	0.71	0.64	0.58	0.54	0.5	0.48	0.45	0.43	0.42
3	8.37	2.27	1.39	1.05	0.88	0.77	0.69	0.63	0.58	0.55	0.51	0.49	0.47
3 1/2													
4													
5													
6													
7													
8													
10													
12													
14													
16													
18													
20													
22													
24													
26													
28													
30													
32													
34													
36													
38													
40													
Flat Surface Vertical													
Duct-Tank Flat Top													
Duct-Tank Flat Bottom													
Duct-Rect Horizontal													
Duct-Rect Vertical													
Tank Shell													

I-Star Energy Solutions-Confidential

3E PLUS ENERGY TABLE: HEAT LOSS(HOT SYSTEMS) HEAT GAIN (COLD SYSTEMS) @ KBTU/FT/YR

PROJECT NAME: Harrisburg-Capital Building

SYSTEM: Chilled Water

BARE SURFACE EMITTANCE: 0.8
PROCESS TEMP: 48 deg F
AMBIENT TEMP: 78 deg F
WIND SPEED: 0 MPH
INSULATION LAYER 1: 1000F Mineral Fiber PIPE, Type IV, C547-11

FUEL NAME: Electricity
HEAT CONTENT: 3412 BTU per kwh
FUEL COST: 0.075546 US $ per kwh
EFFICIENCY: 100%
OUTER JACKET MAT'L: All Service Jacket
OUTER SURFACE EMITTANCE: 0.9
HOURS OF OPERATION: 8760

PIPE SIZE	INSULATION THICKNESS												
	BARE	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1/4													
1/2	106	34	24	20	18	15	15	14	13	13	12	12	11
3/4	129	39	29	23	20	17	16	15	14	14	13	13	12
1													
1 1/4													
1 1/2													
2	265	69	46	36	30	27	25	23	21	20	19	18	17
2 1/2	316	81	53	37	32	29	26	24	23	22	20	19	19
3	378	103	63	48	40	35	31	28	26	25	23	22	21
3 1/2													
4													
5													
6													
7													
8													
10													
12													
14													
16													
18													
20													
22													
24													
26													
28													
30													
32													
34													
36													
38													
40													
Flat Surface Vertical													
Duct-Tank Flat Top													
Duct-Tank Flat Bottom													
Duct-Rect Horizontal													
Duct-Rect Vertical													
Tank Shell													

I-Star Energy Solutions-Confidential

3E PLUS ENERGY TABLE: SAVINGS @ $/FT/YR

PROJECT NAME: **Harrisburg-Capital Building**

SYSTEM: **Chilled Water**

BARE SURFACE EMITTANCE: 0.8
PROCESS TEMP: 48 deg F
AMBIENT TEMP: 78 deg F
WIND SPEED: 0 MPH
INSULATION LAYER 1: 1000F Mineral Fiber PIPE, Type IV, C547-11

FUEL NAME: Electricity
HEAT CONTENT: 3412 BTU per kwh
FUEL COST: 0.075546 US $ per kwh
EFFICIENCY: 100%
OUTER JACKET MAT'L: All Service Jacket
OUTER SURFACE EMITTANCE: 0.9
HOURS OF OPERATION: 8760

PIPE SIZE	INSULATION THICKNESS												
	BARE	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1/4	0	0	0	0	0	0	0	0	0	0	0	0	0
1/2	0	1.6	1.81	1.91	1.96	2.01	2.03	2.05	2.06	2.07	2.08	2.09	2.1
3/4	0	1.99	2.2	2.34	2.41	2.47	2.49	2.51	2.53	2.54	2.55	2.56	2.57
1	0	0	0	0	0	0	0	0	0	0	0	0	0
1 1/4	0	0	0	0	0	0	0	0	0	0	0	0	0
1 1/2	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	4.33	4.85	5.07	5.2	5.27	5.33	5.37	5.4	5.43	5.45	5.47	5.48
2 1/2	0	5.2	5.81	6.17	6.28	6.35	6.41	6.45	6.49	6.51	6.54	6.56	6.57
3	0	6.1	6.98	7.32	7.49	7.6	7.68	7.74	7.79	7.82	7.86	7.88	7.9
3 1/2	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0
32	0	0	0	0	0	0	0	0	0	0	0	0	0
34	0	0	0	0	0	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0	0	0	0	0	0
38	0	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0	0	0
Flat Surface Vertical	0	0	0	0	0	0	0	0	0	0	0	0	0
Duct-Tank Flat Top	0	0	0	0	0	0	0	0	0	0	0	0	0
Duct-Tank Flat Bottom	0	0	0	0	0	0	0	0	0	0	0	0	0
Duct-Rect Horizontal	0	0	0	0	0	0	0	0	0	0	0	0	0
Duct-Rect Vertical	0	0	0	0	0	0	0	0	0	0	0	0	0
Tank Shell	0	0	0	0	0	0	0	0	0	0	0	0	0

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3E PLUS ENVIRONMENT TABLE: CO2 @ LB/FT/YR

PROJECT NAME: Harrisburg-Capital Building

SYSTEM: Chilled Water

BARE SURFACE EMITTANCE: 0.8
PROCESS TEMP: 48 deg F
AMBIENT TEMP: 78 deg F
WIND SPEED: 0 MPH
INSULATION LAYER 1: 1000F Mineral Fiber PIPE, Type IV, C547-11

FUEL NAME: Electricity
HEAT CONTENT: 3412 BTU per kwh
FUEL COST: 0.075546 US $ per kwh
EFFICIENCY: 100%
OUTER JACKET MAT'L: All Service Jacket
OUTER SURFACE EMITTANCE: 0.9
HOURS OF OPERATION: 8760

PIPE SIZE	INSULATION THICKNESS												
	BARE	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1/4													
1/2	45.103	14.467	10.212	8.51	7.659	6.3825	6.3825	5.957	5.5315	5.5315	5.106	5.106	4.6805
3/4	54.8895	16.5945	12.3395	9.7865	8.51	7.2335	6.808	6.3825	5.957	5.957	5.5315	5.5315	5.106
1													
1 1/4													
1 1/2													
2	112.7575	29.3595	19.573	15.318	12.765	11.4885	10.6375	9.7865	8.9355	8.51	8.0845	7.659	7.2335
2 1/2	134.458	34.4655	22.5515	15.7435	13.616	12.3395	11.063	10.212	9.7865	9.361	8.51	8.0845	8.0845
3	160.839	43.8265	26.8065	20.424	17.02	14.8925	13.1905	11.914	11.063	10.6375	9.7865	9.361	8.9355
3 1/2													
4													
5													
6													
7													
8													
10													
12													
14													
16													
18													
20													
22													
24													
26													
28													
30													
32													
34													
36													
38													
40													
Flat Surface Vertical													
Duct-Tank Flat Top													
Duct-Tank Flat Bottom													
Duct-Rect Horizontal													
Duct-Rect Vertical													
Tank Shell													

I-Star Energy Solutions-Confidential

3E PLUS ENVIRONMENT TABLE: NOx @ LB/FT/YR

PROJECT NAME: Harrisburg-Capital Building

SYSTEM: Chilled Water

BARE SURFACE EMITTANCE: 0.8
PROCESS TEMP: 48 deg F
AMBIENT TEMP: 78 deg F
WIND SPEED: 0 MPH
INSULATION LAYER 1: 1000F Mineral Fiber PIPE, Type IV, C547-11

FUEL NAME: Electricity
HEAT CONTENT: 3412 BTU per kwh
FUEL COST: 0.075546 US $ per kwh
EFFICIENCY: 100%
OUTER JACKET MAT'L: All Service Jacket
OUTER SURFACE EMITTANCE: 0.9
HOURS OF OPERATION: 8760

PIPE SIZE	INSULATION THICKNESS												
	BARE	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1/4													
1/2	0.1007	0.0323	0.0228	0.019	0.0171	0.0142	0.0142	0.0133	0.0123	0.0123	0.0114	0.0114	0.0104
3/4	0.1225	0.037	0.0275	0.0218	0.019	0.0161	0.0152	0.0142	0.0133	0.0133	0.0123	0.0123	0.0114
1													
1 1/4													
1 1/2													
2	0.2517	0.0655	0.0437	0.0342	0.0285	0.0256	0.0237	0.0218	0.0199	0.019	0.018	0.0171	0.0161
2 1/2	0.3001	0.0769	0.0503	0.0351	0.0304	0.0275	0.0247	0.0228	0.0218	0.0209	0.019	0.018	0.018
3	0.359	0.0978	0.0598	0.0456	0.038	0.0332	0.0294	0.0266	0.0247	0.0237	0.0218	0.0209	0.0199
3 1/2													
4													
5													
6													
7													
8													
10													
12													
14													
16													
18													
20													
22													
24													
26													
28													
30													
32													
34													
36													
38													
40													
Flat Surface Vertical													
Duct-Tank Flat Top													
Duct-Tank Flat Bottom													
Duct-Rect Horizontal													
Duct-Rect Vertical													
Tank Shell													

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3E PLUS ENERGY TABLE: COST @ $/FT/YR

PROJECT NAME: Harrisburg-Capital Building

SYSTEM: Steam Condensate(60)

BARE SURFACE EMITTANCE: 0.8
PROCESS TEMP: 190 deg F
AMBIENT TEMP: 60 deg F
WIND SPEED: 0 MPH
INSULATION LAYER 1: 1000F Mineral Fiber PIPE, Type IV, C547-11

FUEL NAME: Steam
HEAT CONTENT: 1000 BTU per lb
FUEL COST: 24 US $ per Klbs
EFFICIENCY: 100%
OUTER JACKET MAT'L: All Service Jacket
OUTER SURFACE EMITTANCE: 0.9
HOURS OF OPERATION: 8760

PIPE SIZE	INSULATION THICKNESS												
	BARE	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1/4													
1/2	15.52	4.07	2.87	2.33	2.06	1.8	1.69	1.61	1.54	1.47	1.43	1.38	1.34
3/4													
1													
1 1/4													
1 1/2													
2													
2 1/2	46.83	9.72	6.28	4.34	3.75	3.36	3.07	2.82	2.65	2.51	2.37	2.27	2.19
3	56.21	12.39	7.43	5.59	4.65	4.06	3.64	3.3	3.07	2.88	2.7	2.57	2.47
3 1/2													
4													
5													
6	102.53	22.59	13.15	9.57	7.51	6.41	5.64	4.96	4.56	4.24	3.97	3.75	3.56
7													
8													
10													
12													
14													
16													
18													
20													
22													
24													
26													
28													
30													
32													
34													
36													
38													
40													
Flat Surface Vertical													
Duct-Tank Flat Top													
Duct-Tank Flat Bottom													
Duct-Rect Horizontal													
Duct-Rect Vertical													
Tank Shell													

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3E PLUS ENERGY TABLE: HEAT LOSS(HOT SYSTEMS) HEAT GAIN (COLD SYSTEMS) @ KBTU/FT/YR

PROJECT NAME: Harrisburg-Capital Building

SYSTEM: Steam Condensate(60)

BARE SURFACE EMITTANCE:	0.8		FUEL NAME:	Steam	
PROCESS TEMP:	190	deg F	HEAT CONTENT:	1000	BTU per lb
AMBIENT TEMP:	60	deg F	FUEL COST:	24	US $ per Klbs
WIND SPEED:	0	MPH	EFFICIENCY:	100%	
INSULATION LAYER 1:	1000F Mineral Fiber PIPE, Type IV, C547-11		OUTER JACKET MAT'L:	All Service Jacket	
			OUTER SURFACE EMITTANCE:	0.9	
			HOURS OF OPERATION:	8760	

PIPE SIZE	INSULATION THICKNESS												
	BARE	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1/4													
1/2	647	170	120	97	86	75	70	67	64	61	59	58	56
3/4													
1													
1 1/4													
1 1/2													
2													
2 1/2	1951	405	262	181	157	140	128	118	111	105	99	95	91
3	2342	517	310	233	194	169	152	138	128	120	112	107	103
3 1/2													
4													
5													
6	4272	941	548	399	313	267	235	207	190	177	166	156	149
7													
8													
10													
12													
14													
16													
18													
20													
22													
24													
26													
28													
30													
32													
34													
36													
38													
40													
Flat Surface Vertical													
Duct-Tank Flat Top													
Duct-Tank Flat Bottom													
Duct-Rect Horizontal													
Duct-Rect Vertical													
Tank Shell													

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3E PLUS ENERGY TABLE: SAVINGS @ $/FT/YR

PROJECT NAME: **Harrisburg-Capital Building**

SYSTEM: **Steam Condensate(60)**

BARE SURFACE EMITTANCE: 0.8
PROCESS TEMP: 190 deg F
AMBIENT TEMP: 60 deg F
WIND SPEED: 0 MPH
INSULATION LAYER 1: 1000F Mineral Fiber PIPE, Type IV, C547-11

FUEL NAME: Steam
HEAT CONTENT: 1000 BTU per lb
FUEL COST: 24 US $ per Klbs
EFFICIENCY: 100%
OUTER JACKET MAT'L: All Service Jacket
OUTER SURFACE EMITTANCE: 0.9
HOURS OF OPERATION: 8760

PIPE SIZE	INSULATION THICKNESS												
	BARE	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1/4	0	0	0	0	0	0	0	0	0	0	0	0	0
1/2	0	11.45	12.65	13.19	13.46	13.72	13.83	13.91	13.98	14.05	14.09	14.14	14.18
3/4	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0
1 1/4	0	0	0	0	0	0	0	0	0	0	0	0	0
1 1/2	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0
2 1/2	0	37.11	40.55	42.49	43.08	43.47	43.76	44.01	44.18	44.32	44.46	44.56	44.64
3	0	43.82	48.78	50.62	51.56	52.15	52.57	52.91	53.14	53.33	53.51	53.64	53.74
3 1/2	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	79.94	89.38	92.96	95.02	96.12	96.89	97.57	97.97	98.29	98.56	98.78	98.97
7	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0
32	0	0	0	0	0	0	0	0	0	0	0	0	0
34	0	0	0	0	0	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0	0	0	0	0	0
38	0	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0	0	0
Flat Surface Vertical	0	0	0	0	0	0	0	0	0	0	0	0	0
Duct-Tank Flat Top	0	0	0	0	0	0	0	0	0	0	0	0	0
Duct-Tank Flat Bottom	0	0	0	0	0	0	0	0	0	0	0	0	0
Duct-Rect Horizontal	0	0	0	0	0	0	0	0	0	0	0	0	0
Duct-Rect Vertical	0	0	0	0	0	0	0	0	0	0	0	0	0
Tank Shell	0	0	0	0	0	0	0	0	0	0	0	0	0

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3E PLUS ENVIRONMENT TABLE: CO2 @ LB/FT/YR

PROJECT NAME: Harrisburg-Capital Building

SYSTEM: Steam Condensate(60)

BARE SURFACE EMITTANCE: 0.8
PROCESS TEMP: 190 deg F
AMBIENT TEMP: 60 deg F
WIND SPEED: 0 MPH
INSULATION LAYER 1: 1000F Mineral Fiber PIPE, Type IV, C547-11

FUEL NAME: Steam
HEAT CONTENT: 1000 BTU per lb
FUEL COST: 24 US $ per Klbs
EFFICIENCY: 100%
OUTER JACKET MAT'L: All Service Jacket
OUTER SURFACE EMITTANCE: 0.9
HOURS OF OPERATION: 8760

PIPE SIZE	INSULATION THICKNESS												
	BARE	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1/4													
1/2	75.3949	19.8101	13.9836	11.3034	10.0216	8.7398	8.1571	7.8075	7.4579	7.1083	6.8753	6.7587	6.5257
3/4													
1													
1 1/4													
1 1/2													
2													
2 1/2	227.35	47.1946	30.5309	21.0919	18.2952	16.3142	14.9158	13.7505	12.9348	12.2356	11.5365	11.0704	10.6042
3	272.9133	60.246	36.1243	27.1515	22.6068	19.6936	17.7126	16.0811	14.9158	13.9836	13.0514	12.4687	12.0026
3 1/2													
4													
5													
6	497.8161	109.6547	63.8584	46.4955	36.4739	31.1135	27.3846	24.1217	22.1407	20.6258	19.344	18.1787	17.363
7													
8													
10													
12													
14													
16													
18													
20													
22													
24													
26													
28													
30													
32													
34													
36													
38													
40													
Flat Surface Vertical													
Duct-Tank Flat Top													
Duct-Tank Flat Bottom													
Duct-Rect Horizontal													
Duct-Rect Vertical													
Tank Shell													

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3E PLUS ENVIRONMENT TABLE: NOx @ LB/FT/YR

PROJECT NAME: Harrisburg-Capital Building

SYSTEM: Steam Condensate(60)

BARE SURFACE EMITTANCE: 0.8
PROCESS TEMP: 190 deg F
AMBIENT TEMP: 60 deg F
WIND SPEED: 0 MPH
INSULATION LAYER 1: 1000F Mineral Fiber PIPE, Type IV, C547-11

FUEL NAME: Steam
HEAT CONTENT: 1000 BTU per lb
FUEL COST: 24 US $ per Klbs
EFFICIENCY: 100%
OUTER JACKET MAT'L: All Service Jacket
OUTER SURFACE EMITTANCE: 0.9
HOURS OF OPERATION: 8760

PIPE SIZE	INSULATION THICKNESS												
	BARE	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
1/4													
1/2	0.1512	0.0397	0.028	0.0227	0.0201	0.0175	0.0164	0.0157	0.015	0.0143	0.0138	0.0136	0.0131
3/4													
1													
1 1/4													
1 1/2													
2													
2 1/2	0.456	0.0947	0.0612	0.0423	0.0367	0.0327	0.0299	0.0276	0.0259	0.0245	0.0231	0.0222	0.0213
3	0.5474	0.1208	0.0725	0.0545	0.0453	0.0395	0.0355	0.0323	0.0299	0.028	0.0262	0.025	0.0241
3 1/2													
4													
5													
6	0.9985	0.2199	0.1281	0.0933	0.0732	0.0624	0.0549	0.0484	0.0444	0.0414	0.0388	0.0365	0.0348
7													
8													
10													
12													
14													
16													
18													
20													
22													
24													
26													
28													
30													
32													
34													
36													
38													
40													
Flat Surface Vertical													
Duct-Tank Flat Top													
Duct-Tank Flat Bottom													
Duct-Rect Horizontal													
Duct-Rect Vertical													
Tank Shell													

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Preliminary Pipe Insulation Detail

Building	Floor	System	Size	Thick	Pipe	90s	45s	Tees	UCs	BVs	FPs	FVs	Strs	Ecaps	Rdcr	Bonnets	Traps	Inline Pumps	Centrifugal Pumps	Equipment
Central Plant	Tunnel	HPS High Pressure Steam	0.5	2.5	1	1				1										
Central Plant	Tunnel	HPS High Pressure Steam	0.75	2.5	15.5	20		6	8	11		1	4	1			4			
Central Plant	Tunnel	HPS High Pressure Steam	3	3	2	1						1								
Central Plant	Tunnel	HPS High Pressure Steam	8	3		1					3									
					18.5	**23**	**0**	**6**	**8**	**12**	**3**	**2**	**4**	**1**	**0**	**0**	**4**	**0**	**0**	
Central Plant	Tunnel North	HPS High Pressure Steam	0.5	2.5	0.5	1				1				1						
Central Plant	Tunnel North	HPS High Pressure Steam	0.75	2.5	3	4		3	2	3			1							
Central Plant	Tunnel North	HPS High Pressure Steam	1	2.5	1	1			1	1			1				1			
Central Plant	Tunnel North	HPS High Pressure Steam	3	3	40															
Central Plant	Tunnel North	HPS High Pressure Steam	4	3	26															
Central Plant	Tunnel North	HPS High Pressure Steam	6	3	46															
Central Plant	Tunnel North	HPS High Pressure Steam	10													1				
					116.5	**6**	**0**	**3**	**3**	**5**	**0**	**0**	**2**	**1**	**0**	**1**	**1**	**0**	**0**	
Central Plant	Tunnel South	HPS High Pressure Steam	0.5	2.5	12	8		4	4	4										
Central Plant	Tunnel South	HPS High Pressure Steam	0.75	2.5	2	11		5	8	12		1	5				2			
Central Plant	Tunnel South	HPS High Pressure Steam	5	3							4									
Central Plant	Tunnel South	HPS High Pressure Steam	6	3	3.5	1					1									
Central Plant	Tunnel South	HPS High Pressure Steam	8	3	2	2					3	1								
					19.5	**22**	**0**	**9**	**12**	**16**	**8**	**2**	**5**	**0**	**0**	**0**	**2**	**0**	**0**	
Damaged	CP Tunnel	HPS High Pressure Steam	6	3	15															
Damaged	East Wing N P2	LPS Low Pressure Steam	8	3							1			1						
Damaged	Main Cap sub bsmt	HHW Heating Hot Water	6	2		1					1									
Damaged	Main Cap sub bsmt	LPS Low Pressure Steam	16	3							1			1						
					15	**1**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	
B09	Heat Exchanger	HHW Heating Hot Water	8	2							1	7								
B09	Heat Exchanger	LPS Low Pressure Steam	6	3								3				4				Cond Rec 21" x 41" x 19 (1ea)
					0	**0**	**0**	**0**	**0**	**0**	**1**	**10**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	
B09	Pump Area	HHW Heating Hot Water	2.5	2	0.5						2									
B09	Pump Area	HHW Heating Hot Water	4	2		2					2	4	2						2	
B09	Pump Area	HHW Heating Hot Water	6	2	3															
B09	Pump Area	HHW Heating Hot Water	8	2	3	1		1				2			1					
					6.5	**3**	**0**	**1**	**0**	**0**	**4**	**6**	**2**	**0**	**1**	**0**	**0**	**0**	**2**	
East Wing	M 87 AHU 14	LPS Low Pressure Steam	0.75	2.5	4	8			4	4										
East Wing	M 87 AHU 14	LPS Low Pressure Steam	1.25	2.5	7.5	7		3	7	2										
East Wing	M 87 AHU 14	LPS Low Pressure Steam	2	3	2															
East Wing	M 87 AHU 14	LPS Low Pressure Steam	2.5	3	1.5	2					2									
					15	**17**	**0**	**3**	**11**	**6**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	
East Wing	N P2 Hang Htr 30	LPS Low Pressure Steam	1	2.5	1	1			1				1				1			
East Wing	N P2 Hang Htr 30	LPS Low Pressure Steam	2	3					1											
					1	**1**	**0**	**0**	**2**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	
East Wing	N P2 Steam Stat 1	HPS High Pressure Steam	1	2.5	0.5				1	1			1							
East Wing	N P2 Steam Stat 1	HPS High Pressure Steam	1.25	2.5	0.5				1							1				
East Wing	N P2 Steam Stat 1	HPS High Pressure Steam	1.5	3	2				2	1										
East Wing	N P2 Steam Stat 1	LPS Low Pressure Steam	1.5	3					1											
East Wing	N P2 Steam Stat 1	LPS Low Pressure Steam	2	3					1											
East Wing	N P2 Steam Stat 1	MPS Medium Pressure Steam	0.75	2.5	2	3			2	2			2				2			
East Wing	N P2 Steam Stat 1	MPS Medium Pressure Steam	1.25	2.5	0.5				1											
East Wing	N P2 Steam Stat 1	MPS Medium Pressure Steam	1.5	3	0.5				2											
East Wing	N P2 Steam Stat 1	MPS Medium Pressure Steam	2	3					1											
East Wing	N P2 Steam Stat 1	MPS Medium Pressure Steam	2.5	3	0.5	1						1								
East Wing	N P2 Steam Stat 1	MPS Medium Pressure Steam	6													2				
					6.5	**4**	**0**	**0**	**12**	**4**	**0**	**1**	**3**	**0**	**0**	**3**	**2**	**0**	**0**	
East Wing	N P2 Steam Stat 2	HPS High Pressure Steam	0.5	2.5					1				1				1			
East Wing	N P2 Steam Stat 2	HPS High Pressure Steam	0.75	2.5	0.5				2				1							
East Wing	N P2 Steam Stat 2	LPS Low Pressure Steam	2	3					1											
East Wing	N P2 Steam Stat 2	LPS Low Pressure Steam	4	3		1					1									
East Wing	N P2 Steam Stat 2	LPS Low Pressure Steam	8	3	0.5															
East Wing	N P2 Steam Stat 2	MPS Medium Pressure Steam	0.75	2.5	1				2	1			2			1	2			
East Wing	N P2 Steam Stat 2	MPS Medium Pressure Steam	2	3					1											
					2	**1**	**0**	**0**	**7**	**1**	**1**	**0**	**4**	**0**	**0**	**1**	**3**	**0**	**0**	

East Wing	N P2 Steam Stat 3	HHW Heating Hot Water	2	2	5	3		1	4										
East Wing	N P2 Steam Stat 3	HPS High Pressure Steam	0.75	2.5	0.5				1	2			1						
East Wing	N P2 Steam Stat 3	HPS High Pressure Steam	2	3	1		1		3	1									
East Wing	N P2 Steam Stat 3	HPS High Pressure Steam	3	3										1					
East Wing	N P2 Steam Stat 3	LPS Low Pressure Steam	0.75	2.5	0.5				1	1			1			1	1		
East Wing	N P2 Steam Stat 3	LPS Low Pressure Steam	1	2.5	0.5				1	1			1			1			
Building	**Floor**	**System**	**Size**	**Thick**	**Pipe**	**90s**	**45s**	**Tees**	**UCs**	**BVs**	**FPs**	**FVs**	**Strs**	**Ecaps**	**Rdcr**	**Bonnets**	**Traps**	**Inline Pumps**	**Centrifugal Pumps**	**Equipment**
East Wing	N P2 Steam Stat 3	LPS Low Pressure Steam	2	3	1.5	1			1	1									
East Wing	N P2 Steam Stat 3	LPS Low Pressure Steam	2.5													1			
East Wing	N P2 Steam Stat 3	MPS Medium Pressure Steam	0.75	2.5	4	4			8	8			4				4		
East Wing	N P2 Steam Stat 3	MPS Medium Pressure Steam	2	3					2										
East Wing	N P2 Steam Stat 3	MPS Medium Pressure Steam	4													1			
					13	**8**	**1**	**1**	**21**	**14**	**0**	**0**	**7**	**1**	**0**	**4**	**5**	**0**	**0**	
East Wing	North P2	DHW Domestic Hot Water	1.25	1					8				2						
East Wing	North P2	DHW Domestic Hot Water	1.5	1.5									2						
East Wing	North P2	DHW Domestic Hot Water	1.75	1.5														2	
East Wing	North P2	DHW Domestic Hot Water	2.5	1.5	1					1		3				2			Control valves
East Wing	North P2	DHW Domestic Hot Water	4	1.5							4	4							
					1	**0**	**0**	**0**	**8**	**1**	**4**	**7**	**4**	**0**	**0**	**2**	**0**	**2**	**0**	
East Wing	North P2 AHU	LPS Low Pressure Steam	1	2.5	0.5				1	1			1				1		
East Wing	North P2 AHU	LPS Low Pressure Steam	1.25	2.5						1									
East Wing	North P2 AHU	LPS Low Pressure Steam	2	3	4				4		8		4			4	4		
East Wing	North P2 AHU	LPS Low Pressure Steam	6	3	1									1					
					5.5	**0**	**0**	**0**	**5**	**2**	**8**	**0**	**5**	**1**	**0**	**4**	**5**	**0**	**0**	
East Wing	North P2 AHU 11	LPS Low Pressure Steam	0.75	2.5	1.5	1			2	1			1				1		
					1.5	**1**	**0**	**0**	**2**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	
East Wing	North P2 Elevator	HPS High Pressure Steam	6	3	1						1			1					
					1	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	
East Wing	North P2 MER	LPS Low Pressure Steam	0.75	2.5	1				1	1			1				1		
East Wing	North P2 MER	LPS Low Pressure Steam	2	3						1									
					1	**0**	**0**	**0**	**1**	**2**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	
East Wing	South P2	HHW Heating Hot Water	6	2								1							
East Wing	South P2	HHW Heating Hot Water	12	2								5							
East Wing	South P2	HPS High Pressure Steam	0.75	2.5	3	3		1	2	3			2				1		
East Wing	South P2	LPS Low Pressure Steam	0.5	2.5	0.5	1				1									
East Wing	South P2	LPS Low Pressure Steam	0.75	2.5	3	1			5	3			5			2	3		
East Wing	South P2	LPS Low Pressure Steam	1	2.5	3	3		1	2	2			2				2		
East Wing	South P2	LPS Low Pressure Steam	1.25	2.5					1										
East Wing	South P2	LPS Low Pressure Steam	2	3						1									
Building	**Floor**	**System**	**Size**	**Thick**	**Pipe**	**90s**	**45s**	**Tees**	**UCs**	**BVs**	**FPs**	**FVs**	**Strs**	**Ecaps**	**Rdcr**	**Bonnets**	**Traps**	**Inline Pumps**	**Centrifugal Pumps**	**Equipment**
East Wing	N P2 CHW Station	CHW Chilled Water	3	1.5														1		
					0	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	
Finance	Steam Room	BFW Boiler Feed Water	3	2	2	1					2	2								
Finance	Steam Room	BFW Boiler Feed Water	4	2	18	8		1				1								HX 12" D x 96" (2ea)
Finance	Steam Room	BFW Boiler Feed Water	12	2							2									
Finance	Steam Room	LPS Low Pressure Steam	0.75	2.5	3	9		1	3	3			3				4			
Finance	Steam Room	LPS Low Pressure Steam	1.25	2.5	4	12		2	2	1			2	2		6	3			
Finance	Steam Room	LPS Low Pressure Steam	1.5	3	1	1			1	1			1				1			
Finance	Steam Room	LPS Low Pressure Steam	2	3						1				1		2				
Finance	Steam Room	LPS Low Pressure Steam	3	3												1				
Finance	Steam Room	LPS Low Pressure Steam	4	3	2	4						9				1				FV is control valve
Finance	Steam Room	LPS Low Pressure Steam	8	3	2			1			1			1						
					32	**35**	**0**	**5**	**6**	**6**	**5**	**12**	**6**	**4**	**0**	**10**	**8**	**0**	**0**	
Main Capital	North Sub Bsmt	HPS High Pressure Steam	0.75	2.5	1				1	1			1							
Main Capital	North Sub Bsmt	HPS High Pressure Steam	2	3	1.5							2	1							PRV
Main Capital	North Sub Bsmt	HPS High Pressure Steam	2.5	3	1.5	1						2	1							PRV
Main Capital	North Sub Bsmt	HPS High Pressure Steam	6	3								3	1							PRV
Main Capital	North Sub Bsmt	LPS Low Pressure Steam	0.75	2.5	0.5				1	1			1				1			
Main Capital	North Sub Bsmt	LPS Low Pressure Steam	1.5	3	7.5	1		1	4								4			
Main Capital	North Sub Bsmt	LPS Low Pressure Steam	2.5	3								3	2							control valve
Main Capital	North Sub Bsmt	LPS Low Pressure Steam	3	3	0.5							3								control valve
Main Capital	North Sub Bsmt	LPS Low Pressure Steam	4	3	2						2									
Main Capital	North Sub Bsmt	LPS Low Pressure Steam	6	3	1.5						3			1		1				
Main Capital	North Sub Bsmt	LPS Low Pressure Steam	8	3	0.5						1			1						
Main Capital	North Sub Bsmt	MPS Medium Pressure Steam	0.75	2.5	1				2	2			2							
Main Capital	North Sub Bsmt	MPS Medium Pressure Steam	2	3	1							1								
Main Capital	North Sub Bsmt	MPS Medium Pressure Steam	2.5	3	1							1								
Main Capital	North Sub Bsmt	MPS Medium Pressure Steam	3	3	1							4	2							PRV
Main Capital	North Sub Bsmt	MPS Medium Pressure Steam	6	3								2	1							PRV
Building	**Floor**	**System**	**Size**	**Thick**	**Pipe**	**90s**	**45s**	**Tees**	**UCs**	**BVs**	**FPs**	**FVs**	**Strs**	**Ecaps**	**Rdcr**	**Bonnets**	**Traps**	**Inline Pumps**	**Centrifugal Pumps**	**Equipment**
Main Capital	N P2 Steam Stat 2	HPS High Pressure Steam	4	3												1				
Main Capital	N P2 Steam Stat 2	HPS High Pressure Steam	6	3												2				
					0	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	

Main Capital	N P2 Steam Stat 3	LPS Low Pressure Steam	1	1.5												1			
Main Capital	N P2 Steam Stat 3	HPS High Pressure Steam	6	3											1				
					0	0	0	0	0	0	0	0	0	0	1	1	0	0	
Main Capital	Sub Basement	BFW Boiler Feed Water	0.75	1.5	36	8			1										
Main Capital	Sub Basement	HHW Heating Hot Water	1.25	1.5	66	24													
Main Capital	Sub Basement	HHW Heating Hot Water	1.5	2	64	6				2									
Main Capital	Sub Basement	HHW Heating Hot Water	2	2	0.5					1		2		1					Control Valve
Main Capital	Sub Basement	HHW Heating Hot Water	2.5	2	61	3		2		2		1							
Main Capital	Sub Basement	HHW Heating Hot Water	3	2	1	1													
Main Capital	Sub Basement	HHW Heating Hot Water	4	2	3.5	1													
Main Capital	Sub Basement	HHW Heating Hot Water	6	2	3			2							2				
Main Capital	Sub Basement	LPS Low Pressure Steam	0.75	2.5	1	2			2	2			2			1			
Main Capital	Sub Basement	LPS Low Pressure Steam	1	2.5	2	2			2	3			2			1	2		
Main Capital	Sub Basement	LPS Low Pressure Steam	1.5	3	3	2				3						7			
Main Capital	Sub Basement	LPS Low Pressure Steam	2	3	7	3			2	4			3				2		
Main Capital	Sub Basement	LPS Low Pressure Steam	3													4			
Main Capital	Sub Basement	LPS Low Pressure Steam	4	3	1							2				2			PRV
Main Capital	Sub Basement	LPS Low Pressure Steam	6	3	0.5							1							
Main Capital	Sub Basement	LPS Low Pressure Steam	8	3	1							1	1						
					250.5	52	0	4	7	17	0	7	8	1	2	14	5	0	0	
Main Capital	Sub Bsmt Stm Stat	LPS Low Pressure Steam	0.75	2.5	0.5	1													
Main Capital	Sub Bsmt Stm Stat	LPS Low Pressure Steam	1.5	3	4	3			4	3					1		4		
Main Capital	Sub Bsmt Stm Stat	LPS Low Pressure Steam	2	3	4	3		1	1	4			2	2			3		
Main Capital	Sub Bsmt Stm Stat	LPS Low Pressure Steam	2.5	3								1							
Main Capital	Sub Bsmt Stm Stat	LPS Low Pressure Steam	3	3	0.5							4	2						
Main Capital	Sub Bsmt Stm Stat	LPS Low Pressure Steam	4	3		1					1	1				5			
Main Capital	Sub Bsmt Stm Stat	LPS Low Pressure Steam	6	3	0.5						1			1					
Main Capital	Sub Bsmt Stm Stat	LPS Low Pressure Steam	8	3	0.5						1			1					
					10	8	0	1	5	7	3	6	4	4	1	5	7	0	0	
North Office	B 31/33 Stm Statn	HPS High Pressure Steam	0.75	2.5	0.5					1			1						
North Office	B 31/33 Stm Statn	LPS Low Pressure Steam	0.75	2.5	4.5				5	4			5			1	5		
Building	**Floor**	**System**	**Size**	**Thick**	**Pipe**	**90s**	**45s**	**Tees**	**UCs**	**BVs**	**FPs**	**FVs**	**Strs**	**Ecaps**	**Rdcr**	**Bonnets**	**Traps**	**Inline Pumps**	**Centrifugal Pumps**	**Equipment**
North Office	B 31/33 Stm Statn	LPS Low Pressure Steam	1	2.5	4	5				1										
North Office	B 31/33 Stm Statn	LPS Low Pressure Steam	2	3	1			1		1				2						
					10	5	0	1	5	7	0	0	6	2	0	1	5	0	0	
North Office	Next to G16	HHW Heating Hot Water	0.75	1.5	3				4	2										BV is control valve
North Office	Next to G16	HHW Heating Hot Water	1.25	1.5		2			4	2			4					2		strainer bonnets
North Office	Next to G16	HHW Heating Hot Water	1.5	2	8	4		3	4	2	7	2						2		BV & FV are control valves
North Office	Next to G16	HHW Heating Hot Water	2	2	3				2			1						2		FV is control valve
North Office	Next to G16	HHW Heating Hot Water	2.5	2	1.5							18	2							
North Office	Next to G16	HHW Heating Hot Water	4	2	4	2		2			2	15	2	2					2	FV is control valve
North Office	Next to G16	HHW Heating Hot Water	6	2	0.5						2	1								
North Office	Next to G16	LPS Low Pressure Steam	1.5	3	1.5	2		1	4	1		3	1			1	2			Control valve
North Office	Next to G16	LPS Low Pressure Steam	2.5	3	6															
North Office	Next to G16	LPS Low Pressure Steam	4													4				
North Office	Next to G16	LPS Low Pressure Steam	6	3							1									
North Office	Next to G16	LPS Low Pressure Steam	15	3							1									
					27.5	10	0	6	18	7	13	40	9	2	0	5	2	6	2	
South Office	B01 Converter Area	BFW Boiler Feed Water	1.5	2	1				2			2								Control valves
South Office	B01 Converter Area	LPS Low Pressure Steam	0.75	2.5	2.5	3		1	2	3			1				1			
South Office	B01 Converter Area	LPS Low Pressure Steam	1	2.5	0.5															
South Office	B01 Converter Area	LPS Low Pressure Steam	1.25	2.5	3	3		2	2	4			2				2			
South Office	B01 Converter Area	LPS Low Pressure Steam	1.5	3	0.5			1												
South Office	B01 Converter Area	LPS Low Pressure Steam	2	3	15	7		1	3	5		3								Tank 12" x 72" (1ea)
South Office	B01 Converter Area	LPS Low Pressure Steam	2.5	3	1.5	1			3	1										
South Office	B01 Converter Area	LPS Low Pressure Steam	6	3	1						2			2						
South Office	B01 Converter Area	LPS Low Pressure Steam	8	3								2								
South Office	B01 Converter Area	LPS Low Pressure Steam	10	3							2									
					25	14	0	5	12	13	4	7	3	2	0	0	3	0	0	
South Office	B01-HEX Area	HHW Heating Hot Water	8	2								2								
South Office	B01-HEX Area	LPS Low Pressure Steam	1.25	2.5	1					1										
South Office	B01-HEX Area	LPS Low Pressure Steam	2	3	2.5	3		1	2	2			2				2			
South Office	B01-HEX Area	LPS Low Pressure Steam	3	3												2				
Building	**Floor**	**System**	**Size**	**Thick**	**Pipe**	**90s**	**45s**	**Tees**	**UCs**	**BVs**	**FPs**	**FVs**	**Strs**	**Ecaps**	**Rdcr**	**Bonnets**	**Traps**	**Inline Pumps**	**Centrifugal Pumps**	**Equipment**
South Office	B01-HEX Area	LPS Low Pressure Steam	4	3	2						2			2						
South Office	B01-HEX Area	LPS Low Pressure Steam	8	3	1						2									
South Office	B01-HEX Area	LPS Low Pressure Steam	10	3	1						2									
South Office	B01-HEX Area	LPS Low Pressure Steam	20	3							4			2						
					7.5	3	0	1	2	3	10	2	2	4	0	2	2	0	0	

South Office	B01-HHW Pump 6-7	HHW Heating Hot Water	1.5	2		1	1			2									
South Office	B01-HHW Pump 6-7	HHW Heating Hot Water	4	2	3						12	13	2	2				2	1 FV is Control valve
South Office	B01-HHW Pump 6-7	HHW Heating Hot Water	8	2	0.5						1	2							
					3.5	**1**	**1**	**0**	**0**	**2**	**13**	**15**	**2**	**2**	**0**	**0**	**0**	**0**	**2**	
South Office	B01-HHW Pump Area	HHW Heating Hot Water	2	2			1			1									
South Office	B01-HHW Pump Area	HHW Heating Hot Water	6	2								2	1			1			2	
					0	**0**	**1**	**0**	**0**	**1**	**0**	**2**	**1**	**0**	**0**	**1**	**0**	**0**	**2**	
South Office	B01-MER Middle Room	HHW Heating Hot Water	4	2								1							
South Office	B01-MER Middle Room	HHW Heating Hot Water	6	2	1.5	1		1			5	4							Control valve
South Office	B01-MER Middle Room	HHW Heating Hot Water	8	2								1							
					1.5	**1**	**0**	**1**	**0**	**0**	**5**	**6**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	
South Office	Fan Room-AC 1	CHW Chilled Water	2.5	1.5	0.5							2							
South Office	Fan Room-AC 1	HHW Heating Hot Water	1.5	2					6							3			
					0.5	**0**	**0**	**0**	**6**	**0**	**0**	**2**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	
South Office	Fan Room-AC 2	CHW Chilled Water	2.5	1.5	1.5							3							
South Office	Fan Room-AC 2	HHW Heating Hot Water	1.5	2					6							3			
					1.5	**0**	**0**	**0**	**6**	**0**	**0**	**3**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	
Forum	MER	LPS Low Pressure Steam	0.5	2.5	1	2			2				1				2		
Forum	MER	LPS Low Pressure Steam	0.75	2.5	6	4			3				3				5		
Forum	MER	LPS Low Pressure Steam	1	2.5	3	2			1							1	2		
Forum	MER	LPS Low Pressure Steam	1.5	3	2	1													
Forum	MER	LPS Low Pressure Steam	2	3				1	2			1							
Forum	MER	LPS Low Pressure Steam	2.5	3												1			
Forum	MER	LPS Low Pressure Steam	3	3							1	1				1			
Forum	MER	LPS Low Pressure Steam	6	3	1							1							
Forum	MER	LPS Low Pressure Steam	8	3	1							1							
					14	**9**	**0**	**1**	**8**	**0**	**1**	**4**	**4**	**0**	**0**	**3**	**9**	**0**	**0**	
PJC	HHW Area	HHW Heating Hot Water	6	2							2	3							2	
PJC	HHW Area	HHW Heating Hot Water	10	2	2									2						
PJC	HHW Area	LPS Low Pressure Steam	2	3	1				1	1			1				1			
PJC	STC Area	LPS Low Pressure Steam	0.75	2.5	1				1								1			
PJC	STM Station 1	HPS High Pressure Steam	0.75	2.5	1			2									1			
PJC	STM Station 1	HPS High Pressure Steam	1	2.5						1						1				
PJC	STM Station 1	HPS High Pressure Steam	6	3	1						1	1				3				
PJC	STM Station 1	LPS Low Pressure Steam	0.75	2.5	1				1							1				
PJC	STM Station 1	LPS Low Pressure Steam	4	3								2	1			1				
PJC	STM Station 1	LPS Low Pressure Steam	6	3								1				2				
PJC	STM Station 2	LPS Low Pressure Steam	0.75	2.5					2							2	2			
PJC	STM Station 2	LPS Low Pressure Steam	2	3	1						2									
PJC	STM Station 2	LPS Low Pressure Steam	6	3								1				3				
					8	**0**	**0**	**2**	**5**	**2**	**5**	**8**	**2**	**2**	**0**	**13**	**5**	**0**	**2**	

APPENDIX B

Window Film Savings Analysis

ECM ANALYSIS: APPLICATION OF SOLAR CONTROL FILM

LABOR & INDUSTRY

ENVELOPE HEAT TRANSFER CHARACTERISTICS - WINDOWS

Window Opening & Crack Dimensions							Window Counts by Type					
window inventory		dims (in) W x H	area (sf)	crack multiplier	crack depth (inch)	crack (sf)	CATBDε½"	CATBDε½"	CATBDε½"-	CATBDε½"-	CATBDε½"-	CATBDε½"-
LI "TB"	Graboyes	28 x 69	13.4	W•0 H•0	0	0.0	66				-66	
LI "T"	Graboyes	28 x 69	13.4	W•0 H•0	0	0.0	1080				-1080	
LI "WA"	Graboyes	mulled unit	143.7	W•1 H•0	0	0.0		14				-14
						total area of opening (sf)	15376	2012	0	0	-15376	-2012
						code	Traco DP TR-7100	Traco DP TR-7100	CATBDε½"-	CATBDε½"-	Traco TR-7100 filmed	Traco TR-7100 filmed
						U-value of product (Btu / hr / sf / °F)	0.380	0.380	0.460	0.460	0.354	0.354
						heat transfer due to conduction (Btu / hr / °F)	5842.7	764.6	0.0	0.0	-5449.4	-713.1

subtotal conduction heat transfer rate for openings detailed above (Btu / hr / °F) **444.7**

Heat Transfer: slab, below grade wall, windows

	perimeter LF*	U or F2 Btu / hr / °F / sf	area SF	rate Btu / hr / °F	
slab				-	Btu / hr / °F
below grade wall				-	Btu / hr / °F
window		445	1	445	Btu / hr / °F
window				-	Btu / hr / °F
subtotal conduction heat transfer rate for slab, below grade wall and windows defined above				445	**Btu / hr / °F**
GRAND TOTAL CONDUCTION HEAT TRANSFER RATE - AFFECTED COMPONENTS				445	**Btu / hr / °F**

ECM ANALYSIS: APPLICATION OF SOLAR CONTROL FILM

LABOR & INDUSTRY

Heating System Calculations - OCCUPIED SEQUENCE HOURS ONLY

OA bin average Temp ˚F	heating season hrs/yr	interior balance temp ˚F	Instantaneous Heat Output in mBh: envelope gains infiltrat'n	Instantaneous Heat Output in mBh: envelope gains conduct'n	Instantaneous Heat Output in mBh: subtotal loads	estimated generation efficiency	internal gain adjust	Heat Load (mmBtu / yr): envelope gains infiltrat'n	Heat Load (mmBtu / yr): envelope gains condct'n	Heat Load (mmBtu / yr): subtotal loads
52.5	219.1	55		1	1	100%	100%		0.2	0
47.5	200.7	55		3	3	100%	100%		0.7	1
42.5	234.5	55		6	6	100%	100%		1.3	1
37.5	319.3	55		8	8	100%	100%		2.5	2
32.5	250.0	55		10	10	100%	100%		2.5	3
27.5	136.6	55		12	12	100%	100%		1.7	2
22.5	96.6	55		14	14	100%	100%		1.4	1
17.5	58.6	55		17	17	100%	100%		1.0	1
12.5	19.6	55		19	19	100%	100%		0.4	0
7.5	2.0	55		21	21	100%	100%		0.0	0
2.5	0.0	55		23	23	100%	100%		0.0	0
							subtotals:	0	11.7	11.7

* internal gains include electric space heat & electric humidification, as well as interior lighting, plug loads and personnel

pro-rated average seasonal efficiency: 100%

Heating System Calculations - UNOCCUPIED SEQUENCE HOURS ONLY

OA bin average Temp ˚F	heating season hrs/yr	interior balance temp ˚F	Instantaneous Heat Output in mBh: envelope gains infiltrat'n	Instantaneous Heat Output in mBh: envelope gains conduct'n	Instantaneous Heat Output in mBh: subtotal loads	estimated generation efficiency	internal gain adjust	Heat Load (mmBtu / yr): envelope gains infiltrat'n	Heat Load (mmBtu / yr): envelope gains condct'n	Heat Load (mmBtu / yr): subtotal loads
52.5	401.9	63		5	5	100%	100%		1.9	2
47.5	335.3	63		7	7	100%	100%		2.3	2
42.5	436.5	63		9	9	100%	100%		4.0	4
37.5	610.7	63		11	11	100%	100%		6.9	7
32.5	493.0	63		14	14	100%	100%		6.7	7
27.5	340.4	63		16	16	100%	100%		5.4	5
22.5	204.4	63		18	18	100%	100%		3.7	4
17.5	152.4	63		20	20	100%	100%		3.1	3
12.5	63.4	63		22	22	100%	100%		1.4	1
7.5	6.0	63		25	25	100%	100%		0.1	0
2.5	0.0	63		27	27	100%	100%		0.0	0
							subtotals:	0	35.5	35.5

* internal gains include electric space heat & electric humidification, as well as interior lighting, plug loads and personnel

pro-rated average seasonal efficiency: 100%

ECM ANALYSIS: APPLICATION OF SOLAR CONTROL FILM

LABOR & INDUSTRY

LABOR & INDUSTRY ZONES WITH INTERNAL SHADING — *COOLING IMPACT DUE TO FILM APPLICATION*

Orientation & AM data set	PM data set	Shading Coefficient (SC) existing coating etc	Shading Coefficient (SC) existing exterior & interior	Shading Coefficient (SC) proposed coating etc	Shading Coefficient (SC) proposed exterior & interior	project window area (sf)	Solar Gain 40° North Latitude — Solar Gain (Btu / sf) summer peak hour AM	summer peak hour PM	summer total AM	summer total PM	Cooling Savings Peak Load (tons)	Cooling Savings Annual Energy (ton·hr/yr)
ENE	WNW		0.39		0.10	614	198	40	133220	27719	3.0	2400
SSE	SSW		0.39		0.10	10474	209	185	133650	58764	53.2	48958
					TOTALS / MAX:	11088					53.2	51358

LABOR & INDUSTRY ZONES WITH NO INTERNAL SHADING — *COOLING IMPACT DUE TO FILM APPLICATION*

Orientation & AM data set	PM data set	Shading Coefficient (SC) existing coating etc	Shading Coefficient (SC) existing exterior & interior	Shading Coefficient (SC) proposed coating etc	Shading Coefficient (SC) proposed exterior & interior	project window area (sf)	Solar Gain 40° North Latitude — Solar Gain (Btu / sf) summer peak hour AM	summer peak hour PM	summer total AM	summer total PM	Cooling Savings Peak Load (tons)	Cooling Savings Annual Energy (ton·hr/yr)
ENE	WNW	0.59		0.15		1398	198	40	133220	27719	10.2	8269
SSE	SSW	0.59		0.15		4902	209	185	133650	58764	37.6	34662
					TOTALS / MAX:	6300					37.6	42931
					TOTALS / MAX [SHADED & UNSHADED AREAS COMBINED]:	17388					90.8	94289

ASHRAE Fundamentals indicates SC values for fenestration with internal shading devices.

Table 26 below is excerpted from 1989 ASHRAE Fundamentals page 27.31:

Table 26 Shading Coefficients for Insulating Glass[a] with Indoor Shading by Venetian Blinds or Roller Shades

Type of Glass	Nominal Thickness, Each Light	Solar Trans.[b] Outer Pane	Solar Trans.[b] Inner Pane	Type of Shading: Venetian Blinds[c] Medium	Venetian Blinds[c] Light	Roller Shade: Opaque Dark	Roller Shade: Opaque White	Roller Shade: Translucent Light
Clear Out Clear In	3/32, 1/8 in.	0.87	0.87	0.62[d] (0.63)[e]	0.58[d] (0.58)[e]	0.71	0.35	0.40
Clear In	1/4 in.	0.80	0.80					
Heat-Absorbing[f] Out Clear In	1/4 in.	0.46	0.80	0.39	0.36	0.40	0.22	0.30
Reflective Coated Glass SC[g]= 0.20				0.19	0.18			
0.30				0.27	0.26			
0.40				0.34	0.33			

[a]Refers to factory-fabricated units with 3/16, 1/4, or 1/2-in. air space, or to prime windows plus storm windows.
[b]Refer to manufacturer's literature for exact values.
[c]For vertical blinds with opaque white or beige louvers, tightly closed, SC is approximately the same as for opaque white roller shades.
[d]From Van Dyck and Konen (1982), For 45° open venetian blinds, 35° solar incidence, and 35° profile angle
[e]Values for closed venetian blinds. Use these values only when operation is automated for solar gain reduction (as opposed to daylight use).
[f]Refers to bronze, or green tinted, heat-absorbing glass.
[g]SC for glass with no shading device.

Table 20 (right) is excerpted from 1989 ASHRAE Fundamentals page 27.26:

Table 20 Shading Coefficients for Single Glass and Insulating Glass[a]

Type of Glass	Nominal Thickness[b]	Solar Trans.[b]	Shading Coefficient h_o=4.0	Shading Coefficient h_o=3.0
A. Single Glass				
Clear	1/8 in.	0.86	1.00	1.00
	1/4 in.	0.78	0.94	0.95
	3/8 in.	0.72	0.90	0.92
	1/2 in.	0.67	0.87	0.88
Heat Absorbing	1/8 in.	0.64	0.83	0.85
	1/4 in.	0.46	0.69	0.73
	3/8 in.	0.33	0.60	0.64
	1/2 in.	0.24	0.53	0.58
B. Insulating Glass				
Clear Out, Clear In	1/8 in.[c]	0.71[e]	0.88	0.88
Clear Out, Clear In	1/4 in.	0.61	0.81	0.82
Heat Absorbing[d] Out, Clear In	1/4 in.	0.36	0.55	0.58

[a]Refers to factory-fabricated units with 3/16, 1/4, or 1/2-in. air space or to prime windows plus storm sash.
[b]Refer to manufacturer's literature for values.
[c]Thickness of each pane of glass, not thickness of assembled unit.
[d]Refers to gray, bronze, and green tinted heat-absorbing float glass.
[e]Combined transmittance for assembled unit.

ECM ANALYSIS: APPLICATION OF SOLAR CONTROL FILM

LABOR & INDUSTRY

Solar Intensity and Solar Heat Gain Factors for 40° North Latitude - For Calculating Window Savings Associated with a Change in Shading

Half Day Totals

	WINTER (HEATING)				SUMMER (COOLING)						WINTER (HEATING)	
Days	31	28	31	30	31	30	31	31	30	31	30	31
	JAN	FEB	MAR	APR	MAY	JUN	JULY	AUG	SEP	OCT	NOV	DEC
DIRECT NORMAL	1238	1450	1612	1692	1722	1730	1668	1599	1499	1374	1217	1132
E	452	648	832	957	1024	1038	1008	928	787	623	445	374
ENE	199	361	563	758	893	941	885	741	534	351	198	146
ESE	734	916	1035	1051	1025	999	1003	1013	980	878	721	649
HORI-ZONTAL	354	578	794	957	1083	1126	1076	946	738	540	354	282
N	61	84	114	154	215	253	223	164	119	88	63	52
NE	73	152	302	501	666	734	666	498	291	152	75	56
NNE	61	86	139	265	404	470	411	273	142	89	63	52
NNW	61	84	113	147	175	188	181	156	118	88	63	525
NW	61	84	113	147	174	186	180	156	118	88	63	52
S	813	821	694	488	358	315	352	474	672	491	798	775
SE	904	1049	1087	994	881	818	858	956	1033	1006	887	822
SSE	932	1015	968	782	601	523	584	751	925	974	914	867
SSW	561	508	403	296	247	236	248	296	396	493	551	557
SW	273	250	220	199	200	204	204	205	222	247	269	276
W	62	85	114	148	176	188	181	157	119	89	63	53
WNW	61	84	113	147	175	187	180	156	118	88	63	52
WSW	101	114	132	157	180	191	186	166	137	117	101	94

ECM ANALYSIS: APPLICATION OF SOLAR CONTROL FILM

HEALTH & WELFARE

ENVELOPE HEAT TRANSFER CHARACTERISTICS - WINDOWS

Window Opening & Crack Dimensions							Window Counts by Type					
window inventory		dims (in) W x H	area (sf)	crack multiplier	crack depth (inch)	crack (sf)						
HW "H"	Graboyes	29 x 57	11.5	W•0 H•0	0	0.0	612				-612	
					total area of opening (sf)		7025	0	0	0	-7025	0
					code		Traco DP TR-7100				Traco TR-7100 filmed	
					U-value of product (Btu / hr / sf / ˚F)		0.380	0.380	0.460	0.460	0.354	0.354
					heat transfer due to conduction (Btu / hr / ˚F)		2669.6	0.0	0.0	0.0	-2489.9	0.0
						subtotal conduction heat transfer rate for openings detailed above (Btu / hr / ˚F)						**179.7**

Heat Transfer: slab, below grade wall, windows

	perimeter LF*	U or F2 Btu / hr / ˚F / sf	area SF	rate Btu / hr / ˚F	
slab				-	Btu / hr / ˚F
below grade wall				-	Btu / hr / ˚F
window		180	1	180	Btu / hr / ˚F
window				-	Btu / hr / ˚F
subtotal conduction heat transfer rate for slab, below grade wall and windows defined above				180	**Btu / hr / ˚F**
GRAND TOTAL CONDUCTION HEAT TRANSFER RATE - AFFECTED COMPONENTS				180	**Btu / hr / ˚F**

ECM ANALYSIS: APPLICATION OF SOLAR CONTROL FILM

HEALTH & WELFARE

Heating System Calculations - OCCUPIED SEQUENCE HOURS ONLY

OA bin average Temp ˚F	heating season hrs/yr	interior balance temp ˚F	Instantaneous Heat Output in mBh			estimated generation efficiency	internal gain adjust	Heat Load (mmBtu / yr)		
			envelope gains		subtotal loads			envelope gains		subtotal loads
			infiltrat'n	conduct'n				infiltrat'n	condct'n	
52.5	219.1	55		0	0	100%	100%		0.1	0
47.5	200.7	55		1	1	100%	100%		0.3	0
42.5	234.5	55		2	2	100%	100%		0.5	1
37.5	319.3	55		3	3	100%	100%		1.0	1
32.5	250.0	55		4	4	100%	100%		1.0	1
27.5	136.6	55		5	5	100%	100%		0.7	1
22.5	96.6	55		6	6	100%	100%		0.6	1
17.5	58.6	55		7	7	100%	100%		0.4	0
12.5	19.6	55		8	8	100%	100%		0.2	0
7.5	2.0	55		9	9	100%	100%		0.0	0
2.5	0.0	55		9	9	100%	100%		0.0	0
							subtotals:	0	4.7	4.7

* internal gains include electric space heat & electric humidification, as well as interior lighting, plug loads and personnel

pro-rated average seasonal efficiency: 100%

Heating System Calculations - UNOCCUPIED SEQUENCE HOURS ONLY

OA bin average Temp ˚F	heating season hrs/yr	interior balance temp ˚F	Instantaneous Heat Output in mBh			estimated generation efficiency	internal gain adjust	Heat Load (mmBtu / yr)		
			envelope gains		subtotal loads			envelope gains		subtotal loads
			infiltrat'n	conduct'n				infiltrat'n	condct'n	
52.5	401.9	63		2	2	100%	100%		0.8	1
47.5	335.3	63		3	3	100%	100%		0.9	1
42.5	436.5	63		4	4	100%	100%		1.6	2
37.5	610.7	63		5	5	100%	100%		2.8	3
32.5	493.0	63		5	5	100%	100%		2.7	3
27.5	340.4	63		6	6	100%	100%		2.2	2
22.5	204.4	63		7	7	100%	100%		1.5	1
17.5	152.4	63		8	8	100%	100%		1.2	1
12.5	63.4	63		9	9	100%	100%		0.6	1
7.5	6.0	63		10	10	100%	100%		0.1	0
2.5	0.0	63		11	11	100%	100%		0.0	0
							subtotals:	0	14.3	14.3

* internal gains include electric space heat & electric humidification, as well as interior lighting, plug loads and personnel

pro-rated average seasonal efficiency: 100%

ECM ANALYSIS: APPLICATION OF SOLAR CONTROL FILM

HEALTH & WELFARE

LABOR & INDUSTRY ZONES WITH INTERNAL SHADING — *COOLING IMPACT DUE TO FILM APPLICATION*

Orientation & AM data set	PM data set	Shading Coefficient (SC)				project window area (sf)	Solar Gain 40° North Latitude				Cooling Savings	
		existing		proposed			Solar Gain (Btu / sf)				Peak Load (tons)	Annual Energy (ton·hr/yr)
		coating etc	exterior & interior	coating etc	exterior & interior		summer peak hour		summer total			
							AM	PM	AM	PM		
SSE	SSW		0.39		0.10	4637	209	185	133650	58764	23.5	21673
TOTALS / MAX:						4637					23.5	21673

LABOR & INDUSTRY ZONES WITH NO INTERNAL SHADING — *COOLING IMPACT DUE TO FILM APPLICATION*

Orientation & AM data set	PM data set	Shading Coefficient (SC)				project window area (sf)	Solar Gain 40° North Latitude				Cooling Savings	
		existing		proposed			Solar Gain (Btu / sf)				Peak Load (tons)	Annual Energy (ton·hr/yr)
		coating etc	exterior & interior	coating etc	exterior & interior		summer peak hour		summer total			
							AM	PM	AM	PM		
SSE	SSW	0.59		0.15		2389	209	185	133650	58764	18.3	16891
TOTALS / MAX:						2389					18.3	16891
TOTALS / MAX [SHADED & UNSHADED AREAS COMBINED]:						7025					41.9	38564

ASHRAE Fundamentals indicates SC values for fenestration with internal shading devices.

Table 26 below is excerpted from 1989 ASHRAE Fundamentals page 27.31:

Table 26 Shading Coefficients for Insulating Glass[a] with Indoor Shading by Venetian Blinds or Roller Shades

Type of Glass	Nominal Thickness, Each Light	Solar Trans.[b] Outer Pane	Solar Trans.[b] Inner Pane	Type of Shading: Venetian Blinds[c] Medium	Venetian Blinds[c] Light	Roller Shade: Opaque Dark	Roller Shade: Opaque White	Roller Shade: Translucent Light
Clear Out Clear In	3/32, 1/8 in.	0.87	0.87	0.62[d] (0.63)[e]	0.58[d] (0.58)[e]	0.71	0.35	0.40
Clear In Clear In	1/4 in.	0.80	0.80					
Heat-Absorbing[f] Out Clear In	1/4 in.	0.46	0.80	0.39	0.36	0.40	0.22	0.30
Reflective Coated Glass SC[g]= 0.20				0.19	0.18			
0.30				0.27	0.26			
0.40				0.34	0.33			

[a]Refers to factory-fabricated units with 3/16, 1/4, or 1/2-in. air space, or to prime windows plus storm windows.
[b]Refer to manufacturer's literature for exact values.
[c]For vertical blinds with opaque white or beige louvers, tightly closed, SC is approximately the same as for opaque white roller shades.
[d]From Van Dyck and Konen (1982), For 45° open venetian blinds, 35° solar incidence, and 35° profile angle
[e]Values for closed venetian blinds. Use these values only when operation is automated for solar gain reduction (as opposed to daylight use).
[f]Refers to bronze, or green tinted, heat-absorbing glass.
[g]SC for glass with no shading device.

Table 20 (right) is excerpted from 1989 ASHRAE Fundamentals page 27.26:

Table 20 Shading Coefficients for Single Glass and Insulating Glass[a]

Type of Glass	Nominal Thickness[b]	Solar Trans.[b]	Shading Coefficient h_o=4.0	Shading Coefficient h_o=3.0
A. Single Glass				
Clear	1/8 in.	0.86	1.00	1.00
	1/4 in.	0.78	0.94	0.95
	3/8 in.	0.72	0.90	0.92
	1/2 in.	0.67	0.87	0.88
Heat Absorbing	1/8 in.	0.64	0.83	0.85
	1/4 in.	0.46	0.69	0.73
	3/8 in.	0.33	0.60	0.64
	1/2 in.	0.24	0.53	0.58
B. Insulating Glass				
Clear Out, Clear In	1/8 in.[c]	0.71[e]	0.88	0.88
Clear Out, Clear In	1/4 in.	0.61	0.81	0.82
Heat Absorbing[d] Out, Clear In	1/4 in.	0.36	0.55	0.58

[a]Refers to factory-fabricated units with 3/16, 1/4, or 1/2-in. air space or to prime windows plus storm sash.
[b]Refer to manufacturer's literature for values.
[c]Thickness of each pane of glass, not thickness of assembled unit.
[d]Refers to gray, bronze, and green tinted heat-absorbing float glass.
[e]Combined transmittance for assembled unit.

ECM ANALYSIS: APPLICATION OF SOLAR CONTROL FILM

HEALTH & WELFARE

Solar Intensity and Solar Heat Gain Factors for 40° North Latitude - For Calculating Window Savings Associated with a Change in Shading

Half Day Totals

	WINTER (HEATING)				SUMMER (COOLING)						WINTER (HEATING)	
Days	31	28	31	30	31	30	31	31	30	31	30	31
	JAN	FEB	MAR	APR	MAY	JUN	JULY	AUG	SEP	OCT	NOV	DEC
DIRECT NORMAL	1238	1450	1612	1692	1722	1730	1668	1599	1499	1374	1217	1132
E	452	648	832	957	1024	1038	1008	928	787	623	445	374
ENE	199	361	563	758	893	941	885	741	534	351	198	146
ESE	734	916	1035	1051	1025	999	1003	1013	980	878	721	649
HORI-ZONTAL	354	578	794	957	1083	1126	1076	946	738	540	354	282
N	61	84	114	154	215	253	223	164	119	88	63	52
NE	73	152	302	501	666	734	666	498	291	152	75	56
NNE	61	86	139	265	404	470	411	273	142	89	63	52
NNW	61	84	113	147	175	188	181	156	118	88	63	525
NW	61	84	113	147	174	186	180	156	118	88	63	52
S	813	821	694	488	358	315	352	474	672	491	798	775
SE	904	1049	1087	994	881	818	858	956	1033	1006	887	822
SSE	932	1015	968	782	601	523	584	751	925	974	914	867
SSW	561	508	403	296	247	236	248	296	396	493	551	557
SW	273	250	220	199	200	204	204	205	222	247	269	276
W	62	85	114	148	176	188	181	157	119	89	63	53
WNW	61	84	113	147	175	187	180	156	118	88	63	52
WSW	101	114	132	157	180	191	186	166	137	117	101	94

APPENDIX C

Discussion of Labor and Industry Building Cooling Capacity Issues

The Labor & Industry building experiences high internal humidity and cannot maintain interior air-conditioning setpoints on warm and hot days. Symptoms generally begin to appear as the temperature outdoors rises above 76°F-77°F. As a rule, HVAC equipment schedules are overridden hot weather, running around the clock to remove as much of the excess heat and humidity from the building as possible.

TEN's audit indicates several causes for the inability of the existing chilled water configuration to satisfy latent and sensible loads during very warm summer weather.

- Labor & Industry air handling unit (AHU) coils are designed for 41°F entering temperature. Chilled water supply temperatures currently delivered to the AHUs are probably 45°F under moderate loads and likely range upward in very warm weather.
- The Plate Frame Heat Exchanger (PFHX) serving the high-rise systems has a design capacity of 625 tons. Design loads fed by the PFHX total an estimated 1070 tons of heat rejection, for an approximate shortfall of 445 tons.
- The 10" branch of the Central Plant CHW loop services Labor & Industry and the Judicial Center might accommodate maximum flow of 1100 to 3000 gpm, depending upon loop specifics and the authority consulted. Without addressing the L&I Weathermasters, the 10" Judicial-L&I branch of the campus CHW system may be the only present means to support design flows on the order of 4600 gpm. Accounting for 365 tons of heat rejection from the Weathermasters translates to an additional 600 gpm to 900 gpm shortfall, representing loop flow requirements of 5200 gpm to 5500 gpm in the 10" loop.

In light of the shortfall in delivery temperatures, loop capacity and transfer capacity, TEN proposes the installation of chiller(s) to boost the rate at which heat may be transferred from the building to the central plant under design and near-design conditions. At this time we propose the installation of one new chiller on the order of 500 tons (ECM 4C) to reduce the supply temperature in the L&I penthouse riser to 41°F from the present range of 45°F - 48°F.

Discussion

- The building's air handling is designed for 41°F EWT, while the central CHWS leaving the plant is generally maintained at 42°F. Under most conditions, the rise in temperature between the plant and L&I is reported to be on the order of 2°F in warm weather. The PFHX has a design approach of 2°F – but at a capacity much less than the estimated peak load.

  As a consequence, the CHW temperature entering the penthouse AHU coils in warm weather is never lower than 45°F, or 4°F above design, and may rise into a range of 46°F-49°F in hot weather.
- The Plate Frame Heat Exchanger (PFHX) serving the high-rise systems has a capacity of 625 tons. Design loads fed by the PFHX are 312 tons in the Weathermaster loops and 758 tons in the AHU coils; totaling 1070 tons of heat rejection, translating to a shortfall of 445 tons. Tabulations from available documentation are reproduced below

HI-RISE air handling units - Designed for CHWS @ 41F — now served by PFHX @ 46-48F CHWS

			cooling coil entering air (F)			cooling coil leaving air (F)			chilled water		water temp (F)		hi-rise	total
		cfm	DB	WB	h	DB	WB	h	gpm	dP psi	EWT	LWT	tons	tons
AHU-2	North Primary	34500	95.0	75.0	38.7	50.6	50.0	20.5	465	[hot side]	41	53.2	237	237
AHU-3	South Primary	32500	95.0	75.0	38.7	50.6	50.0	20.5	435	[hot side]	41	53.3	223	223
AHU-4A	North Interior	27000	81.5	67.1	31.8	58.1	56.8	24.5	90	[hot side]	41	60.9	75	75
AHU-4B	North Interior	27000	81.5	67.1	31.8	58.1	56.8	24.5	90	[hot side]	41	60.9	75	75
AHU-5A	South Interior	27000	81.5	67.1	31.8	58.1	56.8	24.5	90	[hot side]	41	60.9	75	75
AHU-5B	South Interior	27000	81.5	67.1	31.8	58.1	56.8	24.5	90	[hot side]	41	60.9	75	75
									1260				758	758

LO-RISE air handling units - Designed for CHWS @ 41F — Cooling from Central CHW Loop

			cooling coil entering air (F)			cooling coil leaving air (F)			chilled water		water temp (F)		hi-rise	total
		cfm	DB	WB	h	DB	WB	h	gpm	dP psi	EWT	LWT	tons	tons
AHU-8	EW Interior	32000	83.0	68.7	33.2	59.0	57.8	25.1	104	1.2	41	63.2	0	96
AHU-9	EW Primary	5800	95.0	75.0	38.7	50.0	49.8	20.4	90	1.6	41	51.7	0	40
AHU-10	WW Primary	6100	95.0	75.0	38.7	50.0	49.8	20.4	130	3.3	41	48.8	0	42
AHU-11	WW Interior	14060	83.0	68.3	32.8	59.1	57.5	24.9	52	2.0	41	60.2	0	42
AHU-12	WW Interior	13940	88.0	71.2	35.3	50.2	49.5	20.2	218	1.8	41	49.7	0	79
									594				0	299

Weathermaster Induction - Designed for CHWS @ 50F — LO-Rise served by Central CHW Loop; HI-Rise served by PFHX @ 46-48F CHWS

	HI-RISE induction				LO-RISE induction								subtotal induction CHW tons		
	North Face		South Face		West Wing South		West Wing North		East Wing South		East Wing North				
	Btu ea	qty	Btu ea	qty	Btu ea	qty	Btu ea	qty	Btu ea	qty	Btu ea	qty	lo-rise	hi-rise	total
bsmt	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0
fl. 1	4400	16	0	0	4100	12	4100	8	5245	7	4570	8	12.9	5.9	18.8
fl. 2	4400	22	0	0	4950	14	4950	14	5245	7	4570	8	17.7	8.1	25.7
fl. 3	4400	22	4950	24	0	0	0	0	5245	7	4570	8	6.1	18.0	24.1
fl. 4	4400	22	4950	24	4738 3618	8 6	4738	14	5600	7	4040	8	14.6 1.8	18.0 0.0	32.6 1.8
fl. 5	4400	26	4950	26	---	---	---	---	---	---	---	---	---	20.3	20.3
fl. 6	4400	26	4950	26	---	---	---	---	---	---	---	---	---	20.3	20.3
fl. 7	4400	26	4950	26	---	---	---	---	---	---	---	---	---	20.3	20.3
fl. 8	4400	26	4950	26	---	---	---	---	---	---	---	---	---	20.3	20.3
fl. 9	4400	26	4950	26	---	---	---	---	---	---	---	---	---	20.3	20.3
fl. 10	4400	26	4950	26	---	---	---	---	---	---	---	---	---	20.3	20.3
fl. 11	4400	26	4950	26	---	---	---	---	---	---	---	---	---	20.3	20.3
fl. 12	4400	26	4950	26	---	---	---	---	---	---	---	---	---	20.3	20.3
fl. 13	4400	26	4950	26	---	---	---	---	---	---	---	---	---	20.3	20.3
fl. 14	4400	26	4950	26	---	---	---	---	---	---	---	---	---	20.3	20.3
fl. 15	4400	26	4950	26	---	---	---	---	---	---	---	---	---	20.3	20.3
fl. 16	4400	26	4950	26	---	---	---	---	---	---	---	---	---	20.3	20.3
fl. 17	4400	24	4950	24	---	---	---	---	---	---	---	---	---	18.7	18.7
fl. 18	0	0	0	0	---	---	---	---	---	---	---	---	---	0.0	0.0
													53.2	311.7	364.8

Basement air handling units - Designed for CHWS @ 41F — Cooling from Central CHW Loop

		cooling coil entering air (F)			cooling coil leaving air (F)	chilled water		water temp (F)		hi-rise	total
	cfm	DB			DB	gpm	dP psi	EWT	LWT	tons	tons
~~compressor room~~	~~10750~~	~~90~~	**none evident**		~~57~~	~~60~~	~~12~~	~~41~~	~~41.0~~		~~0~~
transformer room	2400	80			56	30	3	41	45.1	0	5
						30				0	5

Hi-Rise PFHX - CHWS @ 41F								
cold side				hot side			PFHX @ 41F	
flow	water temp (F)		CHW dP	flow	water temp (F)		approach	design
gpm	EWT	LWT	psi	gpm	EWT	LWT	deg.F	tons
1500	41	51	9.99	1500	53	43	2.0	625
NOTE: compressor room AHU apparently removed. Transformer room AHU served by Central CHW Loop.								

estimated CHW design tons - L&I summary					
	@ 41F	@ 50F	LO-Rise Loop	HI-Rise PFHX	building totals
air handling units	1057	0	299	758	1057
weathermasters	0	365	53	312	365
compressor room	0	0	0	0	0
transformer vault	5	0	5	0	5
L&I total	1062	365	357	1070	1427

- This branch of the Central Plant CHW loop transitions from 12" to 10" exiting Finance and continues at 10" in service to the Judicial Center and Labor & Industry building. **The 10" loop might accommodate a maximum flow in the range of 1100 to 3000 gpm**, depending upon loop specifics and the authority consulted.

  As reproduced from the Judicial design below, central chilled water specification for the Judicial Center is 2700 gpm at 42°F / 52°F. Ignoring for the moment the Weathermaster load and the shortfall in hi-rise cooling, the sum of 1500 gpm for the hi-rise PFHX (1500 PFHX gpm at 41°F / 51°F) and 600 gpm required by East and West Wing air handling alone raises the minimum flow to L&I to just under 2100 raw gpm at 41°F EWT.

CHILLED WATER HEAT EXCHANGER SCHEDULE (SKID MOUNTED) SYMBOL: HE

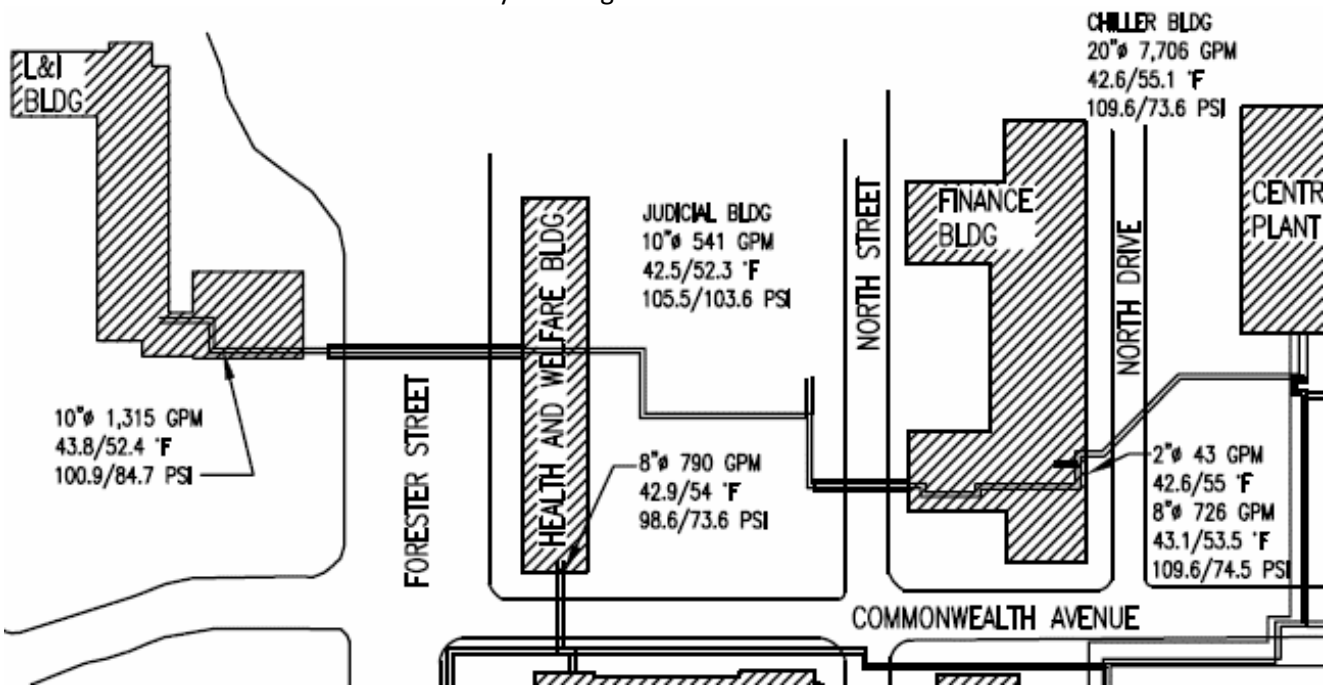
NO.	LOCATION	SERVICE	SYSTEM MBH	HOT-SIDE DATA				COLD-SIDE DATA				OPERATING PRESSURE PSIG	UNIT WEIGHT (LBS.)	BASIS OF DESIGN		NOTES
				FLOW GPM	ENT. TEMP.	LVG. TEMP.	P.D. PSI	FLOW GPM	ENT. TEMP.	LVG. TEMP.	P.D. PSI			MANUFACTURER	TYPE	
HE-2	BASEMENT MECH C007	CHILLED WATER	13,530	2,255	55	43	7	2,700	42	52	10.1	0	17,500	BELL & GOSSETT	GPX-P188-333-TMTL92	1, 2

NOTES:
1. VERTICAL, PLATE AND FRAME, MOUNTED ON CHILLED WATER SKID
2. FOR OTHER ACCEPTABLE MANUFACTURERS SEE SPECIFICATIONS

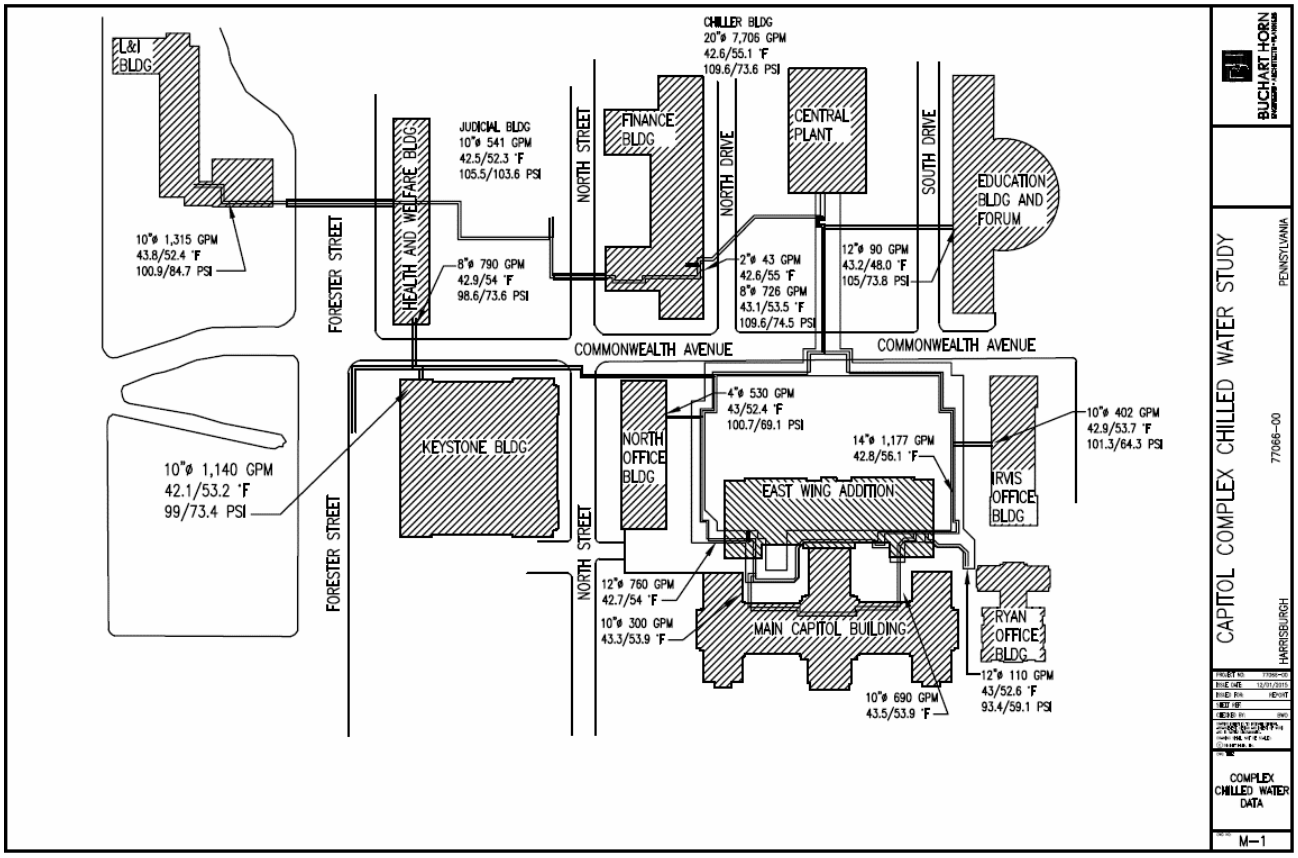
- Accounting for the Weathermasters, at temperature differentials of 10°F, 12°F, 14°F or 16°F, the building's TOTAL connected load of 1427 tons translates to 3424 gpm, 2854 gpm, 2446 gpm, or 2140 gpm, respectively. Thus the minimum peak requirement for the 10" loop, at 2700 gpm to Justice and 2140 gpm to L&I, still exceeds the loop's 3000 gpm capacity by 1840 gpm, i.e., 800 to 1200 tons.
- The Flood & Sterling report found central loop CHW supply pressure fell by nearly 5 psi between Judicial and L&I. Since the pressure drops across the heat exchangers of these two buildings are both on the order of 10 psi, the L&I heat exchanger will only see a portion of the loop capacity which remains after Judicial is satisfied. CHW coils in L&I's East and West Wings are specified with pressure drops below 4 psi, so there again, the L&I plate frame is likely to receive only the excess flow after the East & West Wings are satisfied.

  Thus the 10" Judicial-L&I branch of the campus CHW system is attempting to support flows estimated at more than 4800 peak gpm at minimum. Even at maximum velocity and pressure drop, a flow rate of 3000 gpm in this loop falls short of required capacity by 1800 gpm. Were the Judicial Center and the East and West Wings of L&I ever to call for design flow simultaneously, the high-rise PFHX would receive no cooling whatsoever.

The Buchart/Horn report of Flood & Sterling results below illustrates the routing and size of the loop distribution between Finance and the Labor & Industry building.



The loop readings taken by Flood & Sterling throughout the campus for the Buchart/Horn study are shown below.



TEN has devised various solutions to the L&I building peak cooling season shortfall. Air-cooled options to be located at either L&I or H&W were also considered. The two solutions described below are under consideration as the most practical over the long term.

a) New stand-alone plant

Replace the chillers, cooling towers, and necessary pumping in L&I, using the same spaces which now house the original plant equipment and cooling towers, in order to cool L&I completely without chilled water from the Central CWP when desired. This solution is more practical than the construction of a new plant in a converted location, as there remains in L&I the necessary space and infrastructure, power, etc. to enable this option as well as existing wherewithal to operate a separate standalone CWP.

This is the more expensive of the two approaches discussed here, as it would require two new chillers, along with new CHW and CW pumps and new cooling towers, etc. Energy and water usage will increase to satisfy the load. This option has the best long term benefit as it would be the logical step when the future campus cooling loads increase beyond the existing Complex CWP expansion capability. As a significant cooling load furthest from the Central CWP, L&I would be the first candidate to have a separate stand-alone or satellite CWP.

However, we are advised this option is beyond reach at this time.

b) Satellite Chiller Installation

This option seeks to eliminate the cooling shortfall in a manner that could dovetail with the long term solution above if desired, so as to minimize both up-front capitol and downstream sunk costs.

The least-cost scope necessarily begins with selective demolition of one abandoned Carrier chiller. The other abandoned Carrier chiller will remain as-is.

This option proposes to install one new water-cooled chiller of approximately 500 tons. The new chiller is intended to drive the temperature of the CHW supply leaving the PFHX hot side from the current range of 45°F-48°F downward to the 41°F design required by the HI-RISE air handling systems prior to exiting the basement enroute to the penthouse. The new chiller's condenser will be piped to reject heat to the campus CHW return.

The condenser loop for the new chiller is envisioned as drawing campus return water downstream of all other L&I loads. The scope includes the installation of a new condenser cooling pump with VFD to modulate flow in accord with the heat rejection requirements of the condenser and the temperature available from the central return loop.

The temperature of the campus return entering the new chiller is expected to be less than 65°F under peak conditions. Therefore the base project anticipates the selection of a low-head centrifugal chiller to minimize first cost. Also to keep initial costs down, we propose a fixed speed chiller with a much smaller motor than would be required for a design condenser entering temperature of 85°F, and be equipped with a soft start instead of a VFD. Pre-rotation vanes are proposed for capacity control below 100% .

Not fully determined at this juncture is the means of moving water through the new evaporator. In order to avoid the imposition of an unnecessary pressure drop on the high-rise loop when the new chiller is offline, the base project anticipates a pair of motorized isolation valves acting to divert hot side

flow through the evaporator whenever the chiller is engaged. A more expensive approach, not proposed under the base scope, could install a primary pump in lieu of motorized isolation.

The KW/TR for this chiller will be very low. But there will still be an increase energy use as the chiller will increase the overall number of ton-hours delivered to the building. Moreover, the additional cooling will be provided at lower temperature than currently available from the hot side. And there will be increases in both chilled and condenser water pumping loads. However, among the solutions which can eliminate the shortfall, this option has the least up-front cost and smallest increase in energy usage to the Capitol Complex.

This satellite chiller option may alternately be designed for, or made modifiable to be part of, a future stand-alone CWP at a higher first cost. The modifications would be to increase the chiller motor size, add chiller variable speed drive, modify the heat rejection and electrical support infrastructure, pumps, etc.

A sub-option would be to design the chiller now for future standalone CWP concept, with larger motor, VFD, and CWP designed for the future conditions, then operate it all at off-design conditions – 65F ECWT or better – indefinitely until the future standalone CWP is realized.

Attachments

Equipment schedules from the L&I original design are provided here.

SERVICE	NO.	FACE AREA SQ. FT.	C.F.M.	ENTERING AIR DRY B.	ENTERING AIR WET B.	LEAVING AIR DRY B.	LEAVING AIR WET B.	G.P.M. OF 41° WATER	WATER PRESS. DROP	ROWS DEEP COIL	STATIC PRESS.-IN. INCL. SPRAYS & ELIM.
EAST WING INTERIOR	8	67	32,000	83.0	68.7	59	57.8	104	1.2#	6	1.0"
EAST WING PRIMARY	9	13	5,800	95	75	50	49.8	90	1.6#	8	1.0"

SERVICE	NO.	FACE AREA SQ. FT.	C.F.M.	ENTERING AIR DRY B.	ENTERING AIR WET B.	LEAVING AIR DRY B.	LEAVING AIR WET B.	G.P.M. OF 41° WATER	WATER PRESS. DROP	ROWS DEEP COIL	STATIC PRESS-IN. WATER INCL. SPRAYS & ELIM.
WEST WING PRIMARY	10	13.5	6,100	95	75	50	49.8	130	3.3#	8	1.2"
WEST WING INTERIOR	11	27	14,060	83	68.3	59.1	57.5	52	2.0#	6	1.1"
WEST WING INTERIOR	12	32	13,940	88	71.2	50.2	49.5	218	1.8#	8	1.3"

SERVICE	No.	FACE AREA SQ. FEET	C.F.M.	ENTERING AIR DRY B	ENTERING AIR WET B	LEAVING AIR DRY B	LEAVING AIR WET B.	G.P.M. OF 41° WATER	WATER PRES DROP	ROWS DEEP COIL	STATIC PRES.- IN. WATER INC. SPRAYS & ELIM.
NORTH PRIMARY	2	61	34,500	95	75	50.6	50	465	3.5 #	8	1.9"
SOUTH PRIMARY	3	61	32,500	95	75	50.6	50	435	3.5 #	8	1.9"
NORTH INTERIOR	4A	54	27,000	81.5	67.1	58.1	56.8	90	0.6"	6	1.1"
NORTH INTERIOR	4B	54	27,000	81.5	67.1	58.1	56.8	90	0.6"	6	1.1"
SOUTH INTERIOR	5A	54	27,500	81.5	67.1	58.1	56.8	90	0.6"	6	1.1"
SOUTH INTERIOR	5B	54	27,500	81.5	67.1	58.1	56.8	90	0.6"	6	1.1"

AIR CONDITIONING UNITS	CFM	FACE AREA	ENTERING AIR	LEAVING AIR	WATER GPM	PRESSURE DROP	ROWS DEEP	HP
COMPRESSOR ROOM	10,780	20#	90°F	57°F	60	12 LB	6	5
TRANSFORMER ROOM	2400	7#	80°F	56°F	30	3 LB	4	1

APPENDIX D

Lighting Cut-sheets

2154 LED

PROJECT:	
MODEL #:	
FIXTURE TYPE:	

STANDARD SPECIFICATIONS

BOWL
Both sizes are UV stabilized acrylic and are available in white acrylic or faux alabaster. The 24" bowl is formed from 0.188" material, while the 31" bowl utilizes 0.250" stock.

TRIM
Cold rolled steel stems and canopy, attached to the bowl with cast loops and hooks, and solid brass accents. The optional decorative bowl trim is consists of a steel spinning, held in place with a solid brass finial.

HOUSING
Formed, cold rolled steel design, finished in a high reflectance powder coat white.

LED PERFORMANCE - 3500K STANDARD
120-277V - 3500K, 82 CRI - L80 rating - 60,000 hrs - L70 rating (projected) - 100,000 hrs
Amperage rated @ 110V input
Operating ambient temperature: -20°C / -4°F - 40°C / 104°F

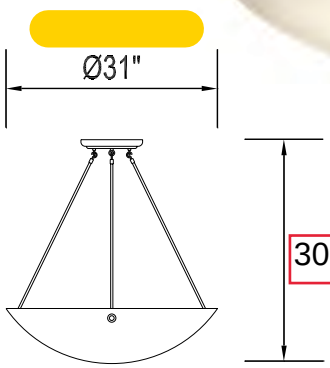
Standard 3500K source lumens noted. Consult Brownlee.com for performance of all CCTs.
C49LED - 49W nominal, .40 A input - 5116 lm - 107 lm/W

MOUNTING
Directly to j-box (by others). Mounting hardware included.

FINISH
The 2154 series is available in all Brownlee paint finishes as a standard offering.

WARRANTY
5 year limited warranty on this LED product. Consult factory for details.

FA diffuser, DBF option



DAMP

SUPPORTS T24 COMPLIANCE

ORDERING INFORMATION

2154	-	_____	-	_____	-	_____	-	_____	-	_____
Model		2.		3.		4.		5.		6. (if required)

2. SIZE

24	24" dia.
31	31" dia.

3. FINISH

STANDARD

BL	Black
BT	Brass Tone
BZ	Bronze
GM	Gun Metal
MB	Metallic Bronze
NT	Nickel Tone
PL	Platinum
WH	White

CUSTOM
Provide color sample or RAL code to match

4. WATTAGE

C49LED	4-C Series boards

5. DIFFUSER

STANDARD

WA	White Acrylic

OPTIONAL

FA	Faux Alabaster Acrylic

6. AVAILABLE OPTIONS

35K	3500K standard color temperature
27K	2700K color temperature
30K	3000K color temperature
40K	4000K color temperature
90R	90 CRI (3000K only)
BAC	Buy American Compliant
DALI	Dali Compatible (0-10v dimming included)
DBF	Decorative Bottom Finial
DIM	Dimming driver (120-277V) (0-10V dimming control required)
DTR	Triac (Line Voltage) Dimming (120V)
ES	ENERGY STAR® (Not available in 90 CRI)
T24[9]	Title 24 Compliant (3000K only)

9) Title 24 Compliance includes 0-10v dimming, 90 CRI and 2016 JA8 High Efficacy compliant fixture labeling. Contact factory for LED performance specifications.

Specifications and dimensions subject to change without notice.
Consult your Brownlee Lighting representative for availability and ordering information.

BROWNLEE LIGHTING
www.brownlee.com

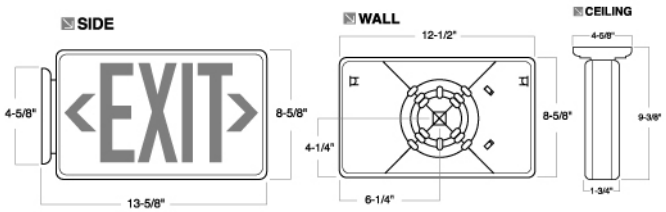
REVISED 2017.6.16

ELX-628

LED Exit Sign With Battery Back-Up & Self-Diagnostic

Architectural

Catalog Number: ELX-628-G-W	
Project Name:	**Type:**
Note:	MAXILUME ARCHITECTURAL LIGHTING



SELF-DIAGNOSTIC SDT

FEATURES

This fixture is an excellent choice when fast installation and an attractive appearance are priorities. Its long-lasting LEDs consume less than two watts of energy and are rated for a life of up to 25 years. If AC power is lost, the fixture provides at least 90 minutes of illumination and will automatically recharge after discharge. The operation of this product can easily be monitored and controlled with the use of a conveniently located test switch that indicates charge and diagnostic state.

BODY

- The thermoplastic housing of the product makes it corrosion-proof and scratch-and impact-resistant.
- UV-stabilization prevents discoloration of the product.
- Every fixture includes a canopy, extra faceplate, and replaceable chevron directional indicator knockouts for control of direction.
- Components shaped by precision injection molding and has ½" knockouts for the supply of power.

FACE

- Single or dual configuration. Solid face included if single face appearance is preferred
- 6" high text with color diffusion
- Knockout directional chevrons

ELECTRICAL

- Consumes only 2 watts of power
- Long-lasting LED sources
- LED lights continue to function while the battery is working
- 120V or 277V dual input with battery back-up

BATTERY

- Nickel Cadmium, or Ni-Cad, battery
- Internal solid-state wiring for charging purposes
- Indicator light reflects high-Charge and ready operation
- Testing button
- Automatic reset
- Safeguarded against short circuits and brown-outs
- Disconnection is necessary for full discharge

LIFE SPAN

- LED and PC circuits have a rating of about 25 years without a drop in illumination

LISTED

- UL 924, NFPA, NEC, State & Municipal
- Damp location approved

ELX-628 - ITEM SELECTOR: (Please check the boxes below for the option desired)

LETTER COLOR	HOUSING COLOR
☑ **G** - Green	☑ **W** - White
☐ **R** - Red	☐ **B** - Black

2 YEARS LIMITED WARRANTY

Specified:

ELX-628 G (LETTER COLOR) - W (HOUSING COLOR)

LED Versa Kit 2X2

APPLICATIONS

This advanced troffer retrofit kit easily converts 2X2 fluorescent troffers to the most current LED technology. Its ultra high efficiency reduces energy costs. It is one of the LED troffer retrofits that comes completely assembled as a lensed kit, requiring only one minute to install, reducing labor costs. The retrofit kit is also 0-10V Dimmable with 5 Year Warranty. Ideal applications include: office, retail, healthcare, education and hospitality interiors.

PERFORMANCE

The VEK series uses the latest LED technology and LED driver to ensure steady performance and long lifetime.

INSTALLATION

The Troffer Retrofit Kit provides the ideal way to replace existing 2X2 recessed troffer, utilizing the existing fixture housing. The kit provides all the components needed to perform the change out quickly and efficiently, allowing for system upgrades without disturbing the ceiling. The LED troffer retrofit is completely assembled within the frame.

Specification Data

Model No.	Watts	Lumens	CCT	Efficacy	Input Voltage	Dimming	Life	THD
VEKT-P2X2/835	23	2300	3500K	100lm/W	120-277V	0-10V	50000	<20%
VEKT-P2X2/840	23	2300	4000K	100lm/W	120-277V	0-10V	50000	<20%
VEKT-P2X2/850	23	2300	5000K	100lm/W	120-277V	0-10V	50000	<20%

Dimensions

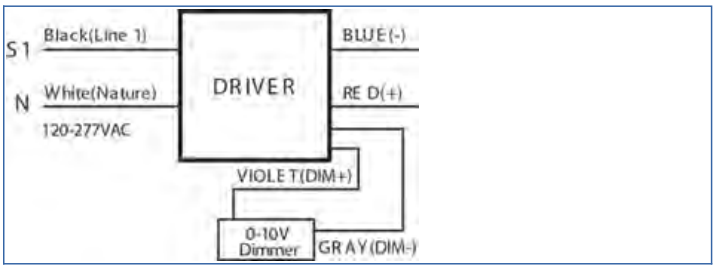
Length	Width	Height
1.87 ft	1.85 ft	2 in

Ordering Information

Sample model: VEKT-P2X2/840

VEKT-P	2X2	H	4000K
Series	**Size**	**Lumen Package**	**CCT**
LED Panel Retrofit Kit	2'X2'	H = 22 Wattage	3500K 4000K 5000K

Wiring Diagram



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Toll Free: (866) 933-7736 | Tel.: (562) 529-2938 | Fax: (562) 529-2978 | Email: info@espentech.com

LED Versa Kit 2X4

APPLICATIONS

This advanced troffer retrofit kit easily converts 2X4 fluorescent troffers to the most current LED technology. Its ultra high efficiency reduces energy costs. It is one of the LED troffer retrofits that comes completely assembled as a lensed kit, requiring only one minute to install, reducing labor costs. The retrofit kit is also 0-10V Dimmable with 5 Year Warranty. Ideal applications include: office, retail, healthcare, education and hospitality interiors.

PERFORMANCE

The VEK series uses the latest LED technology and LED driver to ensure steady performance and long lifetime.

INSTALLATION

The Troffer Retrofit Kit provides the ideal way to replace existing 2X4 recessed troffer, utilizing the existing fixture housing. The kit provides all the components needed to perform the change out quickly and efficiently, allowing for system upgrades without disturbing the ceiling. The LED troffer retrofit is completely assembled within the frame.

Specification Data

Model No.	Watts	Lumens	CCT	Efficacy	Input Voltage	Dimming	Life	THD
VEKT-P2X4/835	34	3400	3500K	100lm/W	120-277V	0-10V	50000	<20%
VEKT-P2X4/840	34	3400	4000K	100lm/W	120-277V	0-10V	50000	<20%
VEKT-P2X4/850	34	3400	5000K	100lm/W	120-277V	0-10V	50000	<20%

Dimensions

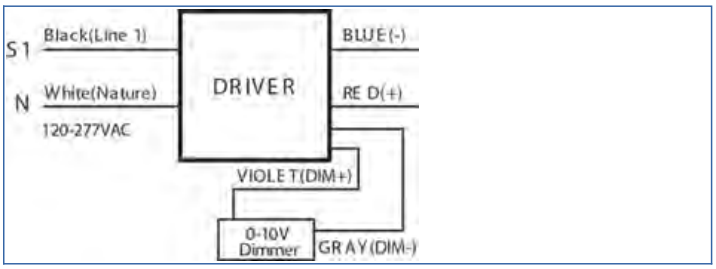
Length	Width	Height
3.89 ft	1.85 ft	2 in

Ordering Information

Sample model: VEKT-P2X2/840

VEKT-P	2X2	H	4000K
Series	**Size**	**Lumen Package**	**CCT**
LED Panel Retrofit Kit	2'X2'	H = 22 Wattage	3500K 4000K 5000K

Wiring Diagram



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EYE LIGHTING INTERNATIONAL

Project ..... Date .....
Catalog # ..... Prepared by .....
Luminaire Type .....
Comments .....

LEDioc® - 30W & 50W Hardwired

LED Post Top Engineered Solution

Applications include: Street/Area, Historic Districts, City Parks & Recreation, Campuses, Glass Lens Post Tops and Plastic Lens Post Tops

Specification Features

Construction
The LED upgrade kit includes a separate LED light source, LED driver and surge protector. All three components are individually replaceable. The LED upgrade kit is capable of tool-less field adjusting the light center length of the LED light source to match the photometric light center length of the original luminaire.

Mounting
LED lampholder is hardwire mounted on a clamp assembly and can be field adjustable. Lamp operating position is base up or base down only.

Optics
Designed for use in the existing HID post top luminaire optics.

Electrical
Constant Current Drivers are 120-277VAC input, with 0-10V dimming capability. The 30 watt system driver has a 684mA output and the operating temperature is -20C° to +40° C. The 50 watt system driver has a 1150mA output and the operating temperature is -40C° to +40° C. Electrical components are mounted separately to allow for easy serviceability.

Reliability
The LEDioc lamp features cast aluminum passive thermal management, which allows air circulation around each LED module to ensure optimal lighting performance and long life.

Warranty
Standard 5 year warranty. See the EYE Lighting full Warranty, and Terms & Conditions of Sale at www.eyelighting.com.

Listings
Designed to comply with UL1598C Standards
Damp Location Rated
Complies with IEEE C62.41
UL Driver
ETL Recognized LED Lamp

Designed and assembled in USA

Check the latest update at www.DesignLights.org for listed product catalog numbers. Hardwired versions are listed. Contact company for solution availability.

Order Guide

CATALOG NUMBER	DESCRIPTION	ACCESSORY (ORDER SEPARATELY)
LES - 30 - 730 - HWD - XXXX[1] - UNV - 3	30W, 3000K, 70 CRI, Hardwired, 120-277V, Surge Protector	HS1 = 50W House-Friendly™ Shield
LES - 30 - 740 - HWD - XXXX[1] - UNV - 3	30W, 4000K, 70 CRI, Hardwired, 120-277V, Surge Protector	HS2 = 30W House-Friendly™ Shield
LES - 30 - 750 - HWD - XXXX[1] - UNV - 3	30W, 5000K, 70 CRI, Hardwired, 120-277V, Surge Protector	
LES - 50 - 730 - HWD - XXXX[1] - UNV - 3	50W, 3000K, 70 CRI, Hardwired, 120-277V, Surge Protector	
LES - 50 - 740 - HWD - XXXX[1] - UNV - 3	50W, 4000K, 70 CRI, Hardwired, 120-277V, Surge Protector	
LES - 50 - 750 - HWD - XXXX[1] - UNV - 3	50W, 5000K, 70 CRI, Hardwired, 120-277V, Surge Protector	

NOTES:
1 Luminaire description "XXXX" to be completed by factory.

LEDioc® - 30W & 50W Hardwired

LED Post Top Engineered Solution

The complete LEDioc upgrade kit includes: the exclusive patent pending EYE LEDioc lamp, driver, surge protector and mounting bracket for the specific luminaire. Installation is easy, thermal/mechanical compatibility is assured and lamp LCL is maintained, preserving the optics and photometric performance of the existing luminaire. Each solution includes application guidelines for the installer. Other solutions available, contact the factory or visit www.eyelighting.com for other solutions.

Performance Data (30W)

	Correlated Color Temp (K)		
LEDioc 30W Lamp Only	**5000K**	**4000K**	**3000K**
Initial Lumens	4100	4000	3900
Efficacy (lm/W)	137	133	130
Rated Average Life (L_{70}@25°C)		>50000 hr	
Min. Color Rendering Index (Ra)	70	70	70
Operating Position		BUD±15°	

Performance Data (50W)

	Correlated Color Temp (K)		
LEDioc 50W Lamp Only	**5000K**	**4000K**	**3000K**
Initial Lumens	6530	6300	6075
Efficacy (lm/W)	131	126	122
Rated Average Life (L_{70}@25°C)		>50000 hr	
Min. Color Rendering Index (Ra)	70	70	70
Operating Position		BUD±15°	

Driver Specifications

Nominal System Watts: 30
Mode: Constant Current Drive Mode
Dimming: 0-10 Volt Dimmable Output
Ratings: Damp Location
Operating Temp: -20°C to +40°C
Class: 2
Total Harmonic Distortion: ≤20%
Internal Surge Protection: 1.2kA & 2.5kV

Input

Voltage: 120 to 277VAC ± 10%
Current: ≤0.36A (nominal)
Frequency: 50/60Hz ± 10%
Power Factor: >0.90 at Full Load

Output

Voltage: 20 to 48 VDC
Current: 684mA
Power (max): 36W

Driver Specifications

Nominal System Watts: 50
Mode: Constant Current Drive Mode
Dimming: 0-10 Volt Dimmable Output
Ratings: IP66 Rated
Operating Temp: -40°C to +40°C
Class: 2
Total Harmonic Distortion: ≤20%
Internal Surge Protection: 3kA & 6kV

Input

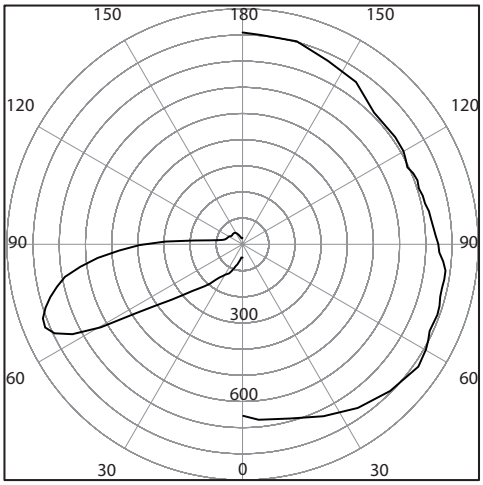
Voltage: 120 to 277VAC ± 10%
Current: ≤0.5A (nominal)
Frequency: 50/60Hz ± 10%
Power Factor: >0.90 at Full Load

Output

Voltage: 15 to 55 VDC
Current: 1150mA
Power (max): 50W

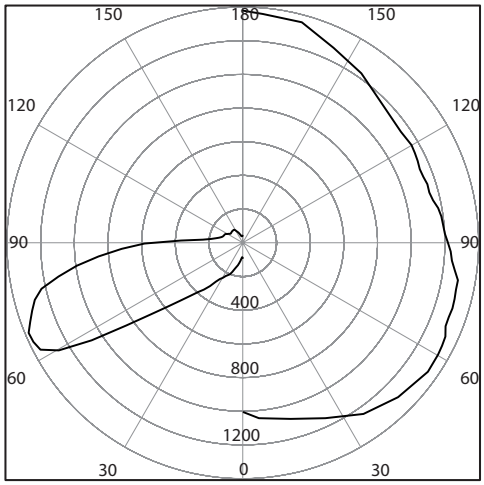
Photometrics

LEDioc 30W



Photometrics

LEDioc 50W



* Photometric distribution is based on Lexalite Lindy 424 per DLC specifications in a Type V distribution.

NOTES:

1) Applications are subject to project performance evaluation and may be subject to thermal validation prior to installation.
2) Actual design will vary based on specific luminaire mounting requirements.
3) Lexalite Lindy 424 is a trademark owned by its respective company.
4) Delivered lumens and light distribution may be impacted by existing globe optics.
5) Product specifications may change without notice. Please contact your local EYE Lighting sales representative for the latest product information.

EYE Lighting International of North America, Inc.
a division of Iwasaki Electric of Japan

9150 Hendricks Road
Mentor, Ohio 44060

Tel: (888) 665-2677
Fax: (440) 350-7001

www.eyelighting.com

GLOBAL
ENERGY & LIGHTING

GLEDPHB2 200W

PURE HIGH BAY SPECIFICATION SHEET

OPTICAL SPECS

System Efficacy	Up to 130 Lm/W (CCT = 50K)
Lumen Output	13,000 Lumens (CCT = 50K)
CCT	30K / 40K / 50K
CRI	70 / 80 Ra
Beam Angle	50°, 90°, 120°

ELECTRICAL SPECS

System Power Usage	120W
Input Voltage	AC 100 - 277 Volts
Power Frequency	50 ~ 60 Hz
Power Factor	> 0.92
Total Harmonic Distortion	< 15%

5 YEAR WARRANTY

CERTS

RoHS

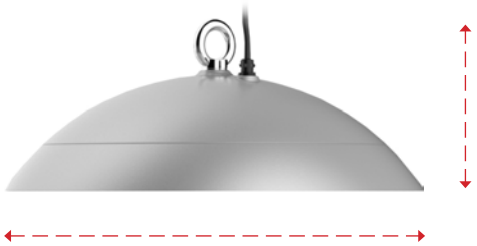
FC

CE

CB

c UL us LISTED

DIMENSIONS



Diameter: 19.25in (489 mm)
Height: 7.8 in (200 mm)

BEAM ANGLES

50° 90° 120°

OTHER DETAILS

Fixture Material	Aluminum Alloy
Ingress Protection	IP66
Luminaire Net Weight	7.2 ± 0.3 Kg
Lifespan	> 50,000 Hours
Operating Humidity	15 - 90%
Operating Temperature	-22° ~ 122°F (-30° ~50°C)
Storage Temperature	-40° ~ 158°F (-40° ~70°C)
Product Dimensions	ø19.25 x 7.8 in (ø489 x 200 mm)
Standard Cord Length	1.5 Meter

FIXTURE ACCESSORIES

Bezel Color	● ● ○ ● ● ●
Alternate Lens	Frosted or Clear PC
Cord Options	Length / Type

*Consult your GEL sales representative or the DLC QPL for specific model certifications.

Standard Fixture:Silver Bezel with 120° Beam Angle

GLEDPHB2 SKU CREATOR

After choosing options to create the perfect controlled fixture for your space, this chart will help you create the correct SKU necessary to order.

PURE HIGH BAY

PRODUCT	WATTAGE	A CCT	B BEAM ANGLE
GLEDPHB2	100W	30K / 40K / 50K	50 / 90 / 120
GLEDPHB2	120W	30K / 40K / 50K	50 / 90 / 120
GLEDPHB2	150W	30K / 40K / 50K	50 / 90 / 120
GLEDPHB2	200W	30K / 40K / 50K	50 / 90 / 120

Create your SKU:

GLEDPHB2			
PRODUCT	WATTAGE	CCT	BEAM ANGLE

Accessory SKUS (if applicable)

Fixture Quantity

SKU CREATOR **GUIDELINES**

- Options in chart separated by slash (/)
- Choose one option per column.
- All characters must **always** utilize capitalization. No special characters (/, &, #, etc.) will be permitted.
- White space in between columns indicates single space in SKU.

SKU CREATOR **CATEGORY KEY**

A **CCT -** COLOR TEMPERATURE

30K - 3,000 Kelvin
40K - 4,000 Kelvin
50K - 5,000 Kelvin

B **BEAM ANGLE**

Degrees at which light is distributed. Photometrics diagrams can be found on the options page.

ACCESSORY SKUS

Order accessories as separate part number from your Fixture SKU.
Learn more about these options on the Accessories Page.

ALTERNATE LENSES	BEZEL COLORS	CORD & PLUG ENDS
GLEDPHB2A Clear PC Lens	GLEDPHB2A BC Custom	GLEDPHB2A CC
GLEDPHB2A Frosted PC Lens	GLEDPHB2A BC Red	GLEDPHB2A EXT 1.5
GLEDPHB2A 120 Lens	GLEDPHB2A BC Grey	GLEDPHB2A 5-15P
GLEDPHB2A 90 Lens	GLEDPHB2A BC White	GLEDPHB2A L5-15P
GLEDPHB2A 50 Lens	GLEDPHB2A BC Yellow	GLEDPHB2A L6-15P
	GLEDPHB2A BC Blue	GLEDPHB2A L7-15P
	GLEDPHB2A BC Black	GLEDPHB2A L7-20P

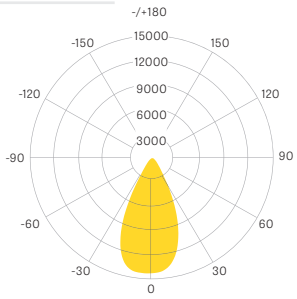
NOTES

FIXTURE OPTIONS

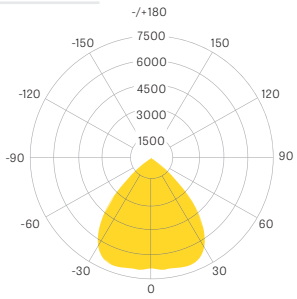
PHOTOMETRICS

For certification information or questions concerning beam angle options, please consult your GEL sales representative.

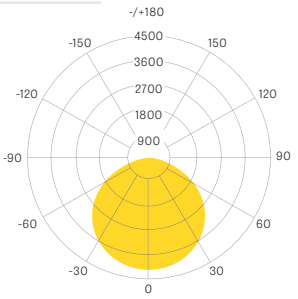
50°



90°



120°



ALTERNATE LENSES

50 / 90 / 120

Polycarbonate Optic lenses which set beam angle to 50°, 90° or 120°.

GLEDPHB2A (50, 90 or 120) Lens

Clear Polycarbonate

Clear cover maximizes light. Beam angle approximately 120°.

GLEDPHB2A Clear PC Lens

Frosted Polycarbonate

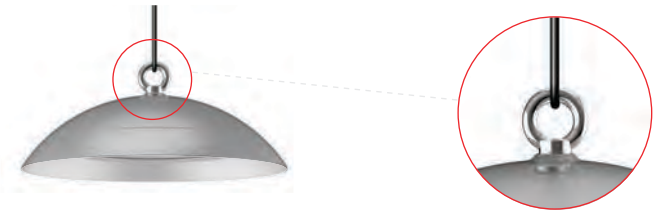
Frosted coverage diffuses light and reduces glare. Beam angle approximately 120°.

GLEDPHB2A Frosted PC Lens

INSTALLATION

LOOP MOUNTING

The Pure High Bay fixture mounts safely through a seamless metal hook.



CORD & PLUGS

SKU	DESCRIPTION
GLEDPHB2A EXT 1.5	1.5 Meter Cord Extension (3 meters overall)
GLEDPHB2A 5-15P	Straight Blade 120v NEMA 5-15P Plug End
GLEDPHB2A L5-15P	Twist Lock 120v NEMA L5-15 Plug End
GLEDPHB2A L6-15P	Twist Lock 208/240v NEMA L6-15 Plug End
GLEDPHB2A L7-15P	Twist Lock 277v NEMA L7-15 Plug End
GLEDPHB2A L7-20P	Twist Lock 277v NEMA L7-20 Plug End

SKU	PHOTO
GLEDPHB2A CC	
IP65 Cable Connector (extends cable length)	

BEZEL COLOR

Customize your fixtures by adding color to integrate them more thoroughly into your space or connect them with your brand. As well as the color options pictured here, you also have the option to choose a completely custom bezel color.

Choose a custom color.

Your Choice
GLEDPHB2A BC Custom
(MOQ 500)

RAL3028
GLEDPHB2A BC Red

RAL9017
GLEDPHB2A BC Black

RAL9016
GLEDPHB2A BC White

RAL5005
GLEDPHB2A BC Blue

RAL7042
GLEDPHB2A BC Grey

RAL1018
GLEDPHB2A BC Yellow

HYLITE™ LED Lighting

LED OMNI-BULB™

Ideal for High-quality Illumination in:

- Down Lights
- Decorative Lighting
- Pendant Lights
- Stairwell Lighting
- Wall Scones
- Accent Lighting
- Walkway Lighting
- Corridor Lighting
- Wall Packs
- Ceiling Lights
- Task Lighting
- Carriage Lanterns

18W / 26W CFL Equivalent

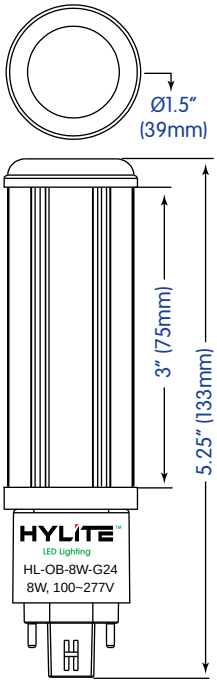
High Performance 8W LED Omni-Bulb

AC Direct **Type B**

The HyLite High Performance LED Omni-Bulb is an ideal Energy-Efficient replacement for CFL & Incandescent Bulb installations in Existing & New Fixtures. The 8W HyLite LED Omni-Bulb provides 360° Energy-Efficient Illumination and replaces 18W/26W CFL Bulbs, effectively reducing Energy Consumption by 56%-69%, and as much as 89% when replacing 75W Incandescent Bulbs. HyLite LED Omni-Bulbs are rated up to 50,000 hours of Lamp Life. This is 50 times longer than a traditional Incandescent Bulb, and 7 times longer than a CFL Bulb. This significantly reduces Energy Usage and Costs as well as Maintenance Expenditures.

- Easy Installation & Retrofitting: Simply Bypass Ballast and Plug-in. Runs on AC Direct Line Voltage. Eliminates Compatibility, Power Loss & Lifetime Issues and Maintenance Costs associated with Ballasts
- Full Brightness with Instant On and Instant Restrike
- Optimal Design for Horizontal or Vertical Mount Sockets
- >80 CRI for Great Visibility
- Suitable for Dry or Damp Location
- Universal Voltage: 100-277V, AC
- Heat & Impact Resistant, UV Protected, Non-Yellowing, Optical Grade Lens
- Excellent Heat Dissipation with Proprietary-Designed Heat Sink
- Cool Operation: Does not add to Heat Load (up to 90% less heat than Incandescent) while producing Brilliantly Bright Light
- Non-Combustible. Made from Flame Retardant, Engineered Polymer, the Base is Mechanically Strong and Heat-Resistant up to 435°F (225°C)
- Safe and Reliable: Isolated Circuit Design
- Maintenance-Free Operation: Lasts up to 50 times longer than Incandescent Bulb. Lowers Costs by Reducing Relamp Frequency
- Safe: Contain No Hazardous Materials; RoHS Compliant: No Lead, Mercury, Toxic Metals or Arsenic Gases. No Disposal Requirements. Facilitates LEED® points
- No Electro-Magnetic (EMi) or Radio Frequency Interference (RFi)
- Environmentally Friendly: 98% of the HyLite LED Lamp is Recyclable

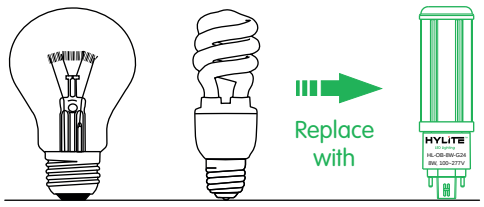
E361357



Not Suitable for Enclosed Fixtures

HyLite LED Omni-Bulbs offer a truly universal G24 base - designed to replace both 2-pin and 4-pin G24 bases listed below:

G24d	G24q	Gx24d	Gx24q
G24d-1	G24q-1	Gx24d-2	Gx24q-1
G24d-2	G24q-2	Gx24d-3	Gx24q-2
G24d-3	G24q-3		Gx24q-3
			Gx24q-4



98% RECYCLABLE

NO LEAD, MERCURY, HEAVY METALS OR TOXIC GASES

Universal Burning Positioning

Lamp can be oriented in any position
- does not affect or diminish the life of the lamp

HYLITE™
LED Lighting

LED
OMNI-BULB™

As part of the company's continuous product improvement program, HyLite reserves the right to change materials or modify the design of its product without notification. All Specifications subject to change without notice. All values are design and/or typical values when measured under laboratory conditions. Actual Values depend upon the ambient temperature of the installation location. Please consult factory for your specific requirements.

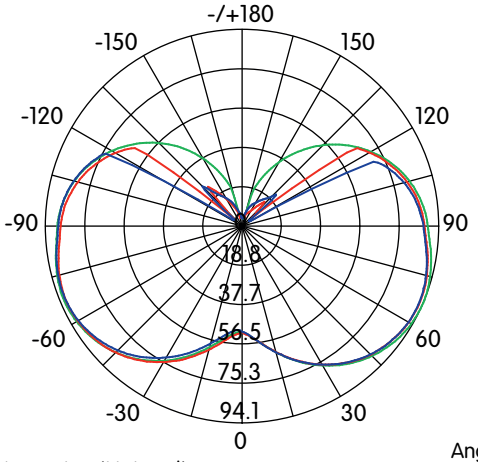
Model No.	Watts	Lumens (lm)	Input Line Current	Dimensions and Weight (each)		
				Width	Height	Net Weight
HL-OB-8W-G24	8	898	65mA@120V	1.5" (39mm)	5.25" (133mm)	3.5 oz. (100g)

- Efficacy: 110 lpw
- CRI: >80
- Beam Angle: 360°
- THD (%): <7%
- Universal Input Voltage 100~277V, AC 50/60 Hz.
- Power Factor: >0.98
- Protection: IP20
- Rated Life: 50,000 Hrs.*
- Warranty: 5 Years
- Ambient Working Temperature: -4°F~+104°F (-20°C~+40°C)
- Base Type: G24
- CCT: 3500K (Neutral White), 4000K (Cool White) and 5000K (DayLight)

** Depending upon the ambient temperature of the installation location*

AC Direct | Type B

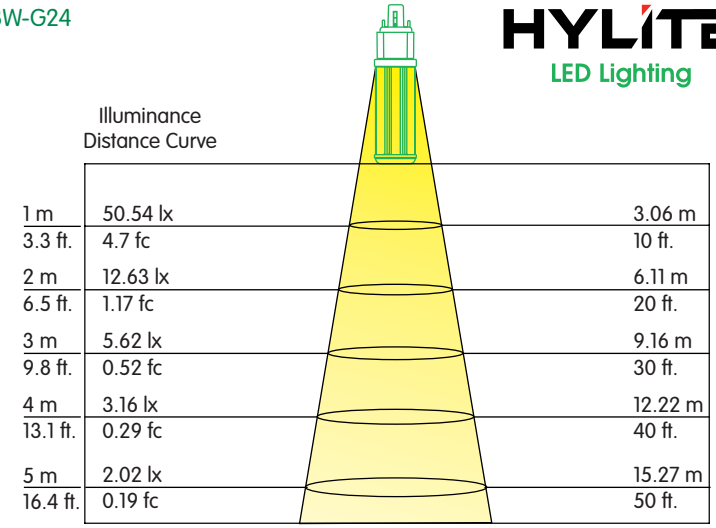
HyLite Omni-Bulb, HL-OB-8W-G24
Photometrics



Intensity: (Unit, cd)

	Angle [50% Max.]	Angle [10% Max]
C180/360	283.5°	329.6°
C0/180	253.7°	306.6°
C90/270	237.3°	322.0°

HYLITE™
LED Lighting



Note: The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance

Ordering for HyLite 8W LED Omni-Bulb with G24 Base

Model / Base	Nominal Color Temperature (CCT, °K)	
HL-OB-8W-G24	-35K	3500K = Neutral White (NW)
	-40K	4000K = Cool White (CW)
	-50K	5000K = DayLight (DL)

Warning: Disable all Power to the Luminaire. HyLite LED Omni-Bulbs are designed to work off 100V~277V, AC. HyLite 8W LED Omni-Bulbs are not compatible with Electronic Ballasts. Electronic Ballast (if equipped) must be Bypassed or removed from the Luminaire before installing the Lamp. Failure to Follow Instructions will VOID Warranty. It can also result in an Electric Shock, or Fire. NOT FOR TOTALLY ENCLOSED LUMINAIRES OR EMERGENCY LIGHTING. NOT FOR USE WITH DIMMERS.

Warning - Risk of Fire or Electric Shock

- For use in Dry or Damp Locations. Do not use where directly exposed to Liquid, Vapor, Rain or Weather. Non-Submergible (not water tight).
- Operate in Fixtures that provide the free flow of air around the Lamp. This will ensure Lumen Maintenance and Extend Its Working Life. When Products are used in Outdoor Fixtures, ensure the space is Waterproof and Well-Ventilated.
- The Installer must determine and verify whether 120V to 277V AC is being utilized at the Luminaire before Installation. Improper Voltage matching can result in Performance Degradation and/or Physical Damage. These Lamps work on Line Voltage and require all Ballasts and Starters to be Bypassed.
- Wiring modification for HyLite LED Lamp Installation requires knowledge of Luminaire Electrical Systems. If not qualified, DO NOT attempt Installation. Contact a Qualified Electrician.
- Luminaire Wiring, Ballast, or other Electrical Parts may be Damaged when Installing. Always check for enclosed Wiring and Components.
- To prevent Wiring Damage or Abrasion, DO NOT expose Wiring to edges of Sheet Metal or other Sharp Objects.
- DO NOT Make or Alter any Open Holes in an Enclosure for Wiring or Electrical Components during Installation.
- DO NOT Block Light emanating from Product in Whole or Part, as this may Cause an Unsafe Condition.
- Installing Surge/Lightning Protectors is Highly Recommended and helps to Eliminate Premature Driver Failure caused by Surges and other Power Fluctuations.
- The End Retrofit Fixture, once Modified, can No Longer Operate as was Originally Intended.

HYLITE™
LED Lighting

LED
OMNI-BULB™

Ideal for High-quality Illumination in:

- Down Lights
- Decorative Lighting
- Pendant Lights
- Stairwell Lighting
- Wall Scones
- Accent Lighting
- Walkway Lighting
- Corridor Lighting
- Wall Packs
- Ceiling Lights
- Task Lighting
- Carriage Lanterns

32W / 42W
CFL Equivalent

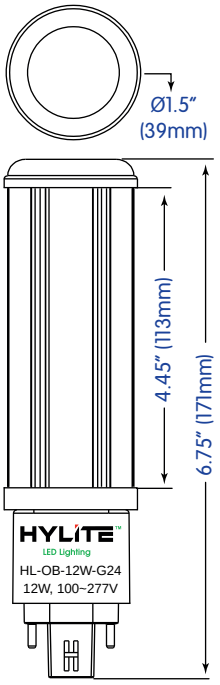
High Performance 12W LED Omni-Bulb

AC Direct | Type B

The HyLite High Performance LED Omni-Bulb is an ideal Energy-Efficient replacement for CFL & Incandescent Bulb installations in Existing & New Fixtures. The 12W HyLite LED Omni-Bulb provides 360° Energy-Efficient Illumination and replaces 32W/42W CFL Bulbs, effectively reducing Energy Consumption by 63%-72%, and as much as 90% when replacing 125W Incandescent Bulbs. HyLite LED Omni-Bulbs are rated up to 50,000 hours of Lamp Life. This is 50 times longer than a traditional Incandescent Bulb, and 7 times longer than a CFL Bulb. This significantly reduces Energy Usage and Costs as well as Maintenance Expenditures.

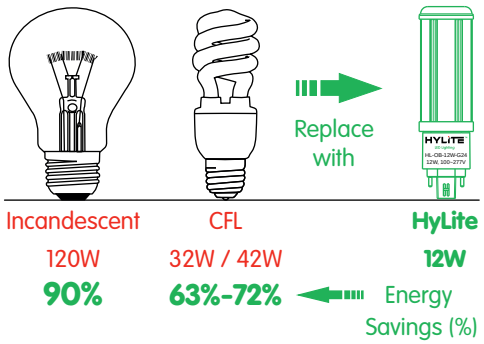
- Easy Installation & Retrofitting: Simply Bypass Ballast and Plug-in. Runs on AC Direct Line Voltage. Eliminates Compatibility, Power Loss & Lifetime Issues and Maintenance Costs associated with Ballasts
- Full Brightness with Instant On and Instant Restrike
- Optimal Design for Horizontal or Vertical Mount Sockets
- >80 CRI for Great Visibility
- Suitable for Dry or Damp Location
- Universal Voltage: 100-277V, AC
- Heat & Impact Resistant, UV Protected, Non-Yellowing, Optical Grade Lens
- Excellent Heat Dissipation with Proprietary-Designed Heat Sink
- Cool Operation: Does not add to Heat Load (up to 90% less heat than Incandescent) while producing Brilliantly Bright Light
- Non-Combustible. Made from Flame Retardant, Engineered Polymer, the Base is Mechanically Strong and Heat-Resistant up to 435°F (225°C)
- Safe and Reliable: Isolated Circuit Design
- Maintenance-Free Operation: Lasts up to 50 times longer than Incandescent Bulb. Lowers Costs by Reducing Relamp Frequency
- Safe: Contain No Hazardous Materials; RoHS Compliant: No Lead, Mercury, Toxic Metals or Arsenic Gases. No Disposal Requirements. Facilitates LEED® points
- No Electro-Magnetic (EMi) or Radio Frequency Interference (RFi)
- Environmentally Friendly: 98% of the HyLite LED Lamp is Recyclable

E361357



HyLite LED Omni-Bulbs offer a truly universal G24 base - designed to replace both 2-pin and 4-pin G24 bases listed below:

G24d	G24q	Gx24d	Gx24q
G24d-1	G24q-1	Gx24d-2	Gx24q-1
G24d-2	G24q-2	Gx24d-3	Gx24q-2
G24d-3	G24q-3		Gx24q-3
			Gx24q-4



98%
RECYCLABLE

NO
LEAD, MERCURY,
HEAVY METALS
OR TOXIC GASES

Universal Burning Positioning

Lamp can be oriented in any position
- does not affect or diminish the life of the lamp

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LED Lighting

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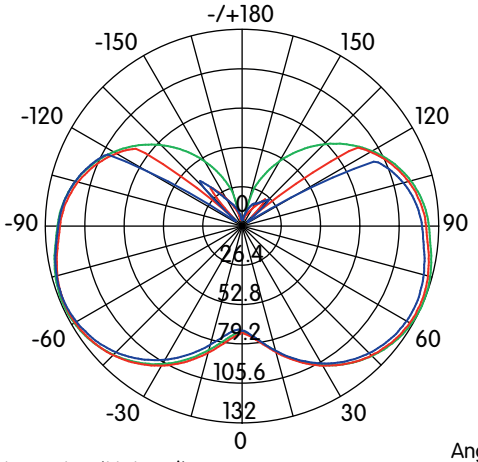
Model No.	Watts	Lumens (lm)	Input Line Current	Dimensions and Weight (each)		
				Width	Height	Net Weight
HL-OB-12W-G24	12	1277	98mA@120V	1.5" (39mm)	6.75" (171mm)	4.75 oz. (133g)

- Efficacy: 103 lpw
- CRI: >80
- Beam Angle: 360°
- THD (%): <7%
- Universal Input Voltage 100~277V, AC 50/60 Hz.
- Power Factor: >0.98
- Protection: IP20
- Rated Life: 50,000 Hrs.*
- Warranty: 5 Years
- Ambient Working Temperature: -4°F~+104°F (-20°C~+40°C)
- Base Type: G24
- CCT: 3500K (Neutral White), 4000K (Cool White) and 5000K (DayLight)

** Depending upon the ambient temperature of the installation location*

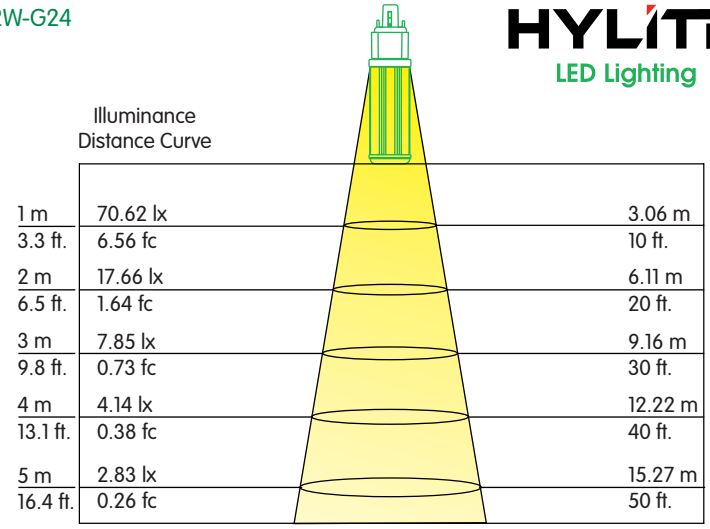
AC Direct | Type B

HyLite Omni-Bulb, HL-OB-12W-G24
Photometrics



Intensity: (Unit, cd)

	Angle [50% Max.]	Angle [10% Max]
C30/210	282.5°	330.5°
C0/180	254.7°	307.8°
C90/270	238.8°	320.2°



Note: The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance

Ordering for HyLite 12W LED Omni-Bulb with G24 Base

Model / Base	Nominal Color Temperature (CCT, °K)	
HL-OB-12W-G24	-35K	3500K = Neutral White (NW)
	-40K	4000K = Cool White (CW)
	-50K	5000K = DayLight (DL)

Warning: Disable all Power to the Luminaire. HyLite LED Omni-Bulbs are designed to work off 100V~277V, AC. HyLite 8W LED Omni-Bulbs are not compatible with Electronic Ballasts. Electronic Ballast (if equipped) must be Bypassed or removed from the Luminaire before installing the Lamp. Failure to Follow Instructions will VOID Warranty. It can also result in an Electric Shock, or Fire. NOT FOR TOTALLY ENCLOSED LUMINAIRES OR EMERGENCY LIGHTING. NOT FOR USE WITH DIMMERS.

Warning - Risk of Fire or Electric Shock

- For use in Dry or Damp Locations. Do not use where directly exposed to Liquid, Vapor, Rain or Weather. Non-Submergible (not water tight).
- Operate in Fixtures that provide the free flow of air around the Lamp. This will ensure Lumen Maintenance and Extend Its Working Life. When Products are used in Outdoor Fixtures, ensure the space is Waterproof and Well-Ventilated.
- The Installer must determine and verify whether 120V to 277V AC is being utilized at the Luminaire before Installation. Improper Voltage matching can result in Performance Degradation and/or Physical Damage. These Lamps work on Line Voltage and require all Ballasts and Starters to be Bypassed.
- Wiring modification for HyLite LED Lamp Installation requires knowledge of Luminaire Electrical Systems. If not qualified, DO NOT attempt Installation. Contact a Qualified Electrician.
- Luminaire Wiring, Ballast, or other Electrical Parts may be Damaged when Installing. Always check for enclosed Wiring and Components.
- To prevent Wiring Damage or Abrasion, DO NOT expose Wiring to edges of Sheet Metal or other Sharp Objects.
- DO NOT Make or Alter any Open Holes in an Enclosure for Wiring or Electrical Components during Installation.
- DO NOT Block Light emanating from Product in Whole or Part, as this may Cause an Unsafe Condition.
- Installing Surge/Lightning Protectors is Highly Recommended and helps to Eliminate Premature Driver Failure caused by Surges and other Power Fluctuations.
- The End Retrofit Fixture, once Modified, can No Longer Operate as was Originally Intended.

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8” CIRCULAR LED KITS
1600 AND 2200 LUMEN OPTIONS

FUTURE FIT LED KITS

DESCRIPTION

Pre-assembled UL 1598C Classified LED retrofit kit. Includes the following components:

• (1) LED Driver • (1) LED Module • (1) Metal Pan • Mounting Accessories (Threaded Rod, Mounting Hardware, and Wiring Hardware)

APPLICATION

Upgrade circular surface-mount fluorescent-style luminaires to an LED solution. Suitable for after-market or OEM installation. (OEM must have UL LED Luminaire General Coverage file.)

TYPICAL INSTALLATION APPLICATION

SYSTEM FEATURES

Module Features

- For Use in Class 2 Lighting Systems
- Highly Reflective White Soldermask
- Low Profile WAGO Push Connectors
- UL Recognized Components
- Single-Sided CEM3 Substrate
- 3-Step MacAdam Color Binning
- LM80 Tested LEDs by Samsung
- Beam Angle: 120º
- Reported Life Expectancy: L70 > 36,000 hours at Tc <85ºC
- Calculated Life Expectancy: L70 = 93,000 hours at Tc <85ºC
- Maximum Board Temperature at Tc Point: 85ºC

Driver Features

- Dimming Options: 120V Phase Control or 120-277V 0-10V
- High Power Factor
- UL 8750 Recognized Component LED Power Unit
- Meets FCC Part 15 Class B (Consumer) Limit for EMI
- Over Current, Short Circuit, and Open Circuit Protection
- Class 2 Output
- Type 1 Outdoor, Suitable for Dry and Damp Locations
- Up to 194ºF/90ºC Maximum Case Temperature
- THD: <20%

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8” CIRCULAR LED KITS
1600 AND 2200 LUMEN OPTIONS

PERFORMANCE SPECIFICATIONS

8”, 1600 LUMEN CIRCULAR

Dimming Type: Phase Control

KIT CONTENTS:
Driver: KTLD-20-1-560-FDIM-AQ7
Module: (1) KTLM-960-C2-8xx-64B
Metal Pan: Yes
Mounting Hardware and Accessories

Color Temp	Input Voltage	LED Retrofit Kit Catalog Number	No. of Modules	Total System Drive Current	Drive Current per Module	Total System Lumens	Total Module Power	Module Efficacy	Driver Efficiency	Total System Power	Total System Efficacy
3000K	120V	KT-RKIT-CP-8-1600-830-FDIM	1	560mA	560mA	1700	13W	130 lm/W	80%	16.2W	105 lm/W
4000K	120V	KT-RKIT-CP-8-1600-840-FDIM	1	560mA	560mA	1750	13W	135 lm/W	80%	16.2W	108 lm/W
5000K	120V	KT-RKIT-CP-8-1600-850-FDIM	1	560mA	560mA	1800	13W	138 lm/W	80%	16.2W	111 lm/W

Dimming Type: 0-10V

KIT CONTENTS:
Driver: KTLD-20-UV-560-VDIM-AQ7
Module: (1) KTLM-900-C2-8xx-48A
Metal Pan: Yes
Mounting Hardware and Accessories

Color Temp	Input Voltage	LED Retrofit Kit Catalog Number	No. of Modules	Total System Drive Current	Drive Current per Module	Total System Lumens	Total Module Power	Module Efficacy	Driver Efficiency	Total System Power	Total System Efficacy
3000K	120-277V	KT-RKIT-CP-8-1600-830-VDIM	1	560mA	560mA	1700	13W	130 lm/W	80%	16.2W	105 lm/W
4000K	120-277V	KT-RKIT-CP-8-1600-840-VDIM	1	560mA	560mA	1750	13W	135 lm/W	80%	16.2W	108 lm/W
5000K	120-277V	KT-RKIT-CP-8-1600-850-VDIM	1	560mA	560mA	1800	13W	138 lm/W	80%	16.2W	111 lm/W

8”, 2200 LUMEN CIRCULAR

Dimming Type: Phase Control

KIT CONTENTS:
Driver: KTLD-20-1-560-FDIM-AQ7
Module: (1) KTLM-960-C2-8xx-80B
Metal Pan: Yes
Mounting Hardware and Accessories

Color Temp	Input Voltage	LED Retrofit Kit Catalog Number	No. of Modules	Total System Drive Current	Drive Current per Module	Total System Lumens	Total Module Power	Module Efficacy	Driver Efficiency	Total System Power	Total System Efficacy
3000K	120V	KT-RKIT-CP-8-2200-830-FDIM	1	560mA	560mA	2110	16.3W	129 lm/W	80%	20.4W	103 lm/W
4000K	120V	KT-RKIT-CP-8-2200-840-FDIM	1	560mA	560mA	2180	16.3W	134 lm/W	80%	20.4W	107 lm/W
5000K	120V	KT-RKIT-CP-8-2200-850-FDIM	1	560mA	560mA	2240	16.3W	137 lm/W	80%	20.4W	109 lm/W

Dimming Type: 0-10V

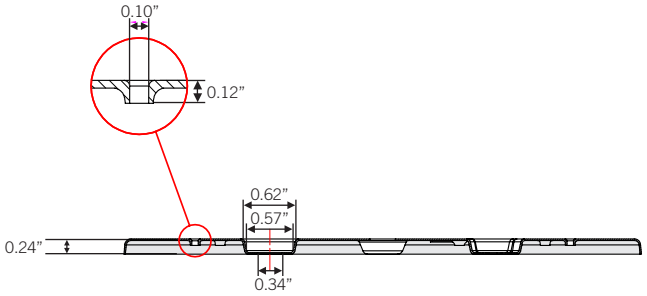
KIT CONTENTS:
Driver: KTLD-20-UV-560-VDIM-AQ7
Module: (1) KTLM-960-C2-8xx-80B
Metal Pan: Yes
Mounting Hardware and Accessories

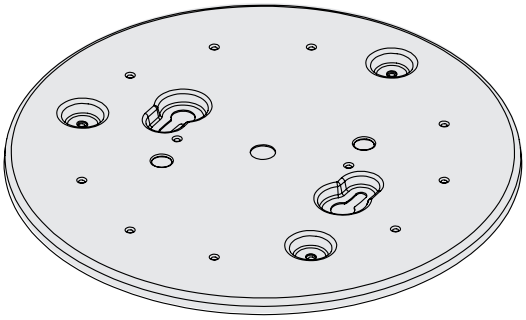
Color Temp	Input Voltage	LED Retrofit Kit Catalog Number	No. of Modules	Total System Drive Current	Drive Current per Module	Total System Lumens	Total Module Power	Module Efficacy	Driver Efficiency	Total System Power	Total System Efficacy
3000K	120-277V	KT-RKIT-CP-8-2200-830-VDIM	1	560mA	560mA	2110	16.3W	129 lm/W	80%	20.4W	103 lm/W
4000K	120-277V	KT-RKIT-CP-8-2200-840-VDIM	1	560mA	560mA	2180	16.3W	134 lm/W	80%	20.4W	107 lm/W
5000K	120-277V	KT-RKIT-CP-8-2200-850-VDIM	1	560mA	560mA	2240	16.3W	137 lm/W	80%	20.4W	109 lm/W

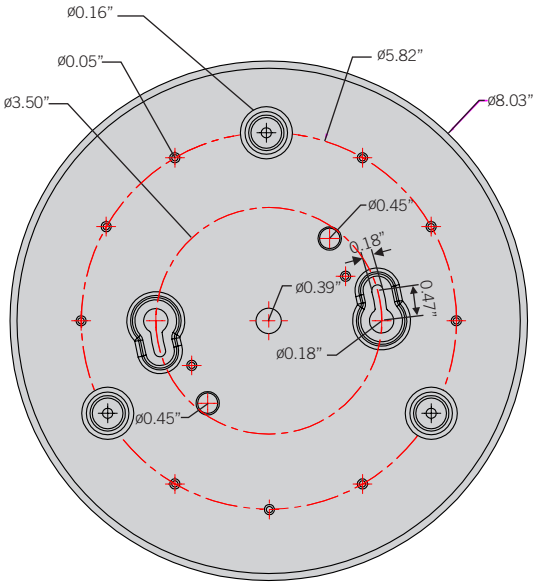
8” CIRCULAR LED KITS
1600 AND 2200 LUMEN OPTIONS

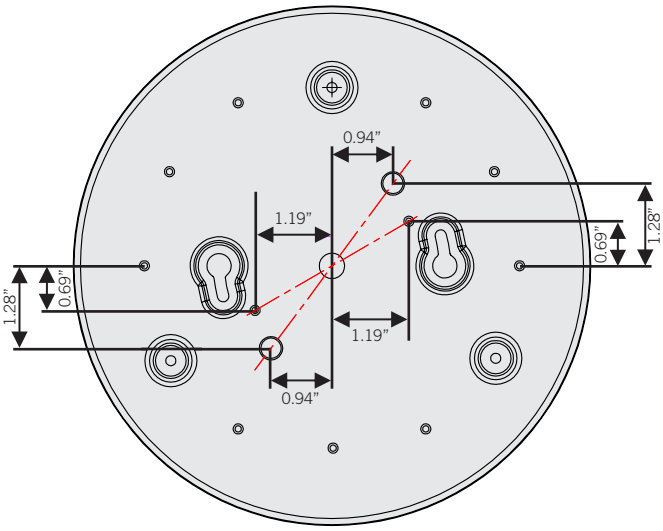
PHYSICAL SPECIFICATIONS

METAL PAN

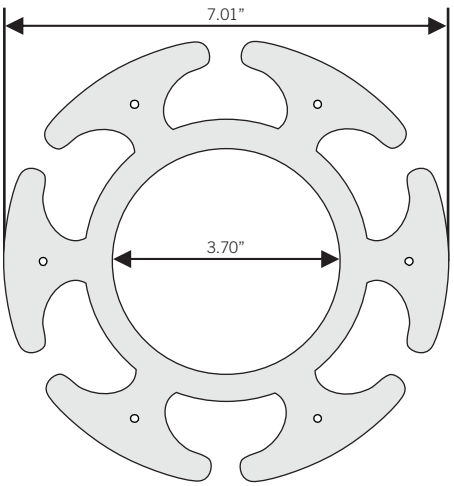




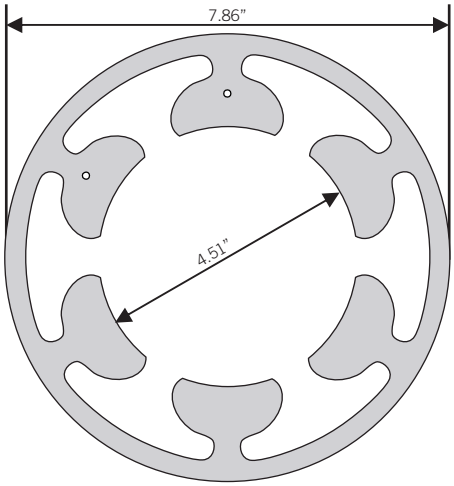




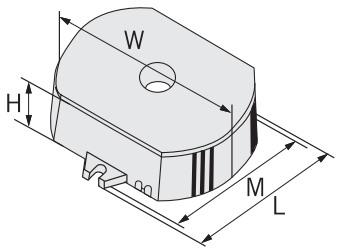
LED MODULE A
FOR 1600 LUMEN KITS



LED MODULE B
FOR 2200 LUMEN KITS



LED DRIVER



LENGTH	6.46”
WIDTH	1.32”
HEIGHT	1.00”
MOUNTING	6.00”

RECTANGULAR LED KITS
800 AND 1600 LUMEN OPTIONS

FUTURE›FIT LED KITS

DESCRIPTION

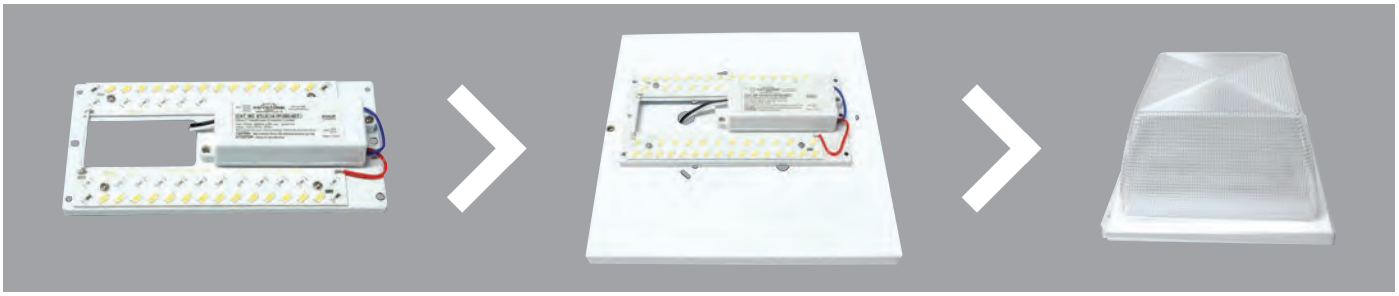
Pre-assembled UL 1598C Classified LED retrofit kit. Includes the following components:

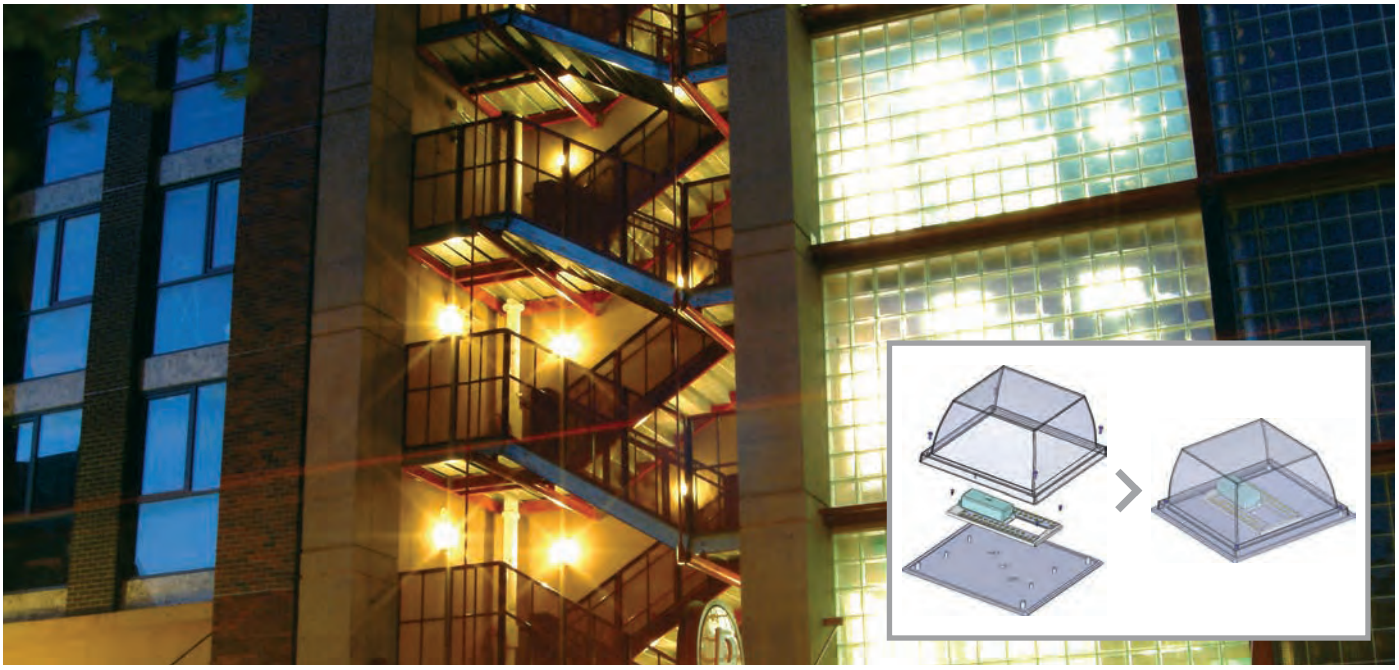
• (1) LED Driver • (1) LED Module • (1) Metal Pan • Mounting Accessories (Mounting Hardware and Wiring Hardware)

APPLICATION

Upgrade surface-mount canopy/security fluorescent-style luminaires to an LED solution. Suitable for after-market or OEM installation. (OEM must have UL LED Luminaire General Coverage file.)

TYPICAL FIXTURE APPLICATION





SYSTEM FEATURES

Module Features

- For Use in Class 2 Lighting Systems
- Highly Reflective White Soldermask
- Low Profile WAGO Push Connectors
- UL Recognized Components
- Single-Sided CEM3 Substrate
- 3-Step MacAdam Color Binning
- LM80 Tested LEDs by Samsung
- Beam Angle: 120°
- Reported Life Expectancy: L70 > 36,000 hours at Tc <85°C
- Calculated Life Expectancy: L70 = 93,000 hours at Tc <85°C
- Maximum Board Temperature at Tc Point: 85°C

Driver Features

- 120V Input, 0.7 Power Factor
- UL 8750 Recognized Component LED Power Unit
- Meets FCC Part 15 Class B (Consumer) Limit for EMI
- Over Current, Short Circuit, and Open Circuit Protection
- Class 2 Output
- Type 1 Outdoor, Suitable for Dry and Damp Locations
- Up to 194°F/90°C Maximum Case Temperature
- THD: <20%

RECTANGULAR LED KITS
800 AND 1600 LUMEN OPTIONS

PERFORMANCE SPECIFICATIONS

3”x6”, 800 LUMEN RECTANGULAR

Wiring: Series

KIT CONTENTS:
Driver: (1) KTLD-14-1P-560-AF5
Module: (2) KTLM-1050-R1-840-14A
Metal Pan: Yes
Mounting Hardware and Accessories

Color Temp	Input Voltage	LED Retrofit Kit Catalog Number	No. of Modules	Total System Drive Current	Drive Current per Module	Total Lumens per Module	Total System Lumens	Total Module Power	Module Efficacy	Driver Efficiency	Total System Power	Total System Efficacy
3000K	120V	KT-RKIT-RP-6-800-830	2	560mA	560mA	415	830	7W	118 lm/W	82%	8.5W	97 lm/W
4000K	120V	KT-RKIT-RP-6-800-840	2	560mA	560mA	425	850	7W	121 lm/W	82%	8.5W	100 lm/W
5000K	120V	KT-RKIT-RP-6-800-850	2	560mA	560mA	435	870	7W	124 lm/W	82%	8.5W	102 lm/W

3”x6”, 1600 LUMEN RECTANGULAR

Wiring: Series

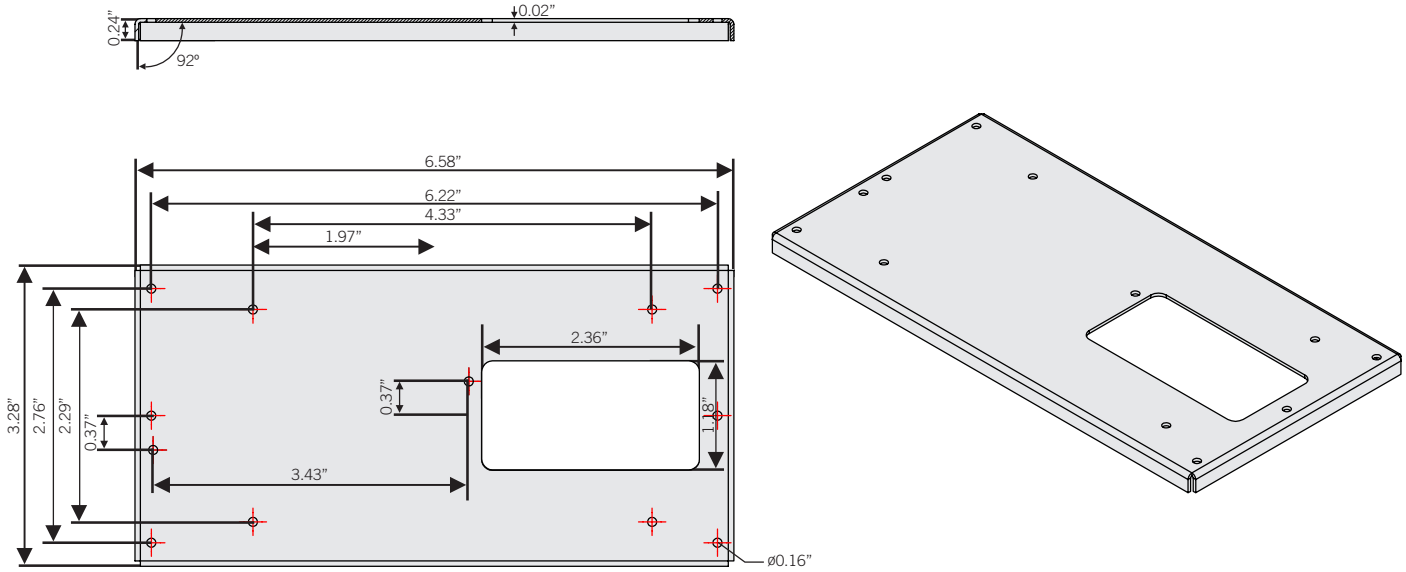
KIT CONTENTS:
Driver: (1) KTLD-14-1P-560-AF5
Module: (2) KTLM-1050-R1-840-28A
Metal Pan: Yes
Mounting Hardware and Accessories

Color Temp	Input Voltage	LED Retrofit Kit Catalog Number	No. of Modules	Total System Drive Current	Drive Current per Module	Total Lumens per Module	Total System Lumens	Total Module Power	Module Efficacy	Driver Efficiency	Total System Power	Total System Efficacy
3000K	120V	KT-RKIT-RP-6-1600-830	2	560mA	560mA	775	1550	14W	110 lm/W	82%	17W	91 lm/W
4000K	120V	KT-RKIT-RP-6-1600-840	2	560mA	560mA	800	1600	14W	114 lm/W	82%	17W	94 lm/W
5000K	120V	KT-RKIT-RP-6-1600-850	2	560mA	560mA	825	1650	14W	118 lm/W	82%	17W	97 lm/W

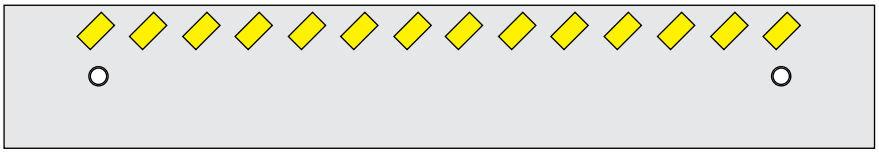
RECTANGULAR LED KITS
800 AND 1600 LUMEN OPTIONS

PHYSICAL SPECIFICATIONS

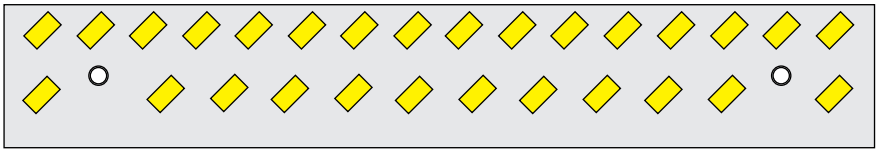
METAL PAN



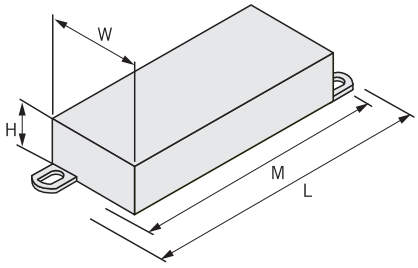
800 LUMEN MODULE
Part No. KTLM-1050-R1-840-14A



1600 LUMEN MODULE
Part No. KTLM-1050-R1-840-28A



LED DRIVER



LENGTH	3.70"
WIDTH	1.30"
HEIGHT	0.79"
MOUNTING	3.40"

KT-LED54HID-EX39-840-D

HID REPLACEMENT LED LAMP

DESCRIPTION

54W HID Replacement LED Lamp | 4000K | >83 CRI | IP64 Rated

LAMP TYPE: HID Replacement LED
BASE TYPE: EX39 (Mogul)
WATTAGE: 54W
COLOR TEMPERATURE: 4000K
METAL HALIDE EQUIVALENT: 250W
COLOR RENDERING INDEX (CRI): >83
WARRANTY: 5 Years

PRODUCT FEATURES

- Replacement for Conventional Metal Halide Lamp
- Non-Dimmable; Do Not Dim
- 50,000+ Hour Lifetime
- Environmentally Friendly: No Mercury Used
- Instant Startup
- UL Listed
- Operating Temperature: -29ºC/-20ºF to 60ºC/140ºF
- Suitable for Use in Fully Enclosed Fixture
- Integral Driver, Eliminates the Need for External Driver or Ballast; Includes 4kV Surge Protection
- IP64 Rated; Integrated Heat Sink Quickly Dissipates Heat and Guides Water Intrusion Out of the Lamp
- Active Cooling Technology: When Internal Thermal Sensor Reaches 84°C, Lamp Power Reduces To 80% Of Max; When Sensor Cools To 65°C Lamp Powers Back Up To 100% Rated Power
- DLC QPL Listed

OPERATING SPECIFICATIONS

ELECTRICAL CHARACTERISTICS

Input Voltage	Power Consumption	Power Factor	Input Current
120-277Vac	54W	>0.9	0.47A @ 120V 0.20A @ 277V

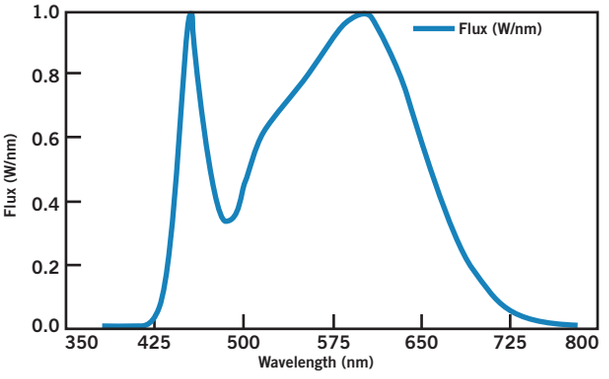
PHOTOMETRIC CHARACTERISTICS

Color Temperature (CCT)	4000K
Luminous Flux	7560 lm
Color Rendering Index (CRI)	>83
Efficacy	140 lm/W
Visible Light Area	360°

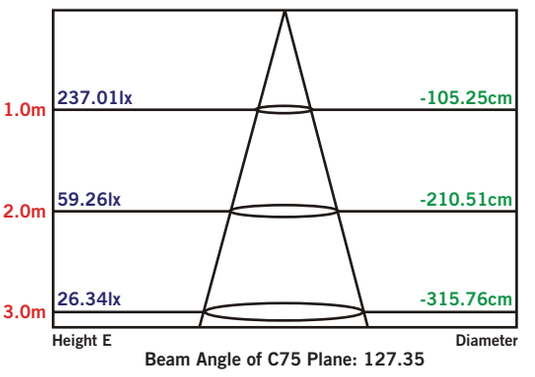
RATED LIFE

L70 (Hours)	50,000

SPECTRAL DISTRIBUTION



LUX DISTANCE CURVE



Beam Angle of C75 Plane: 127.35

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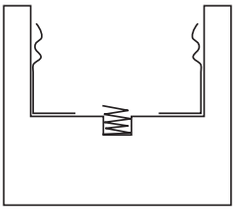
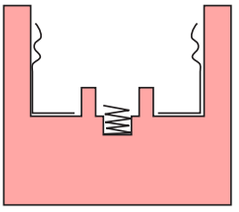
KT-LED54HID-EX39-840-D

HID REPLACEMENT LED LAMP



E39 MOGUL SOCKET



EX39 MOGUL SOCKET

EX39-based lamps will work in both E39 and EX39 sockets.

WIRING DIAGRAM

STEP 1
Disconnect power. Disconnect and remove existing ballast, capacitor, and/or ignitor (where applicable) from fixture.

STEP 2
Rewire for line voltage to the lamp socket.

STEP 3
Install new LED replacement lamp. Ensure lamp is operating properly when power is turned on.

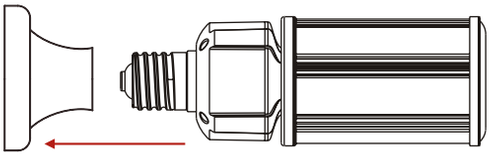


FIGURE 1

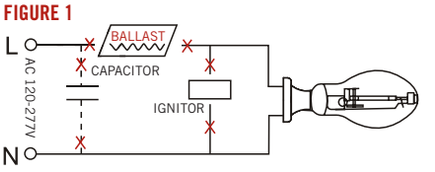


FIGURE 2

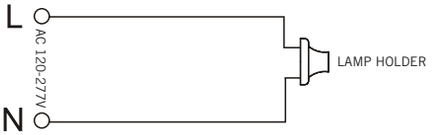
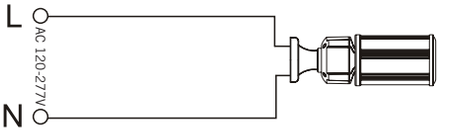
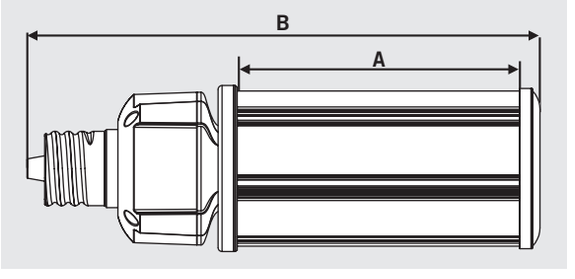
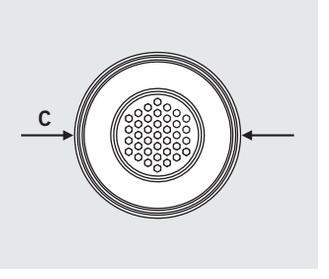


FIGURE 3



PHYSICAL CHARACTERISTICS





LAMP DIMENSIONS

A (Illuminated Length)	5.83”
B (Body Length)	10.70”
C (Diameter)	3.43”

BASE TYPE: EX39 (Mogul)

ORDERING INFORMATION

ORDER CODE	PACKAGING STYLE	PACK QTY.	ITEM STATUS
KT-LED54HID-EX39-840-D-DP	Distributor Pack (Individual Cartons)	16	Quick Ship

CATALOG NUMBER BREAKDOWN

KT-LED54HID-EX39-840-D-DP

- KT — Keystone Technologies
- LED — LED Lamp
- 54 — Wattage
- HID — Lamp Type
- EX39 — Base Type
- 840 — 800 Series
- D — Color Temp.
- DP — Direct Drive Series
- Packaging Style

Keystone Technologies • 1390 Welsh Road, North Wales, PA 19454 • Phone (800) 464-2680 • Fax (888) 966-0556 • **www.keystonetech.com**

Specifications subject to change. Last revised on 2.12.18

Verdera®
Lighted Mirrored Cabinet
K-99007-TL

Features
- LED Task lighting intergrated into the front of the cabinet.
- 1100 Lux at 22", (24" door) provides optimal brightness.
- Light guides provide an even, consistent light.
- Internal shelf with integrated outlets to power and charge small devices such as toothbrushes and shavers.
- Vertically adjustable magnifying mirror on the inside of the door.
- Triple mirror design gives superior visibility with mirrors on the front and back of the door as well as the back of the interior of the cabinet.
- 110° door swing with slow-close hinges.

Material
- Rust-Free aluminum construction provides a clean, lasting finish.

Installation
- Designed for surface or recess mount applications (side kits required for surface mount).
- Hang-and-secure mounting system for easier surface-mount installation.
- Adjustable glass shelves.
- Recommend professional Electrician installation.

Required Accessories
K-99012 Side Mirror Kit

or

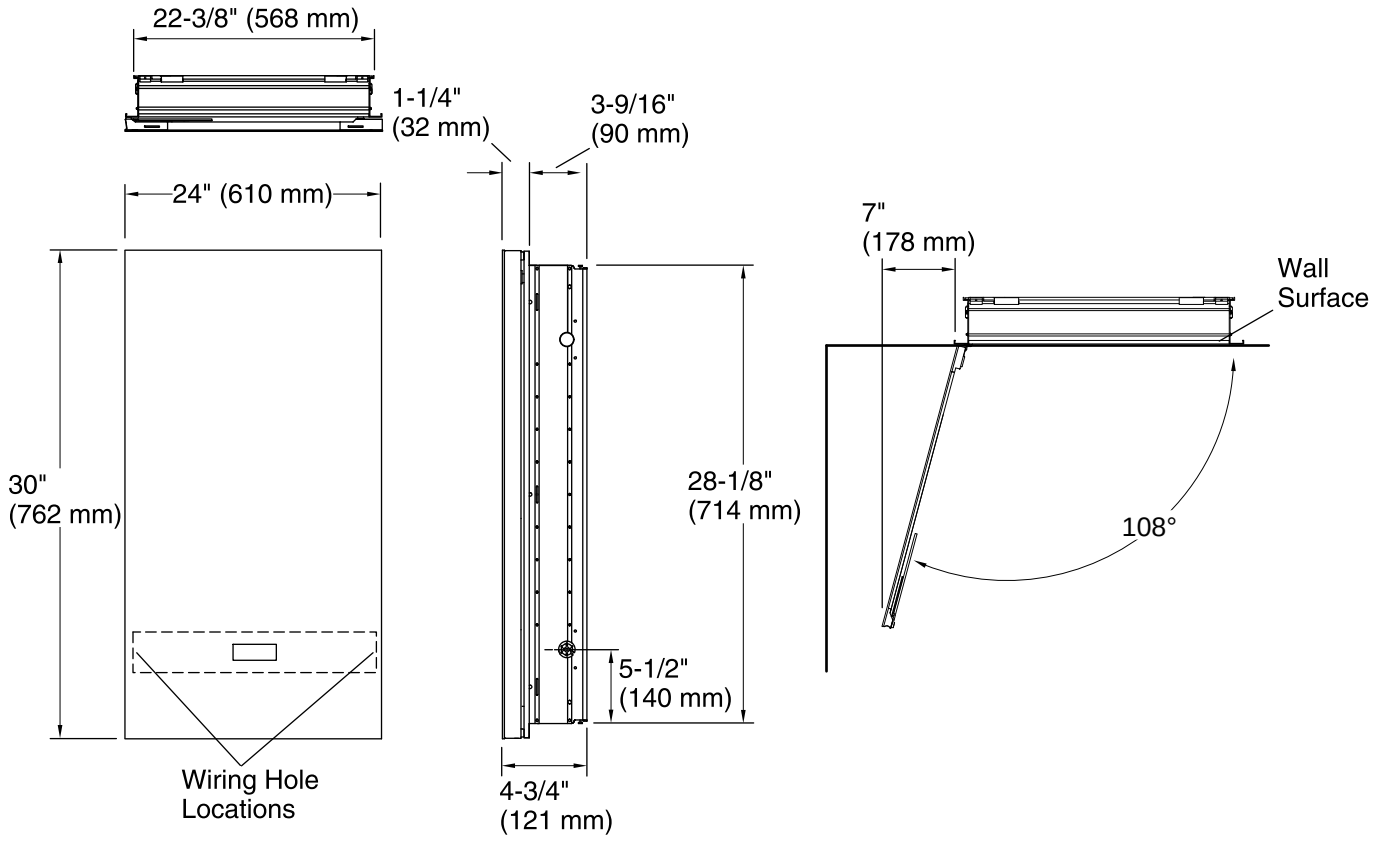
K-99675 Medicine Cabinet Side Kit

Recommended Accessories
K-99661-24 Medicine Cabinet Surround
K-99662-24 Medicine Cabinet Surround
K-99663-24 Medicine Cabinet Surround
K-99661-15 Medicine Cabinet Surround

Codes/Standards
UL 962

KOHLER® One-Year Limited Warranty
See website for detailed warranty information.

Verdera®
Lighted Mirrored Cabinet
K-99007-TL



Required Electrical Service
One circuit required, protected with Class A Ground-Fault Circuit-Interrupter (GFCI) or Residual Current Device (RCD).

Outlet, Lights: 120 V, 15 A, 60 Hz

Technical Information
All product dimensions are nominal.

Notes
Install this product according to the installation guide.

To recess mount, the wall cavity must be framed and the cabinet secured to framing studs. Reroute electrical or water supply lines from the cavity. Consult a professional if drain or vent piping is encountered, or if the wall is load-bearing.

To determine the height of the cabinet, ensure the door will clear all obstacles (such as a faucet). A minimum 3" (76 mm) distance is required.

Cutout for recess-mount installations: 22-1/2" (572 mm) wide x 28-1/4" (718 mm) high x 3-11/16" (94 mm) deep.

A dimmer switch is required. This product is compatible with most residential dimmer switches intended for incandescent and dimmable LED bulbs.

LED T8 - LINEAR REPLACEMENT LAMP

GLASS SERIES
UL TYPE-B

PRODUCT DESCRIPTION:

MaxLite LED T8 Linear Replacement Lamps are the ideal energy saving choices when upgrading traditional linear T8 or T12 fluorescent lamps in fixtures containing standard G13 (medium bi-pin) sockets. The LED T8 lamps are designed to provide appropriate light levels while utilizing a dedicated internal driver and require non-shunted G13 medium bi-pin lamp holders.

FEATURES:

- Universal voltage: 120V-277V applications
- Color Rendering Index (CRI): ≥82
- 50,000 hour life
- THD <20%
- High power factor: ≥.90
- Easy retrofit into most common linear fluorescent fixtures
- Simple ballast bypass
- Instant on
- Mercury free and virtually no UV or IR light
- Non dimmable
- NSF certified
- Suitable for enclosed fixture
- Five year limited warranty
- L9T8SExx-G, L15T8SExx-G & L18T8SExx-G are listed on the DLC QPL ("xx"= 35, 40 or 50" designating color temperature

MODEL SELECTION (Full list of order codes on pg. 3) — Typical order example: L9T8SE240-G

L	9	T8	SE	2	
FAMILY	**WATTAGE**	**LAMP TYPE**	**OPERATION**	**LENGTH**	**CCT**
L= LED Linear	**9=** 9W	**T8=** T8 tube	**SE=** Single-End Power	**2=** 2 FT	**35-G=** 3500K, Glass[1] **40-G=** 4000K, Glass **50-G=** 5000K, Glass

MODEL SELECTION (Full list of order codes on pg. 3) — Typical order example: L12T8SE340-G, L19T8SE540-G or L30T8SE640-G

L		T8	SE		40-G
FAMILY	**WATTAGE**	**LAMP TYPE**	**OPERATION**	**LENGTH**	**CCT**
L= LED Linear	**12=** 12W[2]	**T8=** T8 tube	**SE=** Single-End Power	**3=** 3 FT[2]	**40-G=** 4000K, Glass
	19= 19W[3]			**5=** 5 FT[3]	
	30= 30W[4]			**6=** 6 FT[4]	

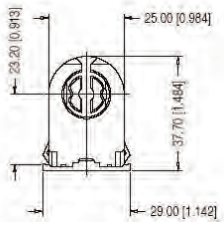
MODEL SELECTION (Full list of order codes on pg. 3) — Typical order example: L18T8SE440-G

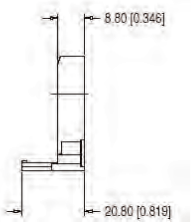
L		T8	SE	4	
FAMILY	**WATTAGE**	**LAMP TYPE**	**OPERATION**	**LENGTH**	**CCT**
L= LED Linear	**15=** 15W[5] **18=** 18W[6]	**T8=** T8 tube	**SE=** Single-End Power	**4=** 4 FT	**35-G=** 3500K, Glass[5,6] **40-G=** 4000K, Glass[6] **50-G=** 5000K, Glass[5,6]
	15= 15W[7]				**65-G=** 6500K, Glass[7]

NOTES:

1. L9T8SE235-G is special order only
2. L12T8SE340-G is special order only, no DLC for 3ft model
3. L19T8SE540-G is special order only, no DLC for 5ft model
4. L30T8SE640-G is special order only, no DLC for 6ft model
5. L15T8SE435-G and L15T8DF450-G are special order only
6. L18T8SE4xx-G are special order only
7. L15T8SE465-G, no DLC for 6500K model

ACCESSORIES			
ORDER CODE	MODEL NUMBER	DESCRIPTION	ACCESSORIES IMAGE
73978	G13LPNS	G13 Low Profile Non-Shunted Lamp Holder	





SPECIFICATIONS:

ITEM	SPECIFICATION	2 - FOOT	3 - FOOT	4 - FOOT		5 - FOOT	6 - FOOT
		DETAILS					
GENERAL PERFORMANCE	Power Consumption	9W	12W	15W	18W	19W	30W
	Lumens Delivered	1,150	1,450	1,800	2,200	2,500	3,600
	Efficacy	127 lm/w	120 lm/w	120 lm/w	122 lm/w	131 lm/W	120 lm/W
	CRI	≥82					
	Beam Angle	330°					
	Color Temperature (CCT)	3500K, 4000K, 5000K	4000K	3500K, 4000K, 5000K, 6500K (15W only)		4000K	4000K
	Lumen Maintenance (L70)	50,000 hours					
ELECTRICAL	Power Factor	≥ 0.90					
	Input Voltage	120V-277V, 50/60 Hz					
PHYSICAL	Operating Temperature	-4°F to 113°F		-4°F to 113°F	-4°F to 113°F		
	Lens	Opal (Frosted)					
CERTIFICATION	Certification	DLC 4.2, UL Classified, NSF, LM80	UL Classified, NSF, LM80	DLC 4.2, UL Classified, NSF, LM79, LM80		UL Classified, NSF, LM80	
	Material Usage	RoHS compliant; no mercury					
	Environment	Dry & Damp					
	Warranty	5 Years					

Lighting layouts and spacing criteria available upon request

ORDERING:

ORDER CODE	ITEM NO	INPUT WATTAGE	EQUIVALENT WATTAGE	BEAM ANGLE	DELIVERED LUMENS	EFFICACY (lm/W)	CRI	BASE TYPE	DLC	CCT	M.O.L
2FT MODELS											
101597	L9T8SE235-G[1]	9	17W Fluorescent	330˚	1150	127	82	G13	N	3500K	23.75”
101598	L9T8SE240-G[1]	9	17W Fluorescent	330˚	1150	127	82	G13	N	4000K	23.75”
101599	L9T8SE250-G[1]	9	17W Fluorescent	330˚	1150	127	82	G13	N	5000K	23.75”
3FT MODEL											
101600	L12T8SE340-G[2]	12	25W Fluorescent	330˚	1450	120	82	G13	N	4000K	35.75”
4FT MODELS											
76425	L15T8SE435-G[5]	15	32W Fluorescent	330˚	1800	120	85	G13	Y	3500K	47.75”
76420	L15T8SE440-G[8]	15	32W Fluorescent	330˚	1800	120	85	G13	Y	4000K	47.75”
76421	L15T8SE450-G[5]	15	32W Fluorescent	330˚	1800	120	85	G13	Y	5000K	47.75”
99913	L15T8SE465-G[7]	15	32W Fluorescent	330˚	1850	123	85	G13	N	6500K	47.75”
76422	L18T8SE435-G[6]	18	32W Fluorescent	330˚	2200	122	85	G13	Y	3500K	47.75”
76423	L18T8SE440-G[6]	18	32W Fluorescent	330˚	2200	122	85	G13	Y	4000K	47.75”
76424	L18T8SE450-G[6]	18	32W Fluorescent	330˚	2200	122	85	G13	Y	5000K	47.75”
5FT MODEL											
101601	L19T8SE540-G[3]	19	40W Fluorescent	330˚	2500	131	82	G13	N	4000K	59.60”
6FT MODELS											
101602	L30T8SE640-G[4]	30	70W Fluorescent	330˚	3600	120	82	G13	N	4000K	70”

NOTES:

1. L9T8SE235-G is special order only
2. L12T8SE340-G is special order only, no DLC for 3ft model
3. L19T8SE540-G is special order only, no DLC for 5ft model
4. L30T8SE640-G is special order only, no DLC for 6ft model
5. L15T8SE435-G and L15T8DF450-G are special order only
6. L18T8SE4xx-G are special order only
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McGraw-Edison

DESCRIPTION

The TopTier™ parking garage, canopy and low-bay luminaire is an innovative solution that delivers an unparalleled combination of performance and visual comfort. The patented WaveStream™ optical technology blocks the line of sight from the LED light sources to the observer, while extracting the maximum amount of light on task. This approach results in a high level of uniformity and vertical footcandles that enhances safety in the application environment. The TopTier luminaire is UL/cUL listed for wet locations, IP66 and 3G vibration rated.

Catalog #		**Type**
Project		
Comments		**Date**
Prepared by		

SPECIFICATION FEATURES

Construction
One-piece, low copper die-cast aluminum housing provides a clean and symmetric housing. Formed aluminum top is sloped to prevent bird nesting. Metal electrical tray allows for easy electrical access for field servicing.

Optics
Unique optical distributions are accomplished using various combinations of reflective backing plates and WaveStream optical technology. The optical Waveguide is manufactured using precision injection molded acrylic. The optics contain features that form a repeatable and redundant pattern to direct light in a precisely prescribed distribution. The drive lane distribution is specifically designed for locations with one direction of travel to optimally direct light in the same direction of travel for maximum glare control. For additional glare control and visual comfort with the Wide distribution, specify the SG option which adds a Solite® glass lens that works in combination with the Waveguide lens and reflective backing plate.

Offered standard in 4000K (+/-275K) CCT, optional 3000K, 5000K and 6000K. Minimum 70 CRI. Optional uplight feature provides a dedicated light engine (17W) to maintain consistent output across fixtures and reduces cave effect. Nominal uplight output is 800 lumens and ranges from 10%-30% total light output depending on the lumen package.

Electrical
LED driver(s) are mounted to metal electrical tray for optimal thermal performance. 120-277V 50/60Hz, 347V 60Hz or 480V 60Hz operation. 480V is compatible for use with 480V Wye systems only. Standard with 0-10V dimming driver(s), specify 5LTD for Fifth Light DALI driver(s). Shipped standard with Eaton proprietary circuit module designed to withstand 10kV of transient line surge. Greater than 90% lumen maintenance expected at 60,000 hours, based off LM-80 test data and TM-21. Suitable for ambient temperature applications from -40°C (-40°F) to 40°C (104°F). For 50°C (122°F) applications, specify the HA high ambient option. IP66 rated against the ingress of dust and water.

Mounting
Standard fixture mounts to a square or octagonal 4" surface or recessed j-box via heavy-gauge quick mount bracket. Optional mounting methods include trunnion mount and wall mount. With the addition of a field supplied wet location j-box, the luminaire can be pendant mounted using the factory supplied decorative pendant mount kit or a suitable field supplied pendant.

Finish
Housing finished in white super durable TGIC polyester powder coat paint with 2.5 mil nominal thickness for superior protection against fade and wear. Optional colors include black, bronze, grey, dark platinum and graphite metallic. RAL and custom color matches available. Consult the McGraw-Edison Architectural Colors brochure for the complete selection.

Warranty
Five-year warranty.

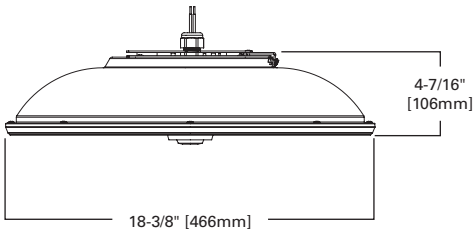
TT TOPTIER LED

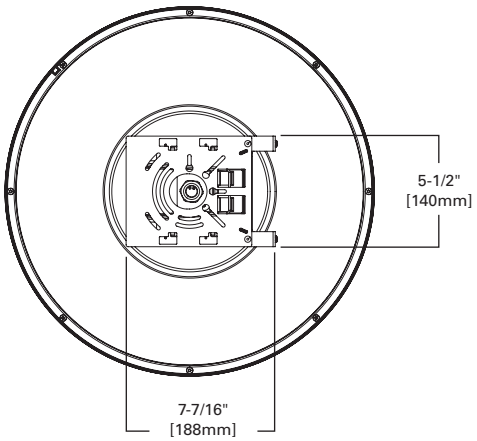
Solid State LED

PARKING GARAGE/ CANOPY/ LOW-BAY LUMINAIRE

DIMENSIONS

SURFACE OR PENDANT MOUNT





powered by fifthlight technology

CERTIFICATION DATA

UL/cUL Wet Location Listed
3G Vibration Rated
LM79 / LM80 Compliant
IP66 Rated
ISO 9001
DesignLights Consortium™ Qualified*

ENERGY DATA

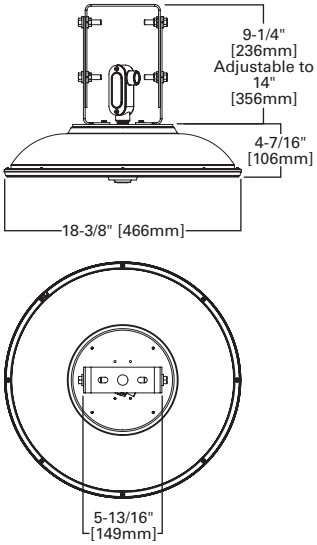
Electronic LED Driver
>0.9 Power Factor
<20% Total Harmonic Distortion
120-277V/50 & 60Hz, 347V/60Hz, 480V/60Hz
-40°C Min. Temperature
40°C Max. Temperature
50°C Max. Temperature (HA Option)

SHIPPING DATA

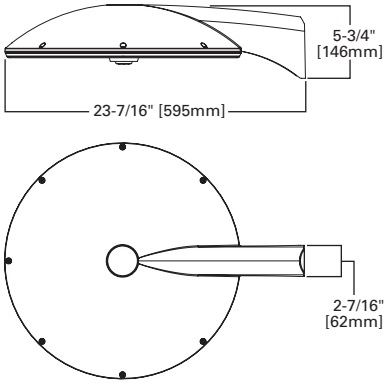
Approximate Net Weight:
16 lbs. (7.2 kgs.)

ADDITIONAL MOUNTING OPTIONS

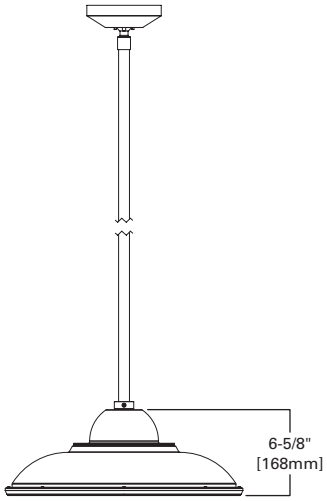
TRUNNION MOUNT



WALL MOUNT

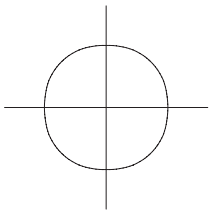


DECORATIVE PENDANT MOUNT

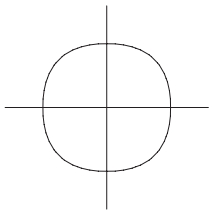


OPTICAL DISTRIBUTIONS

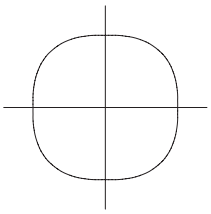
CQ (Concentrated)



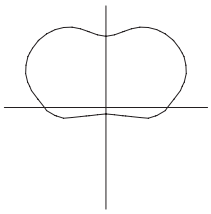
MQ (Medium)



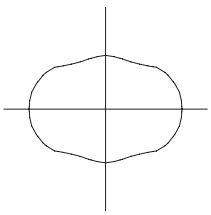
WQ (Wide)



DL (Drive Lane)



RW (Rectangular Wide)



LUMEN MAINTENANCE

Ambient Temperature	Lumen Maintenance				
	25,000 Hours	50,000 Hours	60,000 Hours TM-21 Rating	100,000 Hours	Theoretical L70 (Hours) Per TM-21 Data
C1 Lumen Package					
25°C	> 96%	> 95%	> 95%	> 93%	> 500,000
40°C	> 96%	> 94%	> 94%	> 93%	> 500,000
50°C	> 95%	> 94%	> 93%	> 93%	> 400,000
C2 Lumen Package					
25°C	> 96%	> 95%	> 95%	> 93%	> 500,000
40°C	> 95%	> 94%	> 93%	> 91%	> 500,000
50°C	> 95%	> 93%	> 92%	> 90%	> 400,000
C3 Lumen Package					
25°C	> 96%	> 93%	> 93%	> 89%	> 300,000
40°C	> 95%	> 91%	> 90%	> 85%	> 240,000
50°C	> 95%	> 90%	> 89%	> 83%	> 200,000
C4 Lumen Package					
25°C	> 96%	> 95%	> 95%	> 93%	> 500,000
40°C	> 95%	> 92%	> 92%	> 88%	> 300,000
50°C	> 94%	> 91%	> 90%	> 85%	> 250,000
C5 Lumen Package					
25°C	> 96%	> 93%	> 92%	> 88%	> 300,000
40°C	> 94%	> 90%	> 89%	> 83%	> 200,000
C6 Lumen Package					
25°C	> 95%	> 92%	> 90%	> 86%	> 250,000
40°C	> 95%	> 92%	> 91%	> 86%	> 250,000

POWER AND LUMENS

Lumen Package			**C1**	**C2**	**C3**	**C4**	**C5**	**C6**
Power (Wattage)			28	34	45	58	77	108
Current @ 120V (A)			0.26	0.31	0.41	0.52	0.69	0.95
Current @ 277V (A)			0.13	0.14	0.19	0.24	0.30	0.41
3000K CCT	Lumens	CQ Concentrated	3,293	3,997	5,256	5,486	7,107	9,084
	Lumens per Watt		118	118	117	95	92	84
	BUG Rating		B1-U0-G1	B2-U0-G1	B2-U0-G1	B2-U0-G1	B2-U0-G1	B3-U0-G1
	Lumens	MQ Medium	3,357	4,074	5,357	5,591	7,243	9,259
	Lumens per Watt		120	120	119	96	94	86
	BUG Rating		B2-U0-G1	B2-U0-G1	B2-U0-G2	B2-U0-G2	B3-U0-G2	B3-U0-G2
	Lumens	WQ Wide	3,101	3,764	4,949	5,165	6,691	8,554
	Lumens per Watt		111	111	110	89	87	79
	BUG Rating		B2-U0-G1	B2-U0-G2	B3-U0-G2	B3-U0-G2	B3-U0-G2	B3-U0-G3
	Lumens	RW Rectangular Wide	2,726	3,308	4,350	4,540	5,882	7,519
	Lumens per Watt		97	97	97	78	76	70
	BUG Rating		B2-U0-G1	B2-U0-G2	B3-U0-G2	B3-U0-G2	B3-U0-G2	B3-U0-G3
	Lumens	DL Drive Lane / Type 4	2,440	2,938	4,152	--	--	--
	Lumens per Watt		73	71	62	--	--	--
	BUG Rating		B1-U0-G2	B1-U0-G2	B2-U0-G3	--	--	--
4000K CCT	Lumens	CQ Concentrated	3,848	4,670	6,141	7,273	9,423	12,046
	Lumens per Watt		137	137	136	126	123	111
	BUG Rating		B2-U0-G1	B2-U0-G1	B2-U0-G1	B2-U0-G1	B3-U0-G1	B3-U0-G2
	Lumens	MQ Medium	3,922	4,760	6,259	7,413	9,604	12,277
	Lumens per Watt		140	140	139	128	125	114
	BUG Rating		B2-U0-G1	B2-U0-G2	B3-U0-G2	B3-U0-G2	B3-U0-G3	B3-U0-G3
	Lumens	WQ Wide	3,623	4,397	5,782	6,848	8,872	11,342
	Lumens per Watt		129	129	128	118	115	105
	BUG Rating		B2-U0-G2	B2-U0-G2	B3-U0-G2	B3-U0-G2	B3-U0-G3	B4-U0-G3
	Lumens	RW Rectangular Wide	3,185	3,865	5,082	6,019	7,799	9,969
	Lumens per Watt		114	114	113	104	101	92
	BUG Rating		B2-U0-G2	B2-U0-G2	B3-U0-G2	B3-U0-G2	B3-U0-G3	B3-U0-G3
	Lumens	DL Drive Lane / Type 4	3,235	3,895	5,506	--	--	--
	Lumens per Watt		98	95	83	--	--	--
	BUG Rating		B1-U0-G2	B1-U0-G2	B2-U0-G3	--	--	--
5000K CCT	Lumens	CQ Concentrated	3,645	4,424	5,817	7,204	9,334	11,932
	Lumens per Watt		130	130	130	124	121	110
	BUG Rating		B1-U0-G1	B2-U0-G1	B2-U0-G1	B2-U0-G1	B3-U0-G1	B3-U0-G2
	Lumens	MQ Medium	3,716	4,509	5,929	7,343	9,513	12,161
	Lumens per Watt		133	133	132	127	124	113
	BUG Rating		B2-U0-G1	B2-U0-G2	B3-U0-G2	B3-U0-G2	B3-U0-G3	B3-U0-G3
	Lumens	WQ Wide	3,433	4,166	5,478	6,783	8,788	11,235
	Lumens per Watt		123	123	122	117	114	104
	BUG Rating		B2-U0-G2	B2-U0-G2	B3-U0-G2	B3-U0-G2	B3-U0-G3	B3-U0-G3
	Lumens	RW Rectangular Wide	3,017	3,662	4,815	5,962	7,725	9,875
	Lumens per Watt		108	108	107	103	100	91
	BUG Rating		B2-U0-G2	B2-U0-G2	B3-U0-G2	B3-U0-G2	B3-U0-G3	B3-U0-G3
	Lumens	DL Drive Lane / Type 4	3,205	3,858	5,454	--	--	--
	Lumens per Watt		96	93	82	--	--	--
	BUG Rating		B1-U0-G2	B1-U0-G2	B2-U0-G3	--	--	--

NOTE: Nominal data with 70 CRI for 4000K and 5000K, 80 CRI for 3000K. Wattage values not valid for drive lane optic. For configurations that include the drive lane optic, glass, uplight or occupancy sensor options refer to the specific IES files for wattage, BUG rating and lumen output data.

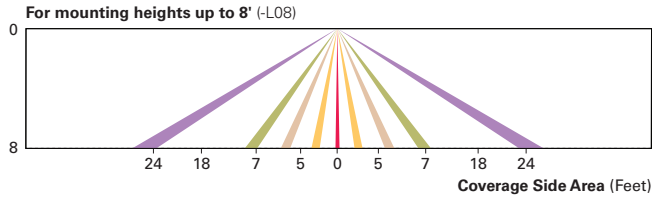
CONTROL OPTIONS

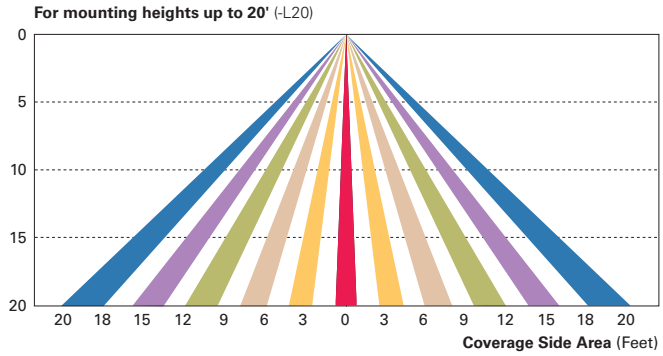
0-10V
This fixture is offered standard with 0-10V dimming driver(s). External 0-10V dimming wire leads are provided for use with a lighting control panel or other control methods except when PER7, 5LTD, MS/DIM or LWR is specified.

Dimming Occupancy Sensor (MS/DIM-LXX)
These sensors are factory installed in the luminaire housing. When the MS/DIM-LXX sensor option is selected, the occupancy sensor is connected to a dimming driver and the entire luminaire dims when there is no activity detected. When activity is detected, the luminaire returns to full light output. The MS/DIM sensor is factory preset to dim down to approximately 50 percent power with a time delay of five minutes.

These occupancy sensors include an integral photocell that can be activated with the FSIR-100 accessory for “dusk-to-dawn” control or daylight harvesting. The factory preset is OFF. The FSIR-100 is a wireless tool utilized for changing the dimming level, time delay, sensitivity and other parameters.

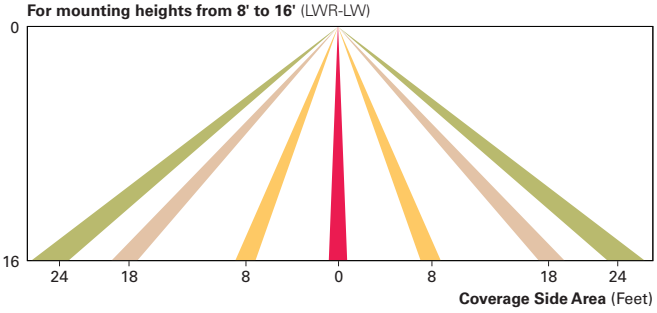
A variety of sensor lenses are available to optimize the coverage pattern for mounting heights from 8’-40’.

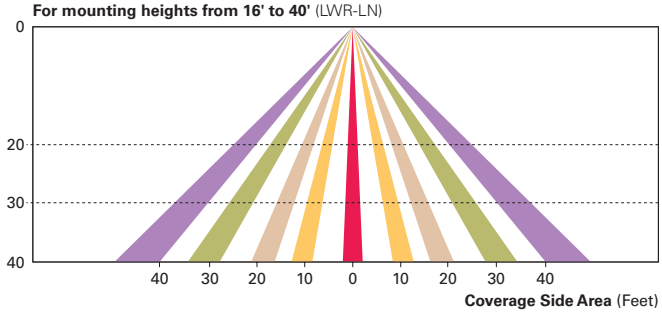




LumaWatt Pro Wireless Control and Monitoring System (LWR-LW and LWR-LN)
The LumaWatt Pro system is a peer-to-peer wireless network of luminaire-integral sensors for any sized project. Each sensor is capable of motion and photo sensing, metering power consumption and wireless communication. The end-user can securely create and manage sensor profiles with browser-based management software. The software will automatically broadcast to the sensors via wireless gateways for zone-based and individual luminaire control. The LumaWatt Pro software provides smart building solutions by utilizing the sensor to provide easy-to-use dashboard and analytic capabilities such as improved energy savings, traffic flow analysis, building management software integration and more.

For additional details, refer to the LumaWatt Pro product guides.





ORDERING INFORMATION

Sample Number: TT-C2-LED-E1-WQ-AP

Product Family	Lumen Package	Lamp Type	Voltage	Distribution	Mounting	Color
TT=TopTier [1]	**C1**=Nominal 3,500 Lumens **C2**=Nominal 4,500 Lumens **C3**=Nominal 6,000 Lumens **C4**=Nominal 7,500 Lumens **C5**=Nominal 9,500 Lumens **C6**=Nominal 12,000 Lumens	**LED**=Solid State Light Emitting Diodes	**E1**=Electrical (120-277V) **347**=347V **480**=480V [2]	**CQ**=Concentrated **MQ**=Medium **WQ**=Wide **RW**=Rectangular Wide **DL**=Drive Lane / Type 4 [3]	**[BLANK]**=Surface or Pendant Mount **TMB**=Trunnion Mount with Connection Box **WM**=Wall Mount **DPM**=Decorative Pendant Mount [4]	**[BLANK]**=White **AP**=Grey **BZ**=Bronze **BK**=Black **DP**=Dark Platinum **GM**=Graphite Metallic

Options (Add as Suffix)	**Accessories** (Order Separately)
8030=80 CRI / 3000K **7060**=70 CRI / 6000K **7050**=70 CRI / 5000K **UPL**=Uplight [5, 6] **30L**=30" Wire Leads [7] **HA**=50°C High Ambient [8] **CG**=Clear Glass [9] **SG**=Solite® Glass [10] **TR**=Tamper Resistant Hardware **X**=Driver Surge Protection Only **5LTD**=Fifth Light DALI Drivers [7, 11] **IBP**=Integral Battery Pack [12] **ICP**=Integral Cold Weather Battery Pack [12] **MS/DIM-L08**=Dimming Occupancy Sensor (<9' Mounting) [13, 14] **MS/DIM-L20**=Dimming Occupancy Sensor (9' - 20' Mounting) [13, 14] **LWR-LW**=LumaWatt Wireless Sensor, Wide Lens 8' - 16' Mounting Height [14, 15] **LWR-LN**=LumaWatt Wireless Sensor, Narrow Lens 16' - 40' Mounting Height [14, 15]	**FSIR-100**=Wireless Configuration Tool for Occupancy Sensor **MA1252**= Replacement 10kV Circuit Module **TT/WG**=Wire Guard **TT/BG-XX**=Bird Guard [16, 17] **DPMS36-XX**=36" Pendant Mount Stem [16] **DPMS48-XX**=48" Pendant Mount Stem [16] **DPMS96-XX**=96" Pendant Mount Stem [16]

NOTES:
1. DesignLights Consortium™ Qualified. Refer to www.designlights.org Qualified Products List under Family Models for details.
2. Only for use with 480V Wye systems. Per NEC, not for use with ungrounded systems, impedance grounded systems or corner grounded systems (commonly known as Three Phase Three Wire Delta, Three Phase High Leg Delta and Three Phase Corner Grounded Delta systems).
3. C1-C3 lumen packages only.
4. Order stem kit accessory.
5. Extended lead times apply.
6. Additional 17W. Provides 800 nominal lumens. Available in 3000K and 4000K with the C1-C4 lumen packages at a 25°C maximum ambient temperature. Not available with 347, 480, TMB, WM, HA, 5LTD, IBP or ICP.
7. Not available with TMB or DPM mounting.
8. HA not available with C5 and C6 lumen packages or 5LTD, IBP and ICP options.
9. Not available with CQ.
10. Standard with CQ, option available with WQ only.
11. Replace E1 with specific voltage (120, 208, 240, 277V available). Not available with C6 lumen package, HA, IBP, ICP or sensor options. Multiply published IES file by .95 when used with the C5 lumen package.
12. Replace E1 with specific voltage (120V and 277V available). 0°C minimum with IBP, -20°C minimum with ICP, 25°C maximum ambient temperature. Not available with WM, DPM, 5LTD or HA.
13. The FSIR-100 configuration tool is required to adjust parameters including high and low modes, sensitivity, time delay, cutoff and more. Consult your lighting representative at Eaton for more information.
14. Includes integral photocell.
15. LumaWatt wireless sensors are factory installed only requiring network components in appropriate quantities. See www.eaton.com/lighting for LumaWatt application information.
16. Specify color in place of XX.
17. Designed for use with pendant mounting only.

EZPAN2X2-40YN/D10

2' x 2' EZPAN edgelit LED panel lights provide smooth and uniform light edge-to-edge for a clean, modern look. Install in drop ceilings or use optional surface, pendant or recessed (dry wall) mounting kits.

Color: White

Weight: 7.1 lbs

Project:	Type:
Prepared By:	Date:

Driver Info

Type:	Constant Current
120V:	0.33A
208V:	0.20A
240V:	0.18A
277V:	0.15A
Input Watts:	41W
Efficiency:	98%

LED Info

Watts:	40W
Color Temp:	3500K
Color Accuracy:	82 CRI
L70 Lifespan:	60000
Lumens:	4218
Efficacy:	104 LPW

Technical Specifications

Listings

UL Listing:

Suitable for damp locations

DLC Listed:

This product is on the Design Lights Consortium (DLC) Qualified Products List and is eligible for rebates from DLC Member Utilities.
DLC Product Code: PTDTJJX1

IESNA LM-79 & LM-80 Testing:

RAB LED luminaries have been tested by an independent laboratory in accordance with IESNA LM-79 and LM-80, and have received the Department of Energy "Lighting Facts" label

LED Characteristics

Note:

All values are typical (tolerance +/- 10%)

Lifespan:

60,000-hour LED lifespan based on IES LM-80 results and TM-21 calculations

LEDs:

Long-life, High efficiency, micro-power, surface mount LEDs

Electrical

Driver:

Constant Current, Class 2, 120-277V, 50/60Hz, 120V: 0.35A, 208V: 0.21A, 240V: 0.18A, 277V: 0.16A

Dimming Driver:

Driver includes dimming control wiring for 0-10V dimming systems. Requires separate 0-10V DC dimming circuit. Dims as low as 10%.

THD:

8.2% at 120V, 9.2% at 277V

Power Factor:

99.2% at 120V, 96.7% at 277V

Construction

IC Rating:

Suitable for insulated ceilings

Ambient Temperature:

Suitable for use in -30°C (-22°F) to 50°C(122°F) ambient temperatures

Lens:

Frosted polystyrene

Mounting:

Recessed ceiling

Housing:

Lightweight aluminum housing, steel pan and junction box

Installation:

Standard integral T-bar clips secure the fixture to T-bars and prevent T-system separation

Finish:

Formulated for high-durability and long lasting color

Green Technology:

Mercury and UV-free. RoHS compliant components. Polyester powder coat finish formulated without the use of VOCs or toxic heavy metals.

Other

Warranty:

RAB warrants that our LED products will be free from defects in materials and workmanship for a period of five (5) years from the date of delivery to the end user, including coverage of light output, color stability, driver performance and fixture finish.

Buy American Act Compliance:

RAB values USA manufacturing! Upon request, RAB may be able to manufacture this product to be compliant with the Buy American Act (BAA). Please contact customer service to request a quote for the product to be made BAA compliant.

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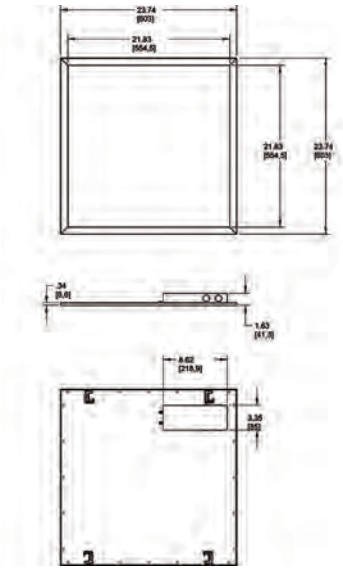
EZPAN2X2-40YN/D10

Dimensions



Features

Perfect for shallow plenums

Even and diffuse ambient illumination, ideal for spaces where glare-free lighting is required

0-10V dimmable driver, standard

Ordering Matrix

Family	Size	Wattage	Color Temp	Driver	Options
EZPAN	2X2	40	YN	/D10	
	2X2 = 2' x 2'	**17** = 17W **30** = 30W **40** = 40W	**Blank** = 5000K (Cool) **N** = 4000K (Neutral) **YN** = 3500K (Warm Neutral) **Y** = 3000K (Warm)	**/D10** = 0-10V Dimming	**Blank** = No Option **/LC** = Lightcloud® Controller **/E2** = Emergency Battery 120-277V

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ALED5T52N

High output LED pole top area light with IES type V circular distribution. Wide and uniform 360 degree pattern ideal for large outdoor areas such as parking lots, corporate parks, and retail settings.

Color: Bronze Weight: 21.8 lbs

Project:	Type:
Prepared By:	Date:

Driver Info		LED Info	
Type:	Constant Current	Watts:	52W
120V:	0.49A	Color Temp:	4000K
208V:	0.31A	Color Accuracy:	73 CRI
240V:	0.27A	L70 Lifespan:	100000
277V:	0.24A	Lumens:	5793
Input Watts:	55W	Efficacy:	105 LPW
Efficiency:	95%		

Technical Specifications

Listings

UL Listing:

Suitable for wet locations

DLC Listed:

This product is on the Design Lights Consortium (DLC) Qualified Products List and is eligible for rebates from DLC Member Utilities.
DLC Product Code: P00001778

IESNA LM-79 & LM-80 Testing:

RAB LED luminaires have been tested by an independent laboratory in accordance with IESNA LM-79 and LM-80, and have received the Department of Energy "Lighting Facts" label

Electrical

THD:

7.2% at 120V, 17% at 277V

Power Factor:

99.1% at 120V, 90.2% at 277V

Drivers (2):

Constant Current, 720mA, Class 2 with 6kV surge protection, 100-277VAC, 50/60 Hz

LED Characteristics

LEDs:

4x13W high-output, long-life LEDs

Lifespan:

100,000-hour LED lifespan based on IES LM-80 results and TM-21 calculations

Color Consistency:

3-step MacAdam Ellipse binning to achieve consistent fixture-to-fixture color

Color Stability:

LED color temperature is warrantied to shift no more than 200K in CCT over a 5 year period

Color Uniformity:

RAB's range of CCT (Correlated Color Temperature) follows the guidelines of the American National Standard for Specifications for the Chromaticity of Solid State Lighting (SSL) Products, ANSI C78.377-2017.

Construction

Cold Weather Starting:

Minimum starting temperature is -40°C (-40°F)

Maximum Ambient Temperature:

Suitable for use in 40°C (104°F) ambient temperatures

Effective Projected Area:

EPA = 1.2

Housing:

Precision die-cast aluminum, Type V distribution

Support Arms:

Extruded aluminum

Lens:

Clear tempered glass lens

Reflector:

Specular vacuum-metallized polycarbonate, Type V distribution

Gaskets:

High-temperature silicone

Finish:

Formulated for high-durability and long lasting color

Green Technology:

Mercury and UV-free. RoHS compliant components. Polyester powder coat finish formulated without the use of VOCs or toxic heavy metals.

Other

Patents:

The designs of the ALED5T52 are protected by patents pending in US, Canada, China, Taiwan and Mexico

Warranty:

RAB warrants that our LED products will be free from defects in materials and workmanship for a period of five (5) years from the date of delivery to the end user, including coverage of light output, color stability, driver performance and fixture finish.

Buy American Act Compliance:

RAB values USA manufacturing! Upon request, RAB may be able to manufacture this product to be compliant with the Buy American Act (BAA). Please contact customer service to request a quote for the product to be made BAA compliant.

Optical

BUG Rating:

B2 U1 G1

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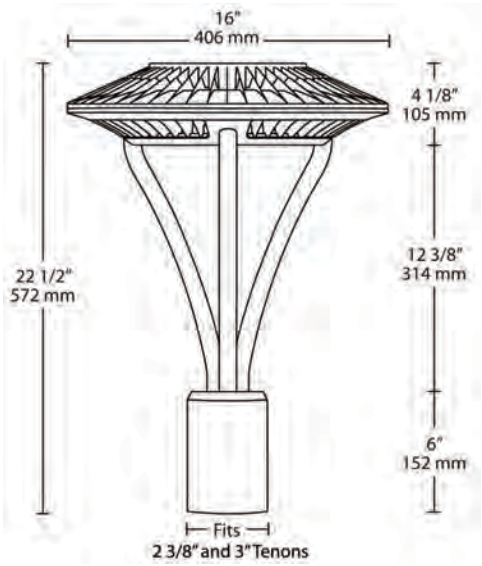
ALED5T52N

RAB

Dimensions



Features

- IES type V (circular) distribution
- 100,000-hour LED lifespan
- Compatible with standard 2 3/8" and 3" tenons
- Air-flow fins for maximum heat dissipation
- 5-year warranty

Ordering Matrix

Family	Distribution	Wattage	Color Temp	Finish	Driver Option	Options
ALED	5T	52	N			
	5T = Type V	**78** = 78W **52** = 52W **26** = 26W	**Blank** = 5000K (Cool) **N** = 4000K (Neutral) **Y** = 3000K (Warm)	**Blank** = Bronze **W** = White	**Blank** = 120-277V **/D10** = Dimmable **/BL** = Bi-Level **/480** = 480V **/480/D10** = 480V w/ Dimmable	**Blank** = No Option **/PCT** = 120-277V Twistlock Photocell **/PCT4** = 480V Twistlock Photocell

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BAYLED78NW

78W BAYLED high bay replaces 250W MH high bays, reducing energy consumption by 67%. Suitable for large spaces, including warehouses, factories, and distribution centers.

Color: White

Weight: 21.0 lbs

Project:	Type:
Prepared By:	Date:

Driver Info

Type:	Constant Current
120V:	0.82A
208V:	0.52A
240V:	0.45A
277V:	0.4A
Input Watts:	90W
Efficiency:	87%

LED Info

Watts:	78W
Color Temp:	4000K
Color Accuracy:	71 CRI
L70 Lifespan:	100000
Lumens:	11285
Efficacy:	125 LPW

Technical Specifications

Listings

UL Listing:

Suitable for damp locations with cord and hook. Suitable for wet locations with 3/4" pendant stem. Covered ceiling mount only.

IESNA LM-79 & LM-80 Testing:

RAB LED luminaries have been tested by an independent laboratory in accordance with IESNA LM-79 and LM-80, and have received the Department of Energy "Lighting Facts" label

LED Characteristics

LEDs:

Three multi-chip, 26W high-output, long-life LEDs

Lifespan:

100,000-hour LED lifespan based on IES LM-80 results and TM-21 calculations

Color Consistency:

3-step MacAdam Ellipse binning to achieve consistent fixture-to-fixture color

Color Stability:

LED color temperature is warrantied to shift no more than 200K in CCT over a 5 year period

Color Uniformity:

RAB's range of CCT (Correlated Color Temperature) follows the guidelines of the American National Standard for Specifications for the Chromaticity of Solid State Lighting (SSL) Products, ANSI C78.377.2011.

Electrical

Drivers (3):

Constant Current, 720mA, Class 2 with 6kV surge protection, 100-277VAC, 50/60 Hz

THD:

11.5% at 120V, 12.3% at 277V

Power Factor:

98.8% at 120V, 91% at 277V

Construction

Ambient Temperature:

Suitable for use in 55°C (131°F) ambient temperatures

Thermal Management:

Superior thermal management with external air-flow fins

Housing:

Precision die-cast aluminum housing and door frame with 3-foot 600V power cord

Mounting:

Heavy-duty 3/4" NPS hook and 3 foot safety chain

Recommended Mounting Height:

25 ft

Lens:

Tempered glass

Reflector:

Specular vacuum metallized polycarbonate

Gaskets:

High-temperature silicone

Finish:

Formulated for high-durability and long lasting color

Green Technology:

Mercury and UV-free. RoHS compliant components. Polyester powder coat finish formulated without the use of VOCs or toxic heavy metals.

Other

Patents:

The design of the BAYLED™ is protected by patents pending in US, Canada, China, Taiwan and Mexico

Accessories:

Available accessories include protective polyshield and wire guards, replacement lens and doorframe, and an occupancy sensor.

Equivalency:

Equivalent to 4 lamp T8 fixtures

Buy American Act Compliance:

RAB values USA manufacturing! Upon request, RAB may be able to manufacture this product to be compliant with the Buy American Act (BAA). Please contact customer service to request a quote for the product to be made BAA compliant.

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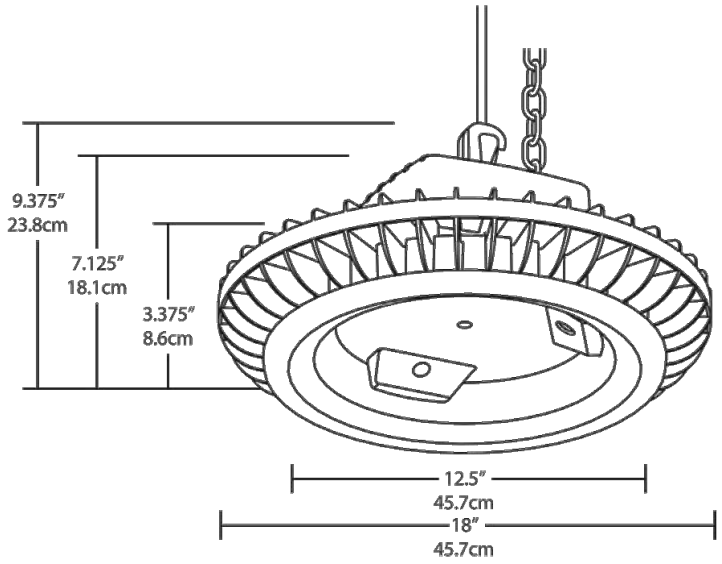
BAYLED78NW

Dimensions



Features

- Replaces 250W MH high bays
- Reduces energy consumption by 67%
- 100,000-hour LED lifespan
- 5-year warranty

Ordering Matrix

Family	Wattage	Color Temp	Finish	Bi-Level
BAYLED				
	78 = 78W	**Blank** = 5000K (Cool) **Y** = 3000K (Warm) **N** = 4000K (Neutral)	**W** = White	**Blank** = No Bi-Level **/BL** = Bi-Level

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EZPAN1X4-17YN/D10

1' x 4' EZPAN edgelit LED panel lights provide smooth and uniform light edge-to-edge for a clean, modern look. Install in drop ceilings or use optional surface, pendant or recessed (dry wall) mounting kits.

Color: White

Weight: 7.1 lbs

Project:	Type:
Prepared By:	Date:

Driver Info

Type:	Constant Current
120V:	0.15A
208V:	0.10A
240V:	0.9A
277V:	0.07A
Input Watts:	18W
Efficiency:	92%

LED Info

Watts:	17W
Color Temp:	3500K
Color Accuracy:	83 CRI
L70 Lifespan:	60000
Lumens:	2053
Efficacy:	112 LPW

Technical Specifications

Listings

UL Listing:

Suitable for damp locations

IESNA LM-79 & LM-80 Testing:

RAB LED luminaries have been tested by an independent laboratory in accordance with IESNA LM-79 and LM-80, and have received the Department of Energy "Lighting Facts" label

DLC Listed:

This product is on the Design Lights Consortium (DLC) Qualified Products List and is eligible for rebates from DLC Member Utilities.
DLC Product Code: P8C9BVO5

LED Characteristics

Note:

All values are typical (tolerance +/- 10%)

Lifespan:

60,000-hour LED lifespan based on IES LM-80 results and TM-21 calculations

LEDs:

Long-life, High efficiency, micro-power, surface mount LEDs

Construction

Ambient Temperature:

Suitable for use in -30°C (-22°F) to 50°C(122°F) ambient temperatures

IC Rating:

Suitable for insulated ceilings

Lens:

Frosted polystyrene

Mounting:

Recessed ceiling

Housing:

Lightweight aluminum housing, steel pan and junction box

Installation:

Standard integral T-bar clips secure the fixture to T-bars and prevent T-system separation

Finish:

Formulated for high-durability and long lasting color

Green Technology:

Mercury and UV-free. RoHS compliant components. Polyester powder coat finish formulated without the use of VOCs or toxic heavy metals.

Electrical

Driver:

Constant Current, Class 2, 120-277V, 50/60 Hz, 120V: 0.15A, 208V: 0.10A, 240V: 0.09A, 277V: 0.07A

Dimming Driver:

Driver includes dimming control wiring for 0-10V dimming systems. Requires separate 0-10V DC dimming circuit. Dims as low as 10%.

THD:

9% at 120V, 8.7% at 277V

Power Factor:

99.4% at 120V, 91.2% at 277V

Other

Warranty:

RAB warrants that our LED products will be free from defects in materials and workmanship for a period of five (5) years from the date of delivery to the end user, including coverage of light output, color stability, driver performance and fixture finish.

Buy American Act Compliance:

RAB values USA manufacturing! Upon request, RAB may be able to manufacture this product to be compliant with the Buy American Act (BAA). Please contact customer service to request a quote for the product to be made BAA compliant.

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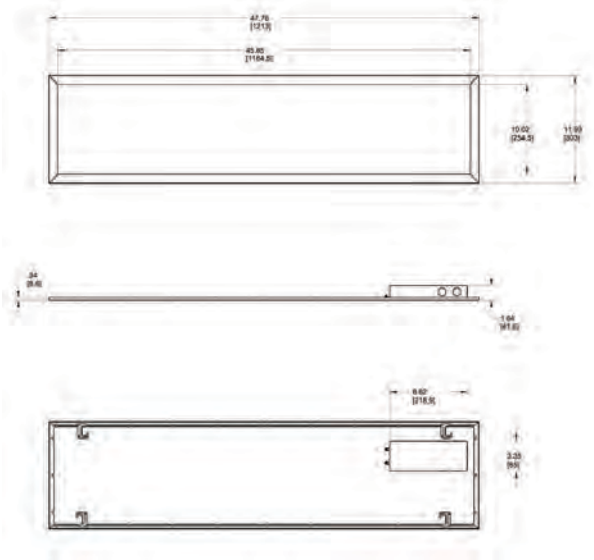
EZPAN1X4-17YN/D10

Dimensions



Features

Perfect for shallow plenums

Even and diffuse ambient illumination, ideal for spaces where glare-free lighting is required

0-10V dimmable driver, standard

Ordering Matrix

Family	Size	Wattage	Color Temp	Driver	Options
EZPAN	1X4	17	YN	/D10	
	1X4 = 1' x 4'	**17** = 17W **30** = 30W **40** = 40W	**Blank** = 5000K (Cool) **N** = 4000K (Neutral) **YN** = 3500K (Warm Neutral) **Y** = 3000K (Warm)	**/D10** = 0-10V Dimming	**Blank** = No Option **/LC** = Lightcloud® Controller **/E2** = Emergency Battery 120-277V

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EZPAN2X2-17YN/D10

2' x 2' EZPAN edgelit LED panel lights provide smooth and uniform light edge-to-edge for a clean, modern look. Install in drop ceilings or use optional surface, pendant or recessed (dry wall) mounting kits.

Color: White Weight: 7.1 lbs

Project:	Type:
Prepared By:	Date:

Driver Info

Type:	Constant Current
120V:	0.15A
208V:	0.10A
240V:	0.09A
277V:	0.07A
Input Watts:	18W
Efficiency:	92%

LED Info

Watts:	17W
Color Temp:	3500K
Color Accuracy:	82 CRI
L70 Lifespan:	60000
Lumens:	2011
Efficacy:	109 LPW

Technical Specifications

Listings

UL Listing:

Suitable for damp locations

DLC Listed:

This product is on the Design Lights Consortium (DLC) Qualified Products List and is eligible for rebates from DLC Member Utilities.
DLC Product Code: P0DUPG7W

IESNA LM-79 & LM-80 Testing:

RAB LED luminaries have been tested by an independent laboratory in accordance with IESNA LM-79 and LM-80, and have received the Department of Energy "Lighting Facts" label

LED Characteristics

Note:

All values are typical (tolerance +/- 10%)

Lifespan:

60,000-hour LED lifespan based on IES LM-80 results and TM-21 calculations

LEDs:

Long-life, High efficiency, micro-power, surface mount LEDs

Construction

Ambient Temperature:

Suitable for use in -30°C (-22°F) to 50°C(122°F) ambient temperatures

IC Rating:

Suitable for insulated ceilings

Lens:

Frosted polystyrene

Mounting:

Recessed ceiling

Housing:

Lightweight aluminum housing, steel pan and junction box

Installation:

Standard integral T-bar clips secure the fixture to T-bars and prevent T-system separation

Finish:

Formulated for high-durability and long lasting color

Green Technology:

Mercury and UV-free. RoHS compliant components. Polyester powder coat finish formulated without the use of VOCs or toxic heavy metals.

Electrical

Driver:

Constant Current, Class 2, 120-277V, 50/60Hz, 120V: 0.15A, 208V: 0.10A, 240V: 0.09A, 277V: 0.07A

Dimming Driver:

Driver includes dimming control wiring for 0-10V dimming systems. Requires separate 0-10V DC dimming circuit. Dims as low as 10%.

THD:

8.1% at 120V, 8.3% at 277V

Power Factor:

99.5% at 120V, 92% at 277V

Other

Warranty:

RAB warrants that our LED products will be free from defects in materials and workmanship for a period of five (5) years from the date of delivery to the end user, including coverage of light output, color stability, driver performance and fixture finish.

Buy American Act Compliance:

RAB values USA manufacturing! Upon request, RAB may be able to manufacture this product to be compliant with the Buy American Act (BAA). Please contact customer service to request a quote for the product to be made BAA compliant.

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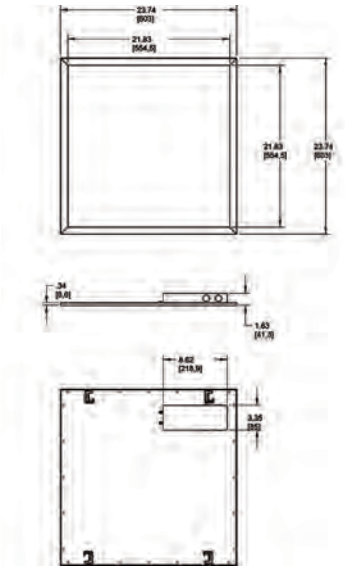
EZPAN2X2-17YN/D10

RAB

Dimensions



Features

Perfect for shallow plenums

Even and diffuse ambient illumination, ideal for spaces where glare-free lighting is required

0-10V dimmable driver, standard

Ordering Matrix

Family	Size	Wattage	Color Temp	Driver	Options
EZPAN	2X2	17	YN	/D10	
	2X2 = 2' x 2'	**17** = 17W **30** = 30W **40** = 40W	**Blank** = 5000K (Cool) **N** = 4000K (Neutral) **YN** = 3500K (Warm Neutral) **Y** = 3000K (Warm)	**/D10** = 0-10V Dimming	**Blank** = No Option **/LC** = Lightcloud® Controller **/E2** = Emergency Battery 120-277V

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EZPAN2X4-30YN/D10

2' x 4' EZPAN edgelit LED panel lights provide smooth and uniform light edge-to-edge for a clean, modern look. Install in drop ceilings or use optional surface, pendant or recessed (dry wall) mounting kits.

Color: White

Weight: 13.4 lbs

Project:	Type:
Prepared By:	Date:

Driver Info

Type:	Constant Current
120V:	0.25A
208V:	0.15A
240V:	0.13A
277V:	0.11A
Input Watts:	29W
Efficiency:	N/A

LED Info

Watts:	30W
Color Temp:	3500K
Color Accuracy:	82 CRI
L70 Lifespan:	60000
Lumens:	3469
Efficacy:	119 LPW

Technical Specifications

Listings

UL Listing:

Suitable for damp locations

DLC Listed:

This product is on the Design Lights Consortium (DLC) Qualified Products List and is eligible for rebates from DLC Member Utilities.
DLC Product Code: PFVTCQJ0

IESNA LM-79 & LM-80 Testing:

RAB LED luminaries have been tested by an independent laboratory in accordance with IESNA LM-79 and LM-80, and have received the Department of Energy "Lighting Facts" label

LED Characteristics

Note:

All values are typical (tolerance +/- 10%)

Lifespan:

60,000-hour LED lifespan based on IES LM-80 results and TM-21 calculations

LEDs:

Long-life, High efficiency, micro-power, surface mount LEDs

Construction

Ambient Temperature:

Suitable for use in -30°C (-22°F) to 50°C(122°F) ambient temperatures

IC Rating:

Suitable for insulated ceilings

Lens:

Frosted polystyrene

Mounting:

Recessed ceiling

Housing:

Lightweight aluminum housing, steel pan and junction box

Installation:

Standard integral T-bar clips secure the fixture to T-bars and prevent T-system separation

Finish:

Formulated for high-durability and long lasting color

Green Technology:

Mercury and UV-free. RoHS compliant components. Polyester powder coat finish formulated without the use of VOCs or toxic heavy metals.

Electrical

Driver:

Constant Current, Class 2, 120-277V, 50/60Hz, 120V: 0.25A, 208V: 0.15A, 240V: 0.13A, 277V: 0.11A

Dimming Driver:

Driver includes dimming control wiring for 0-10V dimming systems. Requires separate 0-10V DC dimming circuit. Dims as low as 10%.

THD:

8.8% at 120V, 7.7% at 277V

Power Factor:

99.2% at 120V, 97.2% at 277V

Other

Warranty:

RAB warrants that our LED products will be free from defects in materials and workmanship for a period of five (5) years from the date of delivery to the end user, including coverage of light output, color stability, driver performance and fixture finish.

Buy American Act Compliance:

RAB values USA manufacturing! Upon request, RAB may be able to manufacture this product to be compliant with the Buy American Act (BAA). Please contact customer service to request a quote for the product to be made BAA compliant.

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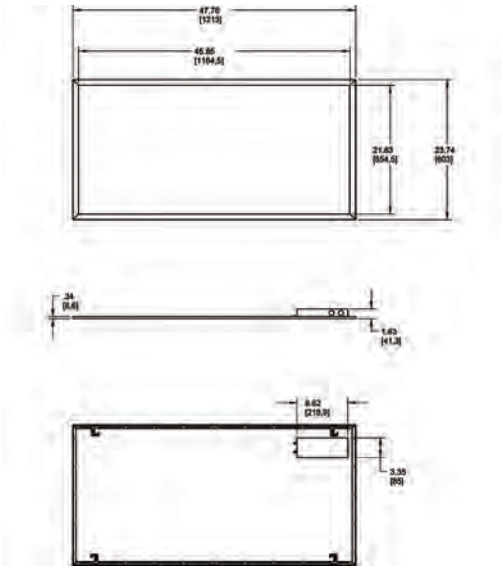
EZPAN2X4-30YN/D10

Dimensions



Features

Perfect for shallow plenums

Even and diffuse ambient illumination, ideal for spaces where glare-free lighting is required

0-10V dimmable driver, standard

Ordering Matrix

Family	Size	Wattage	Color Temp	Driver	Options
EZPAN	2X4	30	YN	/D10	
	2X4 = 2' x 4'	**30** = 30W **40** = 40W **50** = 50W	**Blank** = 5000K (Cool) **N** = 4000K (Neutral) **YN** = 3500K (Warm Neutral) **Y** = 3000K (Warm)	**/D10** = 0-10V Dimming	**Blank** = No Option **/LC** = Lightcloud® Controller **/E2** = Emergency Battery 120-277V

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FFLED80SFN

Rectangular shaped LED floodlight designed to replace 250W Metal Halide. Patent Pending airflow technology ensures long LED and driver lifespan. Use for building facade lighting, sign lighting, LED landscape lighting and instant-on security lighting.

Color: Bronze Weight: 14.2 lbs

Project:	Type:
Prepared By:	Date:

Driver Info		LED Info	
Type:	Constant Current	Watts:	80W
120V:	0.74A	Color Temp:	4000K
208V:	0.48A	Color Accuracy:	72 CRI
240V:	0.41A	L70 Lifespan:	100000
277V:	0.36A	Lumens:	9157
Input Watts:	88W	Efficacy:	104 LPW
Efficiency:	91%		

Technical Specifications

Listings

UL Listing:

Suitable for wet locations. Suitable for ground mounting.

IESNA LM-79 & LM-80 Testing:

RAB LED luminaires have been tested by an independent laboratory in accordance with IESNA LM-79 and LM-80, and have received the Department of Energy "Lighting Facts" label

LED Characteristics

LEDs:

Multi-chip, high-output, long-life LEDs

Lifespan:

100,000-hour LED lifespan based on IES LM-80 results and TM-21 calculations

Color Consistency:

3-step MacAdam Ellipse binning to achieve consistent fixture-to-fixture color

Color Stability:

LED color temperature is warrantied to shift no more than 200K in CCT over a 5 year period

Color Uniformity:

RAB's range of CCT (Correlated Color Temperature) follows the guidelines of the American National Standard for (SSL) Products, ANSI C78.377-2017.

Electrical

Driver:

Constant Current, Class 2, 100-277V, 50/60 Hz, 6 kV surge protection, 120V: 074 A, 208V: 048 A, 240V: 041 A, 277V: 036 A

Construction

IP Rating:

Ingress Protection rating of IP66 for dust and water

Ambient Temperature:

SuitableFor use in 40°C (104°F) ambient temperatures

Cold Weather Starting:

Minimum starting temperature is -40°C (-40°F)

Thermal Management Housing:

Superior heat sinking with external Air-Flow fins

Housing:

Die-cast aluminum housing, lens frame and mounting arm

Threaded Size:

1/2" threaded arm

Mounting:

Heavy-duty Slip Fitter for 2 3/8" OD pipe

Effective Projected Area:

EPA = 0.65

Reflector:

Specular polycarbonate

Gaskets:

High-temperature silicone gaskets

Finish:

Formulated for high-durability and long lasting color

Green Technology:

Mercury and UV-free. RoHS compliant components. Polyester powder coat finish formulated without the use of VOCs or toxic heavy metals.

Optical

NEMA Type:

NEMA Beam Spread of 7H x 6V

Other

Warranty:

RAB warrants that our LED products will be free from defects in materials and workmanship for a period of five (5) years from the date of delivery to the end user, including coverage of light output, color stability, driver performance and fixture finish.

Patents:

The FFLED design is protected by U.S. Pat. D643,147, Canada Pat. 140798, China Pat. ZL201130171304.1, Mexico Pat. 36757 and pending patent in Taiwan.

American Bureau of Shipping (ABS) :

For use on Mobile Offshore Drilling Units (MODU) and shipping vessels

Equivalency:

Equivalent to 250W Metal Halide

Buy American Act Compliance:

RAB values USA manufacturing! Upon request, RAB may be able to manufacture this product to be compliant with the Buy American Act (BAA). Please contact customer service to request a quote for the product to be made BAA compliant.

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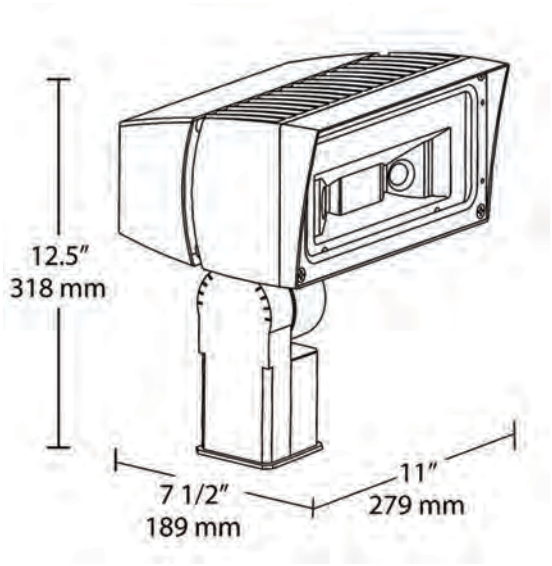
FFLED80SFN

RAB

Dimensions



Features

- Ultra efficient LED and optical design
- Replaces 250W MH floodlights
- 100,000 hour life based on LM-80 tests
- Air-flow technology heatsink
- 5-year warranty

Ordering Matrix

Family	Wattage	Mounting	Color Temp	NEMA Type	Finish	Driver	Photocell Options
FFLED	80	SF	N				
	80 = 80W **52** = 52W **39** = 39W **26** = 26W	**Blank** = Swivel Arm **SF** = Slipfitter **T** = Trunnion	**Blank** = 5000K (Cool) **N** = 4000K (Neutral) **Y** = 3000K (Warm)	**Blank** = 7H x 6V **B55** = 5H x 5V **B44** = 4H x 4V	**Blank** = Bronze **W** = White	**Blank** = On/Off **/D10** = 0-10V Dimming **/480** = 480V On/Off (not available for 80W models)	**Blank** = No Option **/PC** = 120V Photocell **/PC2** = 277V Photocell **/PCS** = 120V Swivel Photocell **/PCS2** = 277V Swivel Photocell **/PCS4** = 480V Swivel Photocell

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RMKPANEL1X4

RAB

Recessed mounting kits for drywall ceilings.

Color: White

Weight: 7.5 lbs

Project:	Type:
Prepared By:	Date:

Technical Specifications

Construction

Construction:

Extruded aluminum construction with mitered corners for square fit

Finish:

Formulated for high-durability and long lasting color

Other

Description:

LPANEL 1X4 recessed mounting kit for drywall ceilings

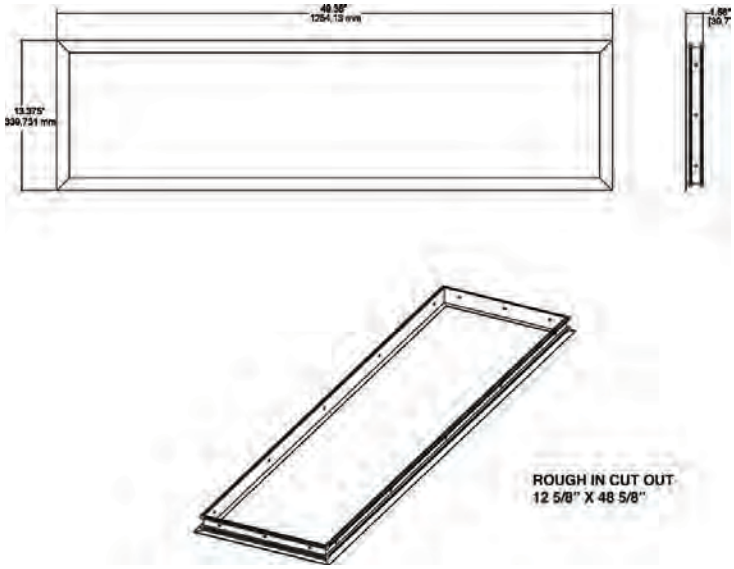
Compatibility:

For EZPAN fixtures with options, please consult factory for compatibility with mounting kits

Buy American Act Compliance:

RAB values USA manufacturing! Upon request, RAB may be able to manufacture this product to be compliant with the Buy American Act (BAA). Please contact customer service to request a quote for the product to be made BAA compliant.

Dimensions



Ordering Matrix

Family	Size
RMKPANEL	1X4

2X4 = 2' x 4'
2X2 = 2' x 2'
1X4 = 1' x 4'

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SMKEZPAN1X4

Surfaced mounting kits.

Color: White

Weight: 14.3 lbs

Project:	Type:
Prepared By:	Date:

Technical Specifications

Listings

UL Listing:

Suitable for damp locations

Construction

Housing:

Steel sheet metal, die formed aluminum

Finish:

Formulated for high-durability and long lasting color

Other

Description:

EZPAN 1X4 surface mounting kit for drywall ceilings

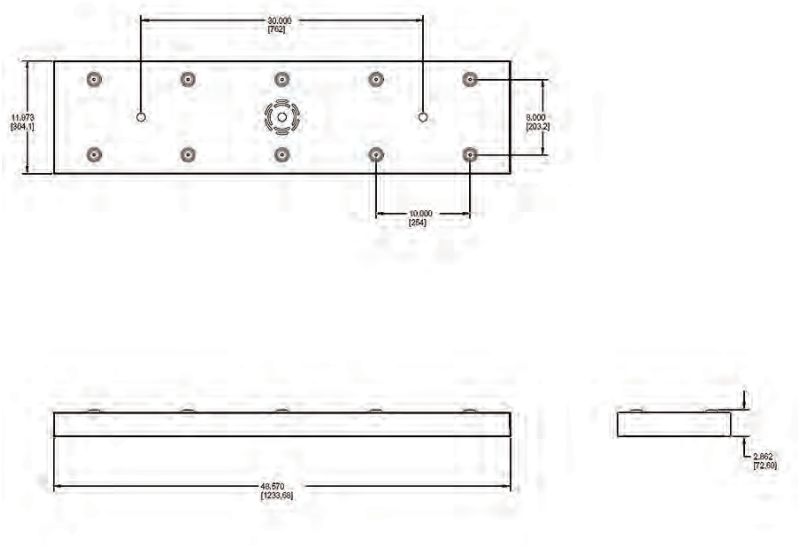
Compatibility:

For EZPAN fixtures with options, please consult factory for compatibility with mounting kits

Buy American Act Compliance:

RAB values USA manufacturing! Upon request, RAB may be able to manufacture this product to be compliant with the Buy American Act (BAA). Please contact customer service to request a quote for the product to be made BAA compliant.

Dimensions



Ordering Matrix

Family	Size
SMKEZPAN	1X4

2X4 = 2' x 4'
2X2 = 2' x 2'

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SMKEZPAN2X2

Surfaced mounting kits.

Color: White

Weight: 14.3 lbs

Project:	Type:
Prepared By:	Date:

Technical Specifications

Listings

UL Listing:

Suitable for damp locations

Construction

Housing:

Steel sheet metal, die formed aluminum

Finish:

Formulated for high-durability and long lasting color

Other

Description:

EZPAN 2X2 surface mounting kit for drywall ceilings

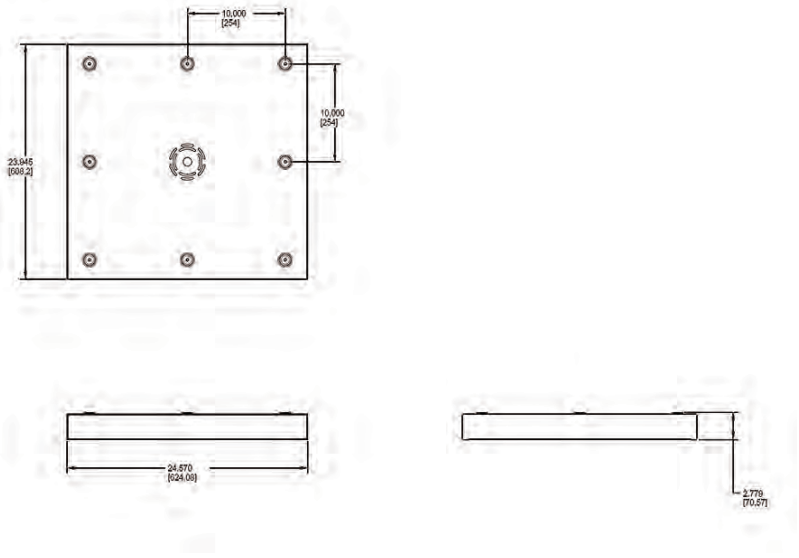
Compatibility:

For EZPAN fixtures with options, please consult factory for compatibility with mounting kits

Buy American Act Compliance:

RAB values USA manufacturing! Upon request, RAB may be able to manufacture this product to be compliant with the Buy American Act (BAA). Please contact customer service to request a quote for the product to be made BAA compliant.

Dimensions



Ordering Matrix

Family	Size
SMKEZPAN	2X2

2X4 = 2' x 4'
2X2 = 2' x 2'

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SMKEZPAN2X4

Surfaced mounting kits.

Color: White

Weight: 25.4 lbs

Project:	Type:
Prepared By:	Date:

Technical Specifications

Listings

UL Listing:

Suitable for damp locations

Construction

Housing:

Steel sheet metal, die formed aluminum

Finish:

Formulated for high-durability and long lasting color

Other

Description:

EZPAN 2X4 surface mounting kit for drywall ceilings

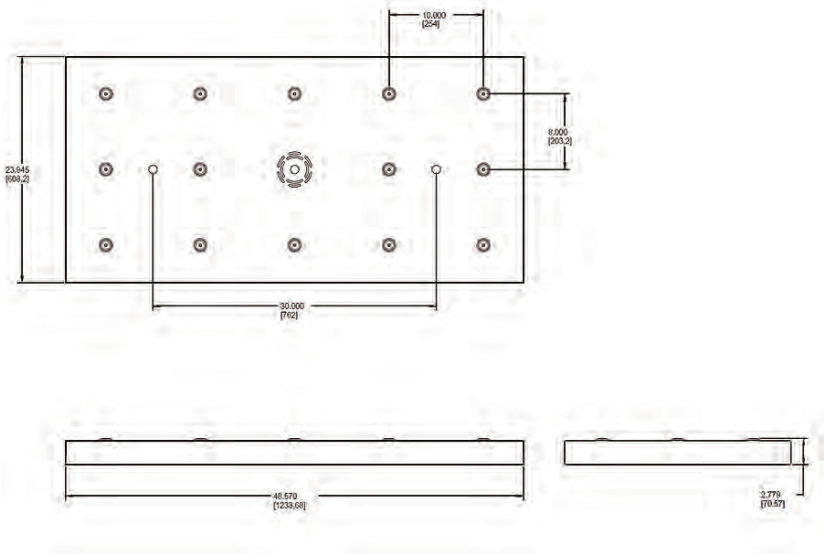
Compatibility:

For EZPAN fixtures with options, please consult factory for compatibility with mounting kits

Buy American Act Compliance:

RAB values USA manufacturing! Upon request, RAB may be able to manufacture this product to be compliant with the Buy American Act (BAA). Please contact customer service to request a quote for the product to be made BAA compliant.

Dimensions



Ordering Matrix

Family	Size
SMKEZPAN	2X4

2X4 = 2' x 4'

2X2 = 2' x 2'

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VANLED40N

Low-profile vandal-resistant fixture covers the footprint of most traditional canopy lights. Available in flat or drop lens with frosted and unfrosted options.

Color: Bronze

Weight: 12.0 lbs

Project:	Type:
Prepared By:	Date:

Driver Info		LED Info	
Type:	Constant Current	Watts:	40W
120V:	0.60A	Color Temp:	4000K
208V:	0.19A	Color Accuracy:	78 CRI
240V:	0.17A	L70 Lifespan:	100000
277V:	0.14A	Lumens:	5177
Input Watts:	39W	Efficacy:	132 LPW
Efficiency:	N/A		

Technical Specifications

Listings

UL Listing:

Suitable for Wet Locations. Covered Ceiling Mount Only.

DLC Listed:

This product is listed by Design Lights Consortium (DLC) as an ultra-efficient premium product that qualifies for the highest tier of rebates from DLC Member Utilities.
DLC Product Code: P3TDZ3HM

IESNA LM-79 & LM-80 Testing:

RAB LED luminaires have been tested by an independent laboratory in accordance with IESNA LM-79 and LM-80, and have received the Department of Energy "Lighting Facts" label

Electrical

Driver:

Class 2, Constant Current, 100-277V, 50-60Hz, 1050mA

THD:

5.5% at 277V

Construction

Maximum Ambient Temperature:

Suitable for use in 40°C (104°F) ambient temperatures

Cold Weather Starting:

Minimum starting temperature is -40°C (-40°F)

Housing:

Die-cast aluminum housing and lens frame with (4) 1/2" NPS side conduit entries and weatherproof rear wire plug and access plate

Mounting:

Ceiling mount to recessed junction with knockout template or directy to ceiling surface, utilizing side conduit entry points

IP Rating:

Ingress Protection rating of IP66 for dust and water

Lens:

Vandal-resistant polycarbonate textured opaque for low glare drop lens

Reflector:

Semi-specular, vacuum-metalized polycarbonate

Gaskets:

High-temperature silicone gaskets

Finish:

Our environmentally friendly polyester powder coatings are formulated for high-durability and long-lasting color

Green Technology:

Mercury and UV-free. RoHS compliant components. Polyester powder coat finish formulated without the use of VOCs or toxic heavy metals.

LED Characteristics

LEDs:

Discreet LEDs on PCB board

Color Stability:

RAB LEDs exceed industry standards for chromatic stability

Color Uniformity:

RAB's range of CCT (Correlated Color Temperature) follows the guidelines of the American National Standard for Specifications for the Chromaticity of Solid State Lighting (SSL) Products, ANSI C78.377-2017.

Other

Warranty:

RAB warrants that our LED products will be free from defects in materials and workmanship for a period of five (5) years from the date of delivery to the end user, including coverage of light output, color stability, driver performance and fixture finish. See our full warranty

Replacement:

Replaces up to 100W Metal Halide

Buy American Act Compliance:

RAB values USA manufacturing! Upon request, RAB may be able to manufacture this product to be compliant with the Buy American Act (BAA). Please contact customer service to request a quote for the product to be made BAA compliant.

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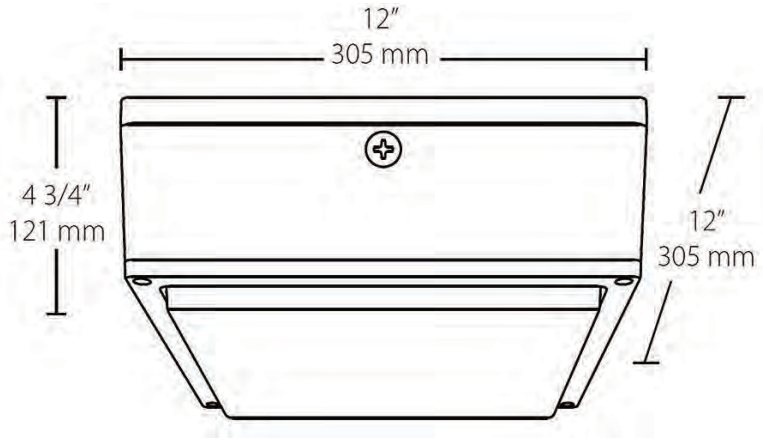
VANLED40N

RAB

Dimensions



Features

- Fits the footprint of older canopy lights
- Vandal resistant and UV resistant lens
- Ultra-high efficiency
- Clean, contemporary, low-profile design
- Available with drop lens or flat lens
- IP66 rated, keeps dust, bugs and water out
- Photo and motion sensor options available

Ordering Matrix

Family	Wattage	Color Temp	Lens	Motion Sensor & Finish	Driver Options	Photocell Options
VANLED						
	10 = 10W **20** = 20W **40** = 40W **52** = 52W **65** = 65W **75** = 75W	**Blank** = 5000K (Cool) **N** = 4000K (Neutral) **Y** = 3000K (Warm)	**Blank** = Drop lens **F** = Flat lens **FR** = Frosted Drop Lens **FFR** = Frosted Flat Lens	**Blank** = Bronze, no sensor **W** = White, no sensor **MS** = Bronze w/ SMS500 mini-sensor (not available w/ D10 models) **MSW** = White w/ SMS500 mini-sensor (not available w/ D10 models)	**Blank** = On/Off driver **/D10** = 0-10V Dimming (not available for 10w) **/480** = 480V (not available for 10W or 20W) **/480/D10** = 480V w/ 0-10V dimming (not available for 10W or 20W)	**/PCS** = 120V Swivel **/PCS2** = 277V Swivel **/PCS4** = 480V Swivel

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WPTLED25N/D10/PC2 USA

High performance LED tallpack. Covers footprint of most HID Tallpacks. Vandal resistant lens. Precision die-cast aluminum. 0-10V dimmable driver with 120-277V photocell.

Color: Bronze

Weight: 6.5 lbs

Project:	Type:
Prepared By:	Date:

Driver Info		LED Info	
Type:	Constant Current	Watts:	25W
120V:	0.201A	Color Temp:	4000K
208V:	0.126A	Color Accuracy:	73 CRI
240V:	0.109A	L70 Lifespan:	100000
277V:	0.096A	Lumens:	2517
Input Watts:	24W	Efficacy:	106 LPW
Efficiency:	N/A		

Technical Specifications

Listings

UL Listing:

Suitable for wet locations. Wall mount only.

IESNA LM-79 & LM-80 Testing:

RAB LED luminaries have been tested by an independent laboratory in accordance with IESNA LM-79 and LM-80, and have been received the Department of Energy "Lighting Facts" label

LED Characteristics

Lifespan:

100,000-hour LED lifespan based on IES LM-80 results and TM-21 calculations

LEDs:

Long-life, high-efficacy surface mount LEDs

Color Stability:

LED color temperature is warrantied to shift no more than 200K in CCT over a 5 year period

Color Uniformity:

RAB's range of CCT (Correlated Color Temperature) follows the guidelines of the American National Standard for Specifications for the Chromaticity of Solid State Lighting (SSL) Products, ANSI C78.377-2017.

Electrical

Drivers:

Constant Current, Class 2, 550mA, 100-277V, 50-60Hz, 120V: 0.201A, 208V: 0.126A, 240V: 0.109A, 277V: 0.096A, Surge Protection: 6kV

Power Factor:

98.8% at 120V, 91.4% at 277V

THD:

12.6% at 120V, 16.4% at 277V

Dimming Driver:

0-10V dimming driver standard for ultimate flexibility. Use as on/off or utilize the 0-10V DC dimming circuit for controls.

Photocell:

Photocell is rated for 120V thru 277V. To disable, simply use the provide silicone rubber cap and cover.

Optical

BUG Rating:

B0 U3 G2

Construction

Ambient Temperature:

Suitable for -40°C (-40°F) to 40°C (104°F) ambient temperatures

Cold Weather Starting:

Minimum starting temperature is -40°C (-40°F)

Thermal Management:

Superior thermal management with die-cast aluminum heatsink

Housing:

Precision die-cast aluminum

Refractor Lens:

High-impact, diffuse, UV-stabilized polycarbonate

Mounting:

Three (3) 1/2" NPS conduit entry points (2 sides for through-feed, and bottom), and drilling template for easy wall box mounting

Reflector:

High-gloss white aluminum

Gaskets:

High-temperature silicone gaskets

Finish:

Formulated for high-durability and long lasting color

Green Technology:

Mercury and UV-free. RoHS compliant components. Polyester powder coat finish formulated without the use of VOCs or toxic heavy metals.

Other

Equivalency:

Equivalent to 70W Metal Halide/50W HPS

Warranty:

RAB warrants that our LED products will be free from defects in materials and workmanship for a period of five (5) years from the date of delivery to the end user, including coverage of light output, color stability, driver performance and fixture finish.

Patents:

The design of WPTLED is protected by patents pending in US, Canada, China, Taiwan and Mexico

FTC Country of Origin:

This product was assembled in the USA by RAB using imported components

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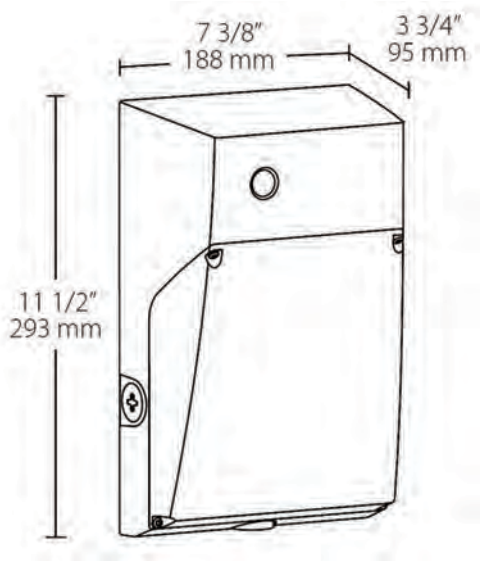
Technical Specifications (continued)

Other

Buy American Act Compliance:

This product complies with the Buy American Act

Dimensions



Features

- Covers footprints of most HID tallpacks
- 0-10V dimmable driver & 120 - 277V photocell
- Vandal-resistant lens
- 100,000-Hour LED lifespan

Ordering Matrix

Family	Wattage	Color Temp	Finish	Dimming	Photocell
WPTLED	25	N		/D10	/PC2
	12 = 12W **25** = 25W **40** = 40W	**Blank** = 5000K (Cool) **Y** = 3000K (Warm) **N** = 4000K (Neutral)	**Blank** = Bronze **W** = White	**/D10** = Dimmable	**/PC2** = 120-277V Photocell

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S9580

4.5T10/LED/E26/27K/120V
4.5 watt T10 LED; Clear; Medium base; 2700K; 430 lumens;
120 volts

Features
- LED with a traditional incandescent look and feel
- Omni-directional light source
- Smooth dimming
- Replaces up to 40 watt lamps
- Long life - 15,000 hours
- Damp Location
- UL listed for totally enclosed fixtures

S9580

Item Number	UPC	Voltage	Watts	Incandescent Equivalent	Power Factor	Lamp Shape	Base
S9580	045923095801	120	4.5	40W	>0.70	T10	Medium

ANSI Base	Lamp Code	Dimmable/Non-Dimmable	Suggested Dimmers	Finish	MOL In Inches	MOD In Inches	Initial Lumens
E26	4.5T10/LED/E26/27K/120V	Dimmable	Compatible dimmers for S9580	Clear	5"	1-1/4"	430

Average Rated Hours	Kelvin Temp	Color	CRI	Beam Spread Deg	Operating Temperature	Pack	Package Type
15000	2700	Warm White	80	360	-20C (-4F) to a maximum of +45C (+113F)	24/6	Box

RoHS Compliant	UL or ETL Listed	UL Classification	Warranty
Yes	Yes	cULus - Damp Location Rated	3 Year Limited

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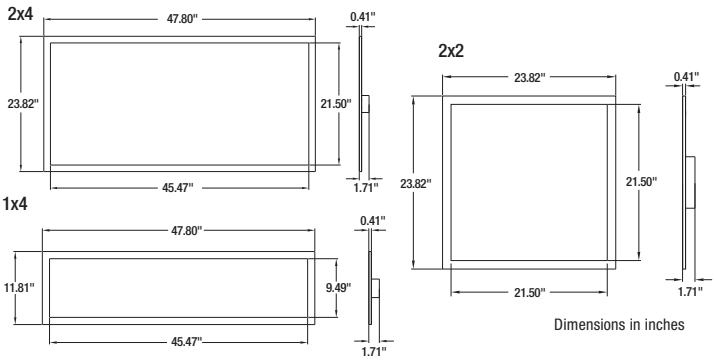
SYLVANIA Luminaires

Edge-Lit Panel

Catalog #	Type
Project	
Notes	
Date	
Prepared by	

Dimensions



Dimensions in inches

Product Features

The Edge-Lit Panels are environmentally preferable LED alternatives to traditional fluorescent luminaires, offering up to 47% in energy savings. Ideal in place of traditional luminaires, or as new installations, the Edge-Lit Panels are offered in three sizes for illuminating offices, retail or hospitality areas.

The slim design of these luminaires is beneficial for installation in tight ceilings spaces and they offer low glare and uniform illumination. SYLVANIA luminaires assure optimum light engine performance for extended service and rated life (≥50,000 hours L_{70}).

Wattage Comparison Chart

Edge-Lit Panel Size	Traditional Source	Traditional System Wattage	LED System Wattage	Energy Savings
1x4	2x28W T8	49	32	35%
	2x32W T8	56	32	43%
2x2	3x17W T8	48	32	33%
	2U31 T8	56	32	43%
2x4	2x28W T8	49	32	35%
	2x32W T8	56	32	43%
	3x28W T8	58	40	31%
	3x32W T8	75	40	47%

Specifications

Weight: 1x4 & 2x2: 7.96lbs (3.6 kg) Standard; 2x4: 14.33lbs (6.5 kg) Standard
1x4 & 2x2: 10.14lbs (4.6 kg) Emergency; 2x4: 16.54lbs (7.5 kg) Emergency

Construction: Extruded aluminum frame with sheet metal back plate, earthquake clips and PMMA diffused flat lens. The standard color is white.

LED System: LED system with a life rating of ≥50,000 hours at L_{70} @ 25°C. Luminaire efficacy up to 114 LPW.

Electrical: Offered in 32 and 40 Watts, the luminaire is designed to operate through the 120-277 VAC universal voltage range. The LED driver has a 0.5kV inherent surge suppression and is a constant current device. The power factor is ≥90% and THD is ≤20%.

Dimming: The driver is 0-10V dimmable (down to 10%). Please reference the dimmer compatibility document (LEDLUM012).

Color Characteristics: CRI>80; CCT of 3500K, 4000K or 5000K.

Optics: White flat edge-lit PMMA diffuser lens.

Options Available: Emergency Battery Backup.

Installation: Luminaire lays in standard 15/16" and 9/16" T-grid ceilings.

Operating Temperature: -4°F to +104°F (-20°C to +40°C);
EM: +32°F to +104°F (0°C to +40°C).

Listings: cETLus listed to UL1598 standards, IC and dry rated.

Warranty: Standard 5-year luminaire warranty (LEDLUM001).

Note: Specifications subject to change without notice. IES files available online.

**DLC not applicable to emergency versions

Ordering Guide

Item Number:

PANELF	1A	/	XXX	XXX	D	8	XX	/	XX	G	/	WH	/	X
Product Name PANELF	Generation 1A		Wattage 032 = 32 Watts 040 = 40 Watts*	Voltage UNV = 120-277V	Dimming D = 0-10V	CRI 8≥80	Color Temp (CCT) 35 = 3500K 40 = 4000K 50 = 5000K		Dimension 14 = 1x4 22 = 2x2 24 = 2x4	Mounting G = Grid		Color/Finish WH = White		Option Blank = No Option E = Emergency

*Only available in 2x4 size.

Photometric Data

Average Illuminance (FC) at 30" AFF and avg/min uniformity
80/50/20 Reflectances

			8 ft Mounting Height			10 ft Mounting Height			12 ft Mounting Height		
			On Center Fixture Spacing			On Center Fixture Spacing			On Center Fixture Spacing		
			8'x10'	10'x10'	10'x12'	8'x10'	10'x10'	10'x12'	8'x10'	10'x10'	10'x12'
1'x4'	32W	PANELF1A/032UNVD835/14G/WH	44fc / 3.2	36fc / 2.9	32fc / 2.0	43fc / 2.7	35fc / 2.4	31fc / 1.8	42fc / 2.5	34fc / 2.3	31fc / 1.8
		PANELF1A/032UNVD840/14G/WH									
2'x2'	32W	PANELF1A/032UNVD835/22G/WH	47fc / 3.2	39fc / 2.9	35fc / 2.0	46fc / 2.7	38fc / 2.4	33fc / 1.8	44fc / 2.4	37fc / 2.3	33fc / 1.8
		PANELF1A/032UNVD840/22G/WH									
2'x4'	32W	PANELF1A/032UNVD835/24G/WH	44fc / 3.3	36fc / 2.8	32fc / 2.0	43fc / 2.7	35fc / 2.4	31fc / 1.8	42fc / 2.5	34fc / 2.3	31fc / 1.7
		PANELF1A/032UNVD840/24G/WH									
	40W	PANELF1A/040UNVD835/24G/WH	62fc / 3.3	51 fc /2.8	46fc / 2.0	60fc / 2.7	50fc / 2.4	44fc / 1.8	59fc / 2.5	48fc / 2.3	43fc / 1.7
		PANELF1A/040UNVD840/24G/WH									

*Table also applicable to emergency versions.

Ordering Information

Item Number	Ordering Abbreviation	Power (W)	Input Voltage	Dimming	CRI	Color Temp (CCT)	Size	Total Fixture Lumens	LPW*	DLC**	Options
74243	PANELF1A/032UNVD835/14G/WH	32	120-277V	0-10V	>80	3500K	1x4	3200	102	Std	–
74244	PANELF1A/032UNVD840/14G/WH	32	120-277V	0-10V	>80	4000K	1x4	3300	104	Std	–
74938	PANELF1A/032UNVD850/14G/WH	32	120-277V	0-10V	>80	5000K	1x4	3500	110	Std	–
74251	PANELF1A/032UNVD835/22G/WH	32	120-277V	0-10V	>80	3500K	2x2	3500	110	Std	–
74252	PANELF1A/032UNVD840/22G/WH	32	120-277V	0-10V	>80	4000K	2x2	3500	110	Std	–
74797	PANELF1A/032UNVD850/22G/WH	32	120-277V	0-10V	>80	5000K	2x2	3500	114	Std	–
74247	PANELF1A/032UNVD835/24G/WH	32	120-277V	0-10V	>80	3500K	2x4	3300	104	Std	–
74248	PANELF1A/032UNVD840/24G/WH	32	120-277V	0-10V	>80	4000K	2x4	3300	104	Std	–
74935	PANELF1A/032UNVD850/24G/WH	32	120-277V	0-10V	>80	5000K	2x4	3500	112	Std	–
74249	PANELF1A/040UNVD835/24G/WH	40	120-277V	0-10V	>80	3500K	2x4	4200	109	Std	–
74250	PANELF1A/040UNVD840/24G/WH	40	120-277V	0-10V	>80	4000K	2x4	4200	110	Std	–
74934	PANELF1A/040UNVD850/24G/WH	40	120-277V	0-10V	>80	5000K	2x4	4300	113	Std	–
74245	PANELF1A/032UNVD835/14G/WH/E	32	120-277V	0-10V	>80	3500K	1x4	3200	102	–	Emergency Battery Backup
74246	PANELF1A/032UNVD840/14G/WH/E	32	120-277V	0-10V	>80	4000K	1x4	3300	104	–	Emergency Battery Backup
74939	PANELF1A/032UNVD850/14G/WH/E	32	120-277V	0-10V	>80	5000K	1x4	3500	110	–	Emergency Battery Backup
74253	PANELF1A/032UNVD835/22G/WH/E	32	120-277V	0-10V	>80	3500K	2x2	3500	110	–	Emergency Battery Backup
74254	PANELF1A/032UNVD840/22G/WH/E	32	120-277V	0-10V	>80	4000K	2x2	3500	110	–	Emergency Battery Backup
74798	PANELF1A/032UNVD850/22G/WH/E	32	120-277V	0-10V	>80	5000K	2x2	3500	114	–	Emergency Battery Backup
74239	PANELF1A/032UNVD835/24G/WH/E	32	120-277V	0-10V	>80	3500K	2x4	3300	104	–	Emergency Battery Backup
74240	PANELF1A/032UNVD840/24G/WH/E	32	120-277V	0-10V	>80	4000K	2x4	3300	104	–	Emergency Battery Backup
74937	PANELF1A/032UNVD850/24G/WH/E	32	120-277V	0-10V	>80	5000K	2x4	3500	112	–	Emergency Battery Backup
74241	PANELF1A/040UNVD835/24G/WH/E	40	120-277V	0-10V	>80	3500K	2x4	4200	109	–	Emergency Battery Backup
74242	PANELF1A/040UNVD840/24G/WH/E	40	120-277V	0-10V	>80	4000K	2x4	4200	110	–	Emergency Battery Backup
74936	PANELF1A/040UNVD850/24G/WH/E	40	120-277V	0-10V	>80	5000K	2x4	4300	113	–	Emergency Battery Backup

*LPW per LM79 report.
**Std for DLC Standard.
For further information and to learn more about utility rebates, contact your local SYLVANIA sales representative.

Options Information

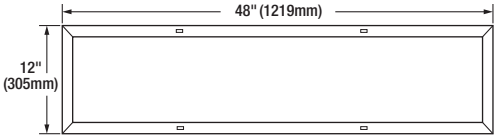
Emergency Battery Backup:
Activates when normal power supply to the fixture fails, providing a minimum of 650 lumens (700 nominal lumens) for at least 90 minutes.

Accessories and Replacement Parts

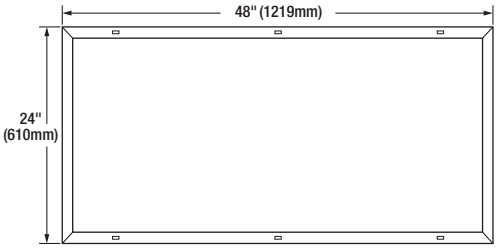
Item Number	Ordering Abbreviation	Item Description
70132	SMKIT1A/14A/WH	1x4 Surface Mount Kit, White Finish
70380	SMKIT1A/22A/WH	2x2 Surface Mount Kit, White Finish
70381	SMKIT1A/24A/WH	2x4 Surface Mount Kit, White Finish

*Please see Surface Mount Kit installation manual for instructions.

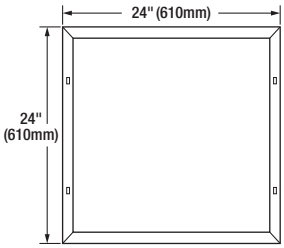
1x4



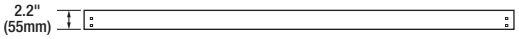
2x4



2x2



Side view for all



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ULTRA HD LED A-line Lamps

Omnidirectional

Key Features & Benefits

- Voluntary California Quality Light-Emitting Diode (LED) Lamp Specification 3.0, Tier II and JA8 Certified
- ENERGY STAR v2.1
- Indoor/Outdoor Damp rated
- Available in 2700K, 3000K, and 5000K color temperatures
- 92+ CRI
- Dimmable down to 10%
- 25,000 hours rated life (L_{70})
- Approved for use in totally enclosed fixtures (except for 100W)

SYLVANIA ULTRA HD LED A-line lamps are high performing bulbs that are ideal for ambient or general lighting applications in both residential and commercial applications.

The 40/60/75/100W replacement lamps are available in 2700K, 3000K, and 5000K color temperatures and deliver excellent 92+ color rendering for crisp and vibrant color to meet California Quality Specifications.

These CEC lamps also meet ENERGY STAR® v 2.1 requirements for omnidirectional lamps by emitting 300° of smooth, high quality light.

Product Offering

Ordering Abbreviation	Wattage	Color Temperature	Typical Lumens
LED 6A19	6	2700K, 3000K, 5000K	470
LED 10A19	10	2700K, 3000K, 5000K	800
LED 12A19	12	2700K, 3000K, 5000K	1100
LED 17A21	17	2700K, 3000K, 5000K	1600

Application Information

Applications

- Downlights
- Pendant fixtures
- Table lamps
- Wall sconces

Market Segments

- Hospitality
- Office
- Residential
- Retail

Application Notes

1. Operating temperature range between -20°C and +45°C (-4°F and + 113°F)
2. Not for use with emergency light fixtures or exit lights
3. Approved for use in totally enclosed fixtures (except for 100W)

Specification Data

Catalog #	Type
Project	
Comments	
Prepared by	

Ordering Information

Item Number	Ordering Abbreviation	Wattage (W)	Light Output (lm)	Replaces	Input Voltage (V)	CCT	CRI	Average Rated Life (hrs.)	Finish	ENERGY STAR®
78108	LED6A19/DIM/O/927/U/B	6	470	40W	120	2700K	93	25,000	Frosted	Yes
78109	LED6A19/DIM/O/930/U/B	6	470	40W	120	3000K	93	25,000	Frosted	Yes
78110	LED6A19/DIM/O/950/U/B	6	470	40W	120	5000K	93	25,000	Frosted	Yes
78111	LED10A19/DIM/O/927/U/B	10	800	60W	120	2700K	93	25,000	Frosted	Yes
78112	LED10A19/DIM/O/930/U/B	10	800	60W	120	3000K	93	25,000	Frosted	Yes
78113	LED10A19/DIM/O/950/U/B	10	800	60W	120	5000K	93	25,000	Frosted	Yes
78114	LED12A19/DIM/O/927/U/B	12	1100	75W	120	2700K	92	25,000	Frosted	Yes
78115	LED12A19/DIM/O/930/U/B	12	1100	75W	120	3000K	92	25,000	Frosted	Yes
78116	LED12A19/DIM/O/950/U/B	12	1100	75W	120	5000K	92	25,000	Frosted	Yes
78117	LED17A21/DIM/O/927/U/B	17	1600	100W	120	2700K	92	25,000	Frosted	Yes
78118	LED17A21/DIM/O/930/U/B	17	1600	100W	120	3000K	92	25,000	Frosted	Yes
78119	LED17A21/DIM/O/950/U/B	17	1600	100W	120	5000K	92	25,000	Frosted	Yes

Ordering Guide

LED	6	A19	/	DIM	/	0	/	9	27	/	U	/	B
LED	Wattage	Lamp Type		Dimmable		Omnidirectional		CRI	CCT		ULTRA		Box

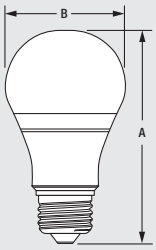
Energy Savings

Basic Product Description	LED Life (hrs.)	LED Lumens	Similar Incandescent	Incandescent Life (hrs.)	Incandescent Lumens	Watts Saved	Energy Savings*	LED Life vs. Incandescent
LED6A19	25,000	450	40W A19	1500	465	34	$93	15x
LED10A19	25,000	800	60W A19	1000	850	50	$137	25x
LED12A19	25,000	1100	75W A19	750	1170	63	$173	30x
LED17A21	25,000	1600	100W A19	750	1600	83	$228	30x

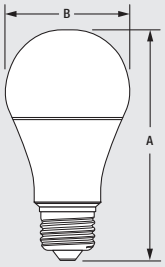
*Energy savings over life of lamp calculated at $0.11/kWh

Lamp Dimensions

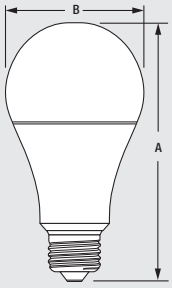
	(A) MOL (inches)	(B) Diameter (inches)
LED6 & 10A19	4.17	2.36
LED12A19	4.42	2.36
LED17A21	5.15	2.75



LED6 & 10A19



LED12A19



LED17A21

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ULTRA Glass LED A-line Lamps

25,000 Hour Life

SYLVANIA offers an extensive portfolio of Classic LED A-line lamps. All lamps have the look and feel of traditional incandescent lamps, while utilizing all the benefits and innovation of LEDs, such as energy savings, long life, and brilliant illumination, while promoting job growth and supporting the U.S. economy.

Assembled in USA ULTRA LED A-line lamps are direct replacements for 40/60/75/100W incandescent lamps and are available in a warm white 2700K and a cool white 5000K.

All lamps are dimmable, have an excellent color rending of 80+, and are rated up to 25,000 hours (L_{70}) of life. They are also ENERGY STAR certified for increased utility rebates, making them ideal for a variety of residential and commercial applications.

Key Features & Benefits

- Lamps Assembled in the USA
- Full glass housing manufactured in the USA
- Look and feel of traditional lamps while utilizing all the benefits of LEDs
- Available in 2700K and 5000K color temperatures
- Indoor and outdoor rated (UL Damp)
- Mercury and lead free
- Dimmable
- ENERGY STAR® certified
- Long rated life of 25,000 hours (L_{70})
- No warm up time, instant on with full light output and stable color

This light source meets restrictions on hazardous substances.

Product Offering

Ordering Abbreviation	Wattage	Color Temperature	Typical Lumens
LED4.5A19	4.5	2700K, 5000K	450
LED6.519	6.5	2700K, 5000K	800
LED9A21	9	2700K, 5000K	1100
LED11A21	11	2700K, 5000K	1600

Application Information

Applications

- Downlights
- Pendant fixtures
- Table/floor lamps
- Wall sconces

Market Segments

- Hospitality
- Office
- Residential
- Retail

Application Notes

1. Operating temperature range between -20°C and +45°C (-4°F and +113°F)
2. Not for use with emergency light fixtures or exit lights
3. Suitable for damp locations

Specification Data

Catalog #	Type
Project	
Comments	
Prepared by	

Ordering Information

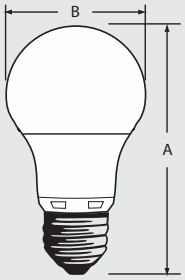
Item Number	Ordering Abbreviation	Wattage (W)	Base Type	Replaces	Input Voltage (V)	Average Rated Life (hrs.)	CCT	Typical Lumens (lm)	CRI	Bulb Finish	ENERGY STAR®
74963	LED4.5A19/DIM/O/827/RP4	4.5	Medium	40W	120	25,000	2700K	450	82	Frosted	Yes
74964	LED4.5A19/DIM/O/827/RP	4.5	Medium	40W	120	25,000	2700K	450	82	Frosted	Yes
74965	LED4.5A19/DIM/O/850/RP4	4.5	Medium	40W	120	25,000	5000K	450	82	Frosted	Yes
74966	LED4.5A19/DIM/O/850/RP	4.5	Medium	40W	120	25,000	5000K	450	82	Frosted	Yes
74967	LED6.5A19/DIM/O/827/RP4	6.5	Medium	60W	120	25,000	2700K	800	82	Frosted	Yes
74968	LED6.5A19/DIM/O/827/RP	6.5	Medium	60W	120	25,000	2700K	800	82	Frosted	Yes
74969	LED6.5A19/DIM/O/850/RP4	6.5	Medium	60W	120	25,000	5000K	800	82	Frosted	Yes
74970	LED6.5A19/DIM/O/850/RP	6.5	Medium	60W	120	25,000	5000K	800	82	Frosted	Yes
74971	LED9A21/DIM/O/827/RP4	9	Medium	75W	120	25,000	2700K	1100	82	Frosted	Yes
74972	LED9A21/DIM/O/827/RP	9	Medium	75W	120	25,000	2700K	1100	82	Frosted	Yes
74973	LED9A21/DIM/O/850/RP4	9	Medium	75W	120	25,000	5000K	1100	82	Frosted	Yes
74974	LED9A21/DIM/O/850/RP	9	Medium	75W	120	25,000	5000K	1100	82	Frosted	Yes
74975	LED11A21/DIM/O/827/RP4	11	Medium	100W	120	25,000	2700K	1600	82	Frosted	Yes
74976	LED11A21/DIM/O/827/RP	11	Medium	100W	120	25,000	2700K	1600	82	Frosted	Yes
74977	LED11A21/DIM/O/850/RP4	11	Medium	100W	120	25,000	5000K	1600	82	Frosted	Yes
74978	LED11A21/DIM/O/850/RP	11	Medium	100W	120	25,000	5000K	1600	82	Frosted	Yes

Ordering Guide

LED	4.5	A19	/	DIM	/	O	/	8	27	/	RP4
LED	Wattage	Lamp Type		Dimmable		Omnidirectional		CRI	CCT		Retail Pack

Lamp Dimensions

	(A) MOL inches (mm)	(B) Diameter inches (mm)
LED4.5A19	4.4 (112)	2.36 (60)
LED6.5A19	4.4 (112)	2.36 (60)
LED9A21	5.17 (131.4)	2.56 (65)
LED11A21	5.17 (131.4)	2.56 (65)



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SYLVANIA

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SubstiTUBE® DULUX® L LED TT5 Lamps

Compatible with instant start electronic DL40 ballasts

Key Features & Benefits

- Optimized glass optics
- CCT: 3000K, 3500K, 4100K
- Compatible with instant start electronic DL40 ballasts
- THD <20%, power factor >0.90
- 2G11 four pin base
- Long life: 50,000 hour life (L_{70})
- 5-year limited lamp warranty (24/7 operation)
- Non-dimmable
- No warm-up time, instant-on with full light output and stable lamp to lamp color
- No UV emission
- Suitable for dry and damp locations (cannot come in direct contact with water)
- Maximize energy savings with occupancy sensors

Energy efficient 50,000 hour LED TT5 lamps providing instant light and a uniform light distribution with an optimized glass design. These lamps contain no mercury, provide instant light and a uniform light distribution. They are engineered to operate on existing instant start electronic DL40 ballasts.

Product Offering

Description	Color Temperature	CRI
DULUX TT5	3000K, 3500K, 4100K	80+

Application Information

Applications

- Cove lighting
- General illumination

Application Notes

1. Due to numerous ballast designs and topologies, this lamp should be tested on existing ballasts before mass quantities are installed.
2. Not intended for use with older dedicated voltage (120V or 277V) ballasts. These ballasts have electronic components that degrade over time and may become unsuitable for the new LED T8 lamp.
3. All installation, inspection, and maintenance of lighting fixtures should be done with the power to the fixture turned off. Lamps should be installed and operated in compliance with the National Electrical Code (NEC), Underwriters Laboratories Inc. (UL) requirements, and all applicable codes and regulations.
4. Insert and align tubes properly in lamp holders. Partial insertion results in a poor or intermittent electrical contact that can result in short lamp life and arcing. Arcing at the lamp holder can result in localized overheating.
5. For approved ballasts, de-lamp is allowed for only 1 lamp so long as the ballast factor remains below 1.20 (for example, 4 lamp ballast can de-lamp to 3 lamps).
6. Operating temperature range between -4°F and 122°F (-20°C and 50°C).
7. Suitable for use in dry and damp environments.
8. Maximum mounting distance between tube and ballast is 20 feet.
9. Please read all installation instructions before attempting installation.
10. For detailed warranty information, please see www.sylvania.com.

Specifications and Certifications

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Specification Data

Catalog #	Type
Project	
Comments	
Prepared by	

Specifications

Energy Data

Ambient Operating Temperature: -4°F to 122°F (-20°C to 50°C)
EMI/RFI: FCC Title 47 CFR, Part 18, Non-Consumer
Max Case Temperature: 140°F (60°C)

Lighting Data

Lumen Output: See specification table (output is dependent on operating ballast)
Lumens per Watt: Up to 104 system efficacy
Correlated Color Temperature (CCT): 3000K, 3500K, 4100K
Color Rendering Index (CRI): 80+
R9: Up to 14

Ordering Information

Item Number	Ordering Abbreviation	Bulb	Lamp Power (W)	Lamp Lumens (lm)	Color Temp.	CRI	Package Qty.
71180	LED17TT5/DL/FG/830/SUB/G6	DL (TT5)	17	2100	3000K	82	10
71181	LED17TT5/DL/FG/835/SUB/G6	DL (TT5)	17	2100	3500K	82	10
71182	LED17TT5/DL/FG/841/SUB/G6	DL (TT5)	17	2200	4100K	82	10

Ordering Guide

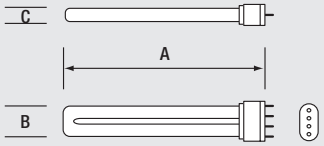
LED	17	TT5	/	DL	/	FG	/	8	41	/	SUB	/	G6
LED	Wattage	Single-Ended Twin-Tube Lamps		DULUX®		Frosted Glass		CRI 82	Color Temperature 30 = 3000K 35 = 3500K 41 = 4100K		SubstiTUBE®		Generation

Specifications and Lighting Data

Lamp	Ballast	Current (AMPS)	System Power (W)	System Lumens (lm)	System Efficacy (lm/W)	No. of Lamps
LED17TT5/DL	QHE2x40DL/UNV ISN-SC	0.16 / 0.08	42	4400	105	2

Lamp Dimensions

	(A) Max. Overall Length in. (mm)	(B) Width of Lamp in. (mm)	(C) Max. Bulb Diameter in. (mm)
LED17TT5/DL/FG	22.4 (570.0)	1.6 (40.0)	0.8 (20.0)



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ULTRA LED™ CL Lamp

Medium Base Retrofit for Ceiling Light Fixtures

The ULTRA LED CL Lamp screws into most existing plastic and porcelain lamp holders without any wiring required. Also installs in junction boxes for new construction applications.

Key Features & Benefits

- Lumen package:
  - 700 lumens @ 9 watts (without pull chain)
  - 1200 lumens @ 15 watts (with pull chain)
  - 2500 lumens @ 31 watts (without pull chain)
- Replacement for 65W incandescent
- CCT: 2700K & 4000K
- CRI of 82
- Reduces energy consumption up to 86%
- 50,000 hours life (L_{70})
- Suitable for damp and dry locations
- Save up to $308 over the life of the fixture and last 25X longer
- 5 year warranty
- Easy installation

Product Offering

Ordering Abbreviation	Wattage	Color Temperature	CRI
LED/700/CL	9	2700K, 4000K	82
LED/1200/CL	15	2700K, 4000K	82
LED/2500/CL	31	2700K, 4000K	82

Application Information

Applications

Indoor
- Closets
- Basements

Application Notes

1. Should not be directly exposed to water/humidity.
2. For detailed warranty information, please see www.sylvania.com/warranty.
3. Not intended for use in dimming applications.

Specifications and Certifications

SYLVANIA

Specification Data

Catalog #	Type
Project	
Comments	
Prepared by	

Specifications

Energy Data

Minimum Starting Temp: -20°F

EMI/RFI: FCC Title 47 CFR, Part 15, Class B

Sound Rating: <24dBA

Input Voltage: 120V

Power Factor: >0.90

Input Frequency: 60Hz

Input Power: 9W, 15W, 31W

Maximum Ambient Operating Temperature: 130°F

Lighting Data

Lumen Output: 700, 1200, 2500

Lumens per Watt: >77

Color

Correlated Color Temperature (CCT): 2700K, 4000K

Color Rendering Index (CRI): 82

R9: 15

Product Weight: 2.3 lbs.

Ordering Information

Item Number	Ordering Abbreviation	Fixture Diameter (in)	Nominal Wattage (W)	Lamp Base	Delivered Light Output (lm)	Color Temperature	CRI	Avg. Rated Life (hrs.)*	Pull Chain
75080	LED/700/CL/827/RP	7	9	Medium (E26)	700	2700K	82	50,000	No
75081	LED/700/CL/840/RP	7	9	Medium (E26)	700	4000K	82	50,000	No
75112	LED/1200/CL/827/RP	7	15	Medium (E26)	1200	2700K	82	50,000	Yes
75113	LED/1200/CL/840/RP	7	15	Medium (E26)	1200	4000K	82	50,000	Yes
75123	LED/2500/CL/827/RP	11	31	Medium (E26)	2500	2700K	82	50,000	No
75124	LED/2500/CL/840/RP	11	31	Medium (E26)	2500	4000K	82	50,000	No

* LED lamp life is defined as the number of hours when 50% of an average group of identical lamps reached 70% of its initial lumens.

Ordering Guide

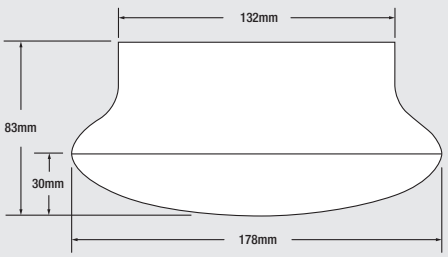
LED	/	700	/	CL	/	8	27
LED		Light Output 700lm or 1200lm		Product Name Ceiling Light		CRI >80	Color Temperature 2700K 4000K

Energy Savings

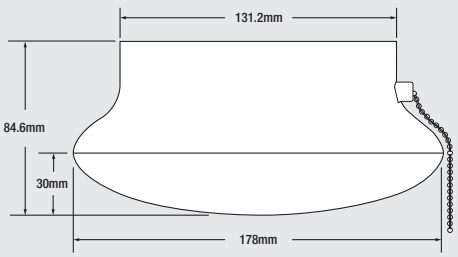
Product Description	LED Lumens	LED Life	Traditional Lamp Type	Lumens	Life	Watts Saved	Energy Savings	Life Benefit
LED/CL/700	700	50,000	Incandescent 65BR30	680	2000	56	$308.00	25x
LED/CL/1200	1200	50,000	100W Incandescent	1200	2000	85	$467.00	25x

Dimensions

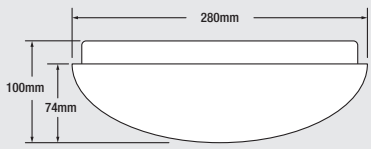
700lm CL



1200lm CL

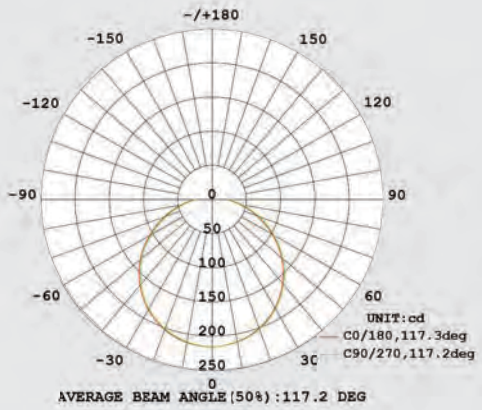


2500lm CL



Photometric Information

700lm CL



Zonal Lumen Distribution

Zone	Lumens	% Fixture
0-30	174.69	23.20
0-40	287.73	38.30
0-60	518.16	68.90
0-80	672.53	89.50
60-80	154.36	20.50
70-80	63.52	8.50
80-90	37.51	5.00
90-110	30.34	4.00
90-120	35.97	4.80
90-130	39.01	5.20
90-150	41.28	5.50
90-180	41.66	5.50
110-180	11.33	1.50
0-180	751.70	100.00

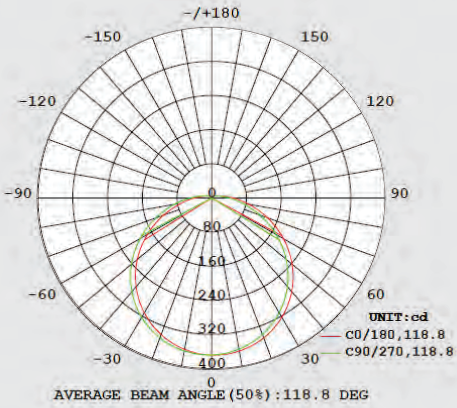
Illuminance

	Edge	Center	Beam Diameter
2 ft	56.0 fc	56.0 fc	6.9 ft
4 ft	13.8 fc	14.0 fc	13.9 ft
6 ft	6.1 fc	6.2 fc	20.8 ft
8 ft	3.5 fc	3.5 fc	27.7 ft
10 ft	2.2 fc	2.2 fc	34.6 ft
12 ft	1.5 fc	1.6 fc	41.6 ft

Spacing to Mounting Height Ratio

Spacing Criteria (0-180°)	1.28
Spacing Criteria (90-270°)	1.30
Spacing Criteria (Diagonal)	1.40

1200lm CL



Zonal Lumen Distribution

Zone	Lumens	% Fixture
0-30	310.81	23.20
0-40	511.73	38.30
0-60	921.16	68.70
0-80	1196.1	89.20
60-80	274.95	20.50
70-80	113.51	8.50
80-90	68.29	5.10
90-110	55.54	4.10
90-120	65.85	4.90
90-130	71.46	5.30
90-150	75.69	5.60
90-180	76.48	5.70
110-180	20.94	1.60
0-180	1340.88	100.00

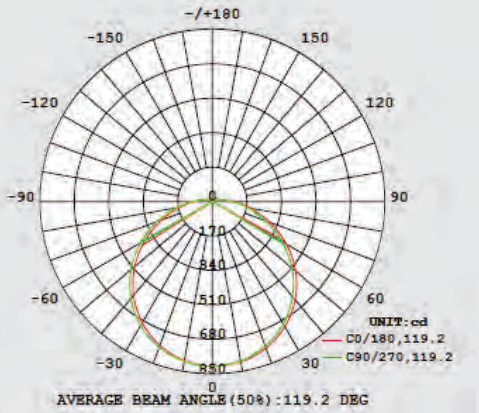
Illuminance

	Edge	Center	Beam Diameter
2 ft	6.8 fc	99.5 fc	6.7 ft
4 ft	1.7 fc	24.9 fc	13.3 ft
6 ft	0.8 fc	11.1 fc	20.0 ft
8 ft	0.4 fc	6.2 fc	26.6 ft
10 ft	0.3 fc	4.0 fc	33.3 ft
12 ft	0.2 fc	2.8 fc	39.9 ft

Spacing to Mounting Height Ratio

Spacing Criteria (0-180°)	1.26
Spacing Criteria (90-270°)	1.28
Spacing Criteria (Diagonal)	1.40

2500lm CL



Zonal Lumen Distribution

Zone	Lumens	% Fixture
0-30	637.5	22.50
0-40	1052.55	37.20
0-60	1904.26	67.20
0-80	2483.99	87.70
60-80	579.73	20.50
70-80	241.06	8.50
80-90	148.01	5.20
90-110	126.23	4.50
90-120	153.37	5.40
90-130	171.25	6.00
90-150	191.45	6.80
90-180	200.31	7.10
110-180	74.07	2.60
0-180	2832.31	100.00

Illuminance

	Edge	Center	Beam Diameter
2 ft	13.4 fc	200.3 fc	6.8 ft
4 ft	3.4 fc	50.8 fc	13.5 ft
6 ft	1.5 fc	22.6 fc	20.3 ft
8 ft	0.8 fc	12.7 fc	27.1 ft
10 ft	0.5 fc	8.1 fc	33.8 ft
12 ft	0.4 fc	5.6 fc	40.6 ft

Spacing to Mounting Height Ratio

Spacing Criteria (0-180°)	1.28
Spacing Criteria (90-270°)	1.28
Spacing Criteria (Diagonal)	1.42

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SubstiTUBE® IPS LED T8

Compatible glass LED T8 for use with instant start and select programmed rapid start electronic T8 ballasts

SubstiTUBE IPS LED T8 lamps are an energy saving alternative, designed to replace traditional fluorescent T8 lamps. These LED T8 lamps contain no mercury, provide instant light and a uniform light distribution.

Engineered to operate on existing instant start and select programmed rapid start electronic T8 ballasts, these lamps minimize labor and recycling costs. Because the SubstiTUBE IPS LED T8 is not affected by switching cycles, the use of occupancy or vacancy sensors can be installed with the existing instant start ballasts for optimal energy savings.

Install a new QHE instant start ballast with the SubstiTUBE IPS LED T8 lamp for optimal performance and to take advantage of the QUICK 72SUB+ system warranty. (See website for details.)

Key Features & Benefits

- Optimized glass optics available in:
  - Dimmable on 0-10V 4ft/15.5W
  - Non-dimmable 4ft/10W, 3ft/10W, 2ft/8W
- CCT: 3000K, 3500K, 4100K, 5000K
- Beam angle: 220°
- Compatible with instant start and select programmed rapid start electronic T8 ballasts with input voltage of 120-277V and 347V
- THD <20%, power factor >0.90
- G13 medium bi-pin base
- Long life: up to 60,000 hour life (L_{70})
- 6 year limited system warranty with purchase of new QHE IS ballast (16/7 operation)
- 5 year limited lamp warranty (24/7 operation)
- No warm-up time, instant-on with full light output and stable lamp to lamp color
- No UV emission
- Suitable for dry and damp locations (cannot come in direct contact with water)
- Maximize energy savings with occupancy sensors
- Suitable for open and enclosed fixtures

Product Offering

Length	Color Temperature	CRI
48in.	3000K, 3500K, 4100K, 5000K	82
36in.	3000K, 3500K, 4100K, 5000K	82
24in.	3000K, 3500K, 4100K, 5000K	82

Application Information

Applications

- Cove lighting
- Display case
- General illumination
- Parking garage
- Tunnels

Specifications and Certifications

Specification Data

Catalog #	Type
Project	
Comments	
Prepared by	

Specifications

Energy Data

Ambient Operating Temperature: -4°F to 122°F (-20°C to 50°C)
EMI/RFI: FCC Title 47 CFR, Part 18, Non-Consumer
Max Case Temperature: LED15T8/L48 = 158°F (70°C), LED10T8/L48 = 149°F (65°C)

Lighting Data

Lumen Output: See specification table (output is dependent on operating ballast)
Lumens per Watt: Up to 134
Correlated Color Temperature (CCT): 3000K, 3500K, 4100K, 5000K
Color Rendering Index (CRI): 82
R9: Up to 14

Ordering Information

Item Number	Ordering Abbreviation	Length	Lamp Power (W)[1]	Lamp Lumens (lm)[1]	Color Temp.	CRI	Beam Angle (°)	Package Quantity	DLC (Y/N)
Glass									
75339	LED15T8L48DIM830SUBG7	4ft	15.5	2100	3000K	82	220	25	Y
75340	LED15T8L48DIM835SUBG7	4ft	15.5	2100	3500K	82	220	25	Y
75341	LED15T8L48DIM841SUBG7	4ft	15.5	2200	4100K	82	220	25	Y
75342	LED15T8L48DIM850SUBG7	4ft	15.5	2200	5000K	82	220	25	Y
79544	LED10T8L48FG830SUBG7	4ft	10	1600	3000K	82	220	10	Y
79545	LED10T8L48FG835SUBG7	4ft	10	1600	3500K	82	220	10	Y
79546	LED10T8L48FG841SUBG7	4ft	10	1600	4100K	82	220	10	Y
79547	LED10T8L48FG850SUBG7	4ft	10	1600	5000K	82	220	10	Y
75516	LED10T8L36FG830SUBG7	3ft	10	1600	3000K	82	220	10	N/A
75517	LED10T8L36FG835SUBG7	3ft	10	1600	3500K	82	220	10	N/A
75518	LED10T8L36FG841SUBG7	3ft	10	1600	4100K	82	220	10	N/A
75519	LED10T8L36FG850SUBG7	3ft	10	1600	5000K	82	220	10	N/A
75520	LED8T8L24FG830SUBG7	2ft	8	1200	3000K	82	220	10	Y
75521	LED8T8L24FG835SUBG7	2ft	8	1200	3500K	82	220	10	Y
75522	LED8T8L24FG841SUBG7	2ft	8	1250	4100K	82	220	10	Y
75523	LED8T8L24FG850SUBG7	2ft	8	1250	5000K	82	220	10	Y

1. Average Lamp Power and Average Lamp Lumens rated on QHE2x32T8/UNV ISN.

Ordering Guide

LED	15	T8	/	L	48	/	DIM	/	8	41	/	SUB	/	G7
LED	Wattage (ISN ballast)	Lamp Type		Length	48 Inches		DIM = frosted glass dimmable FG = frosted glass non-dimmable		CRI = 82	Color Temperature 41 = 4100K 30 = 3000K 35 = 3500K 50 = 5000K		SubstiTUBE® IPS (Compatible LED T8 for use with instant start and select programmed rapid start T8 electronic ballasts)		Generation

Application Information

Application Notes

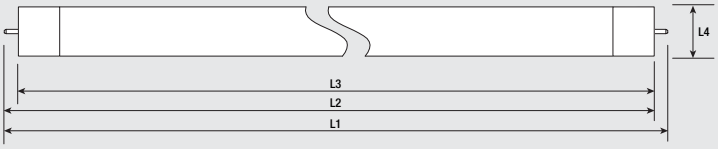
1. Due to numerous ballast designs and topologies, this lamp should be tested on existing ballasts before mass quantities are installed.
2. Not intended for use with older dedicated voltage (120V or 277V) ballasts. These ballasts have electronic components that degrade over time and may become unsuitable for the new LED T8 lamp.
3. All installation, inspection, and maintenance of lighting fixtures should be done with the power to the fixture turned off. Lamps should be installed and operated in compliance with the National Electrical Code (NEC), Underwriters Laboratories Inc. (UL) requirements, and all applicable codes and regulations.
4. Insert and align tubes properly in lamp holders. Partial insertion results in a poor or intermittent electrical contact that can result in short lamp life and arcing. Arcing at the lamp holder can result in localized overheating.
5. For instant start ballasts, use lamp holders with an internal shunt or ensure that lamp holders are wired in a shunt configuration.
6. For Programmed Rapid Start ballasts, use rapid-start lamp holders (non-shunted lamp holders).
7. De-lamp is not allowed for ISH ballasts. For approved ISN and ISL ballasts, de-lamp is allowed for only 1 lamp so long as the ballast factor remains below 1.20 (for example, 4 lamp ballast can de-lamp to 3 lamps).
8. Operating temperature range between -4°F and 122°F (-20°C and 50°C).
9. Suitable for use in dry and damp environments.
10. Maximum mounting distance between tube and ballast is 20 feet.
11. Please read all installation instructions before attempting installation.
12. For detailed warranty information, please see www.sylvania.com.

Specifications & Lighting Data

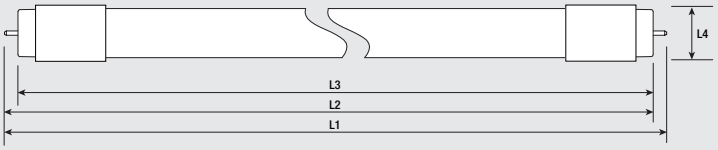
Lamp	Ballast	Current (AMPS)	System Power (W)	System Lumens (lm)	System Efficacy (lm/W)	No. of Lamps
LED15T8/L48	QHE2X32T8/UNV/ISN	0.33 / 0.14	36.0	4400	122	2
LED10T8/L48	QHE2X32T8/UNV/ISN	0.22 / 0.10	26.0	3200	123	2
LED10T8/L36	QHE2X32T8/UNV/ISN	0.22 / 0.10	26.0	3200	123	2
LED8T8/L24	QHE2X32T8/UNV/ISN	0.17 / 0.08	20.0	2400	120	2

Note: For complete system information refer to LED495 – SubstiTUBE System Information.

Assembly Diagram



Product Description	L1 End of Base Pin to End of Opposite Pin End	L2 Base Face to End of Opposite Base Pin	L3 Base Face to Base Face	L4 Bulb Outside Diameter
LED15T8/L48/DIM (4ft)	47.725" ± 0.055" (1212.2mm ± 1.4mm)	47.45" ± 0.05" (1205.25mm ± 1.25mm)	max 47.22" (1199.4mm)	1.02" ± 0.08" (25.9mm ± 2.0mm)
LED10T8/L48 (4ft)	47.725" ± 0.055" (1212.2mm ± 1.4mm)	47.45" ± 0.05" (1205.25mm ± 1.25mm)	max 47.22" (1199.4mm)	1.02" ± 0.08" (25.9mm ± 2.0mm))
LED10T8/L36 (3ft)	35.72" ± 0.055" (907.4mm ± 1.4mm)	35.45" ± 0.05" (900.45mm ± 1.25mm)	max 35.22" (894.6mm)	1.02" ± 0.08" (25.9mm ± 2.0mm)



Product Description	L1 End of Base Pin to End of Opposite Pin End	L2 Base Face to End of Opposite Base Pin	L3 Base Face to Base Face	L4 Bulb Outside Diameter
LED08T8/L24 (2ft)	23.72" ± 0.055" (602.6mm ± 1.4mm)	23.45" ± 0.05" (595.65mm ± 1.25mm)	max 23.22" (589.8mm)	1.02" ± 0.08" (25.9mm ± 2.0mm)

Warranty

SubstiTUBE® IPS LED T8 lamps are covered by the LED T8 Lamp Limited Warranty and the QUICK 72SUB+ System Warranty, a comprehensive system warranty. For additional details, please visit www.sylvania.com/warranty.

LEDVANCE LLC
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Wilmington, MA 01887 USA
Phone 1-800-LIGHTBULB (1-800-544-4828)
www.sylvania.com

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SubstiTUBE® IPS LED T8

Compatible LED T8 for use with instant start and select programmed rapid start electronic T8 ballasts

Key Features & Benefits

- Optimized glass optics available in:
  – Dimmable on 0-10V
- CCT: 3000K, 3500K, 4100K, 5000K
- Beam angle: 220°
- Compatible with instant start and select programmed rapid start electronic T8 ballasts with input voltage of 120-277V and 347V
- THD <20%, power factor >0.90
- G13 medium bi-pin base
- Long life: 60,000 hour life (L_{70})
- 5 year limited lamp warranty (24/7 operation)
- No warm-up time, instant-on with full light output and stable lamp to lamp color
- No UV emission
- Suitable for dry and damp locations (cannot come in direct contact with water)
- Maximize energy savings with occupancy sensors
- Suitable for open and enclosed fixtures

SubstiTUBE IPS LED T8 lamps are an energy saving alternative, designed to replace traditional fluorescent T8 lamps. These LED T8 lamps contain no mercury, provide instant light and a uniform light distribution.

Engineered to operate on existing instant start and select programmed rapid start electronic T8 ballasts, these lamps minimize labor and recycling costs. Because the SubstiTUBE IPS LED T8 is not affected by switching cycles, the use of occupancy or vacancy sensors can be installed with the existing instant start ballasts for optimal energy savings.

Install a new QHE instant start ballast with the SubstiTUBE IPS LED T8 lamp for optimal performance and to take advantage of the QUICK 72SUB+ system warranty. (See website for details.)

Product Offering

Length	Color Temperature	CRI
48in.	3000K, 3500K, 4100K, 5000K	82

Application Information

Applications

- Cove lighting
- Display case
- General illumination
- Parking garage
- Tunnels

Specifications and Certifications

c UL us LISTED

*DLC on 15.5W LED T8 lamp

SYLVANIA

Specification Data

Catalog #	Type
Project	
Comments	
Prepared by	

Specifications

Energy Data

Ambient Operating Temperature: -4°F to 122°F (-20°C to 50°C)

EMI/RFI: FCC Title 47 CFR, Part 18, Non-Consumer

Max Case Temperature: LED15T8/L48 = 140°F (60°C)
LED13T8/L48 = 140°F (60°C)

Lighting Data

Lumen Output: See specification table (output is dependent on operating ballast)

Lumens per Watt: Up to 130

Correlated Color Temperature (CCT): 3000K, 3500K, 4100K, 5000K

Color Rendering Index (CRI): 82

R9: Up to 14

Ordering Information

Item Number	Ordering Abbreviation	Length	Lamp Power (W)[1]	Lamp Lumens (lm)[1]	Color Temp.	CRI	Beam Angle (°)	Package Quantity	DLC (Y/N)
75339	LED15T8/L48/DIM/830/SUB/G7	4ft	15.5	2100	3000K	82	220	25	Y
75340	LED15T8/L48/DIM/835/SUB/G7	4ft	15.5	2100	3500K	82	220	25	Y
75341	LED15T8/L48/DIM/841/SUB/G7	4ft	15.5	2200	4100K	82	220	25	Y
75342	LED15T8/L48/DIM/850/SUB/G7	4ft	15.5	2200	5000K	82	220	25	Y
75508	LED13T8/L48/DIM/830/SUB/G8	4ft	13	2000	3000K	82	220	25	Y
75509	LED13T8/L48/DIM/835/SUB/G8	4ft	13	2000	3500K	82	220	25	Y
75510	LED13T8/L48/DIM/841/SUB/G8	4ft	13	2100	4100K	82	220	25	Y
75511	LED13T8/L48/DIM/850/SUB/G8	4ft	13	2100	5000K	82	220	25	Y

1. Average Lamp Power and Average Lamp Lumens rated on QHE2x32T8/UNV ISN.

Ordering Guide

LED	15	T8 /	L	48 /	DIM /	8	41 /	SUB /	G7
LED	Wattage (ISN ballast)	Lamp Type	Length	48 Inches	DIM = frosted glass dimmable	CRI = 82	Color Temperature 41 = 4100K 30 = 3000K 35 = 3500K 50 = 5000K	SubstiTUBE® IPS (Compatible LED T8 for use with instant start and select programmed rapid start T8 electronic ballasts)	Generation

Application Information

Application Notes

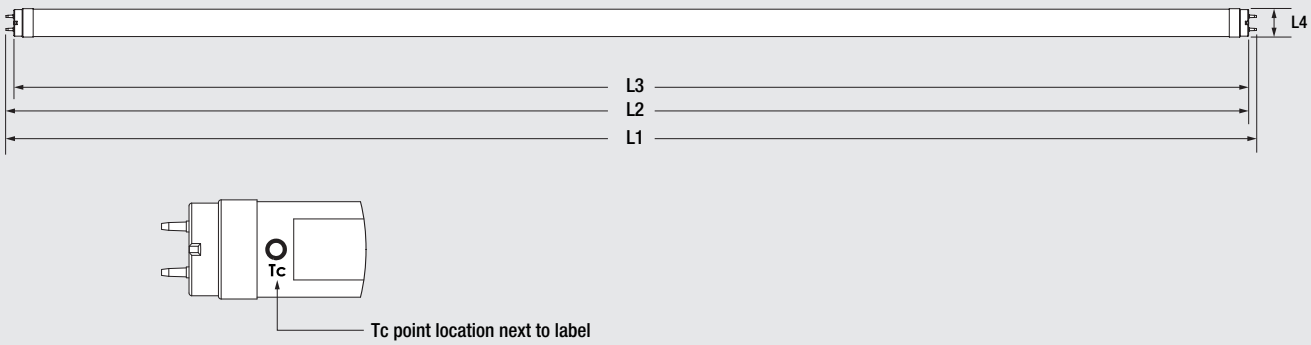
1. Due to numerous ballast designs and topologies, this lamp should be tested on existing ballasts before mass quantities are installed.
2. Not intended for use with older dedicated voltage (120V or 277V) ballasts. These ballasts have electronic components that degrade over time and may become unsuitable for the new LED T8 lamp.
3. All installation, inspection, and maintenance of lighting fixtures should be done with the power to the fixture turned off. Lamps should be installed and operated in compliance with the National Electrical Code (NEC), Underwriters Laboratories Inc. (UL) requirements, and all applicable codes and regulations.
4. Insert and align tubes properly in lamp holders. Partial insertion results in a poor or intermittent electrical contact that can result in short lamp life and arcing. Arcing at the lamp holder can result in localized overheating.
5. For instant start ballasts, use lamp holders with an internal shunt or ensure that lamp holders are wired in a shunt configuration.
6. For Programmed Rapid Start ballasts, use rapid-start lamp holders (non-shunted lamp holders).
7. De-lamp is not allowed for ISH ballasts. For approved ISN and ISL ballasts, de-lamp is allowed for only 1 lamp so long as the ballast factor remains below 1.20 (for example, 4 lamp ballast can de-lamp to 3 lamps).
8. Operating temperature range between -4°F and 122°F (-20°C and 50°C).
9. Suitable for use in dry and damp environments.
10. Maximum mounting distance between tube and ballast is 20 feet.
11. Please read all installation instructions before attempting installation.
12. For detailed warranty information, please see www.sylvania.com.

Specifications & Lighting Data

Lamp	Ballast	Current (AMPS)	System Power (W)	System Lumens (lm)	System Efficacy (lm/W)	No. of Lamps
LED15T8/L48	QHE2X32T8/UNV ISN	0.33 / 0.14	36.0	4400	122	2
LED13T8/L48	QHE2X32T8/UNV ISN	0.33 / 0.14	32.0	4200	130	2

Note: For complete system information refer to LED495 – SubstiTUBE System Information.

Assembly Diagram



Product Description	L1 End of Base Pin to End of Opposite Pin End	L2 Base Face to End of Opposite Base Pin	L3 Base Face to Base Face	L4 Bulb Outside Diameter
LED15T8/L48/DIM (4ft)	47.725" ± 0.055" (1212.2mm ± 1.4mm)	47.45" ± 0.05" (1205.25mm ± 1.25mm)	max 47.22" (1199.4mm)	1.02" ± 0.08" (25.9mm ± 2.0mm)
LED13T8/L48/DIM (4ft)	47.725" ± 0.055" (1212.2mm ± 1.4mm)	47.45" ± 0.05" (1205.25mm ± 1.25mm)	max 47.22" (1199.4mm)	1.02" ± 0.08" (25.9mm ± 2.0mm)

Warranty

SubstiTUBE® IPS LED T8 lamps are covered by the LED T8 Lamp Limited Warranty and the QUICK 72SUB+ System Warranty, a comprehensive system warranty. For additional details, please visit www.sylvania.com/warranty.

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SYLVANIA Luminaires
LED Round Flush Mount

Catalog #	Type
Project	
Notes	
Date	
Prepared by	

Product Features

The Surface Mount Series are environmentally preferable LED alternatives to traditional CFL or Incandescent luminaires, offering up to 87% in energy savings. Ideal in place of traditional luminaires, or as new installations, the Flush Mount Luminaires can be used in residential, educational, property management or hospitality applications.

The LED Round Flush Mount is offered in multiple sizes, is easy to install and provides soft, uniform illumination for universal applications. SYLVANIA luminaires assure optimum light engine performance for extended service and rated life (≥50,000 hours L_{70})

Specifications

Weight: 10": 1.72lbs (.78kg) 12": 2.67lbs (1.21kg)

Construction: Aluminum back plate with a brushed nickel finish and an acrylate/PMMA lens cover. The standard finish is brushed nickel.

LED System: LED system with a life rating of ≥50,000 hours at L_{70} @25°C. Luminaire efficacy up to 67 LPW.

Electrical: Offered in 15 Watts, the luminaire is designed to operate at 120V with driver on board . The power factor is ≥80% and THD is ≤20%.

Dimming: The driver is phase-cut dimmable (down to 10%).

Color Characteristics: CRI>80; CCT of 3000K or 4000K

Optics: White acrylate PMMA diffuser lens.

Installation: Luminaire mounts to recessed outlet box.

Operating Temperature: -4°F to +104°F (-20°C to +40°C)

Listings: cETLus listed to UL1598 standards and suitable for dry locations.

Warranty: Standard 5-year luminaire warranty (LEDLUM001).

Note: Specifications subject to change without notice.

Ordering Information

Item Number	Ordering Abbreviation	Power (W)	Input Voltage	Dimming	CRI	Color Temp (CCT)	Total Fixture Lumens	LPW	Size (in)	Shape
71403	LEDFLUSHRND10IN15DIM830BN	15	120V	Phase-Cut	>80	3000K	1000	67	10	Round
71404	LEDFLUSHRND10IN15DIM840BN	15	120V	Phase-Cut	>80	4000K	1000	67	10	Round
71405	LEDFLUSHRND12IN15DIM830BN	15	120V	Phase-Cut	>80	3000K	1000	67	12	Round
71406	LEDFLUSHRND12IN15DIM840BN	15	120V	Phase-Cut	>80	4000K	1000	67	12	Round

For further information and to learn more about utility rebates, contact your local SYLVANIA sales representative.

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QUICKTRONIC® QHE LED T8

Universal Voltage Systems

Low Power LED System

LED T8 / Electronic Control Gear Guide

LED15T8 SubstiTUBE® LED T8 Lamps
1-lamp QHE 1xLEDT8/UNV-ISL-SC
2-lamp QHE 2xLEDT8/UNV-ISL-SC
3-lamp QHE 3xLEDT8/UNV-ISL-SC
4-lamp QHE 4xLEDT8/UNV-ISL-SC

Also operates
LED12T8/L36, LED08T8/L24, LED15T8/U

Key System Features

- Up to 127 LPW (lumens/watt) with SubstiTUBE LED T8
- Lowest power LED T8 Systems
- Universal voltage (120-277)
- Small Can enclosure size
- Up to 58% energy savings compared to T12 magnetic systems
- Ambient Starting Temp: -4°F to 122°F (-20°C to 50°C)
- <20% THD
- RoHS compliant
- Lead-free solder and manufacturing process

Application Information

OSRAM QUICKTRONIC QHE LED T8 are ideally suited for:

- Any applications where the lowest power T8 systems are needed for maximum energy savings
- Commercial & Retail
- Energy Management
- Energy Retrofits
- Hospitality & Institutional
- New Construction

OSRAM QUICKTRONIC High Efficiency LED T8 (QHE LED) Electronic Control Gears (ECG) offer several advantages:

1. **Optimized design for SubstiTUBE LED T8**
   - Up to 38% in energy savings compared to standard T8 Fluorescent systems
   - Maximum energy savings when compared to F34T12 magnetically ballasted systems
2. **Parallel Circuitry:** keeps remaining LED T8 lit if one or more go out.
3. **Banded Packaging**
   - Distributor-friendly for easy stocking and individual sales
   - ESCO friendly for fast installation
   - Reduced waste
   - Easy removable bands
   - No tangled wires

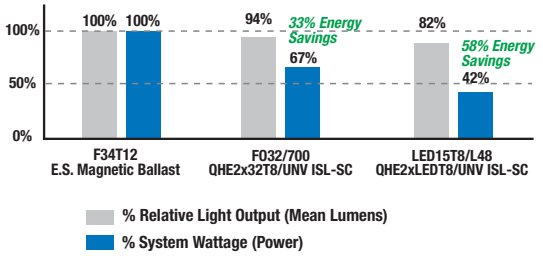
These ECGs are also RoHS compliant and feature lead-free solder and manufacturing process.

OSRAM QUICKTRONIC High Efficiency LED T8 (QHE LED) systems are covered up to 8 years by the SubstiTRONIC™ warranty, the most comprehensive LED system warranty in the industry.

System Information

OSRAM QUICKTRONIC QHE LED T8 System advantages:

- Operate from 120V through 277V
- Eliminates “wrong voltage” errors
- Highest System Efficacy



System Description	Input Power (W)	Initial System Lumens	System Efficacy LPW	Relative Initial Light Output	Energy Savings
F34T12 - E.S. Magnetic Ballast	72	4660	65	Baseline	Baseline
FO32/700 - QHE2x32T8/UNV ISL-SC	48	4370	91	94%	33%
LED15T8/L48 - QHE2xLEDT8/UNV ISL-SC	30	3800	127	82%	58%

OSRAM

High Efficiency Universal Voltage (120-277V) Low Power LED Systems

Item Number	Electronic Control Gear (ECG)	Input Current (AMPS)	SubstiTUBE LED T8	No. of LED T8	System Lumens (lm)	Input Power (W)	System Efficacy (lm/W)
75307	QHE1XLEDT8/UNV ISL-SC	0.13 / 0.06	LED15T8/L48/DIM/**G6**	1	1850	15	123
		0.13 / 0.06	LED15T8/L48/G6	1	1900	15	127
		0.11 / 0.05	LED12T8/L36/G6	1	1350	12	113
		0.08 / 0.04	LED08T8/L24/G6	1	1050	10	111
75308	QHE2XLEDT8/UNV ISL-SC	0.25 / 0.11	LED15T8/L48/DIM/**G6**	2	3700	30	123
		0.26 / 0.12	LED15T8/L48/G6	2	3800	30	127
		0.22 / 0.10	LED12T8/L36/G6	2	2900	26	114
		0.16 / 0.08	LED08T8/L24/G6	2	2100	19	111
75309	QHE3XLEDT8/UNV ISL-SC	0.37 / 0.16	LED15T8/L48/DIM/**G6**	3	5400	44	123
		0.38 / 0.17	LED15T8/L48/G6	3	5700	45	127
		0.34 / 0.15	LED12T8/L36/G6	3	4500	40	114
		0.24 / 0.11	LED08T8/L24/G6	3	3150	29	111
75310	QHE4XLEDT8/UNV ISL-SC	0.51 / 0.23	LED15T8/L48/DIM/**G6**	4	7400	60	123
		0.51 / 0.23	LED15T8/L48/G6	4	7600	60	127
		0.44 / 0.20	LED12T8/L36/G6	4	5850	52	114
		0.32 / 0.14	LED08T8/L24/G6	4	4200	38	111

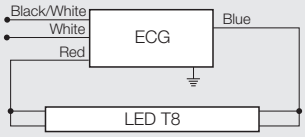
Use only with SubstiTUBE IPS LED T8.

Item No.	LED T8 Description	Length	Item No.	LED T8 Description	Length
75286	LED15T8/L48/DIM/830/SUB/G6	4ft	75128	LED12T8/L36/FG/830/SUB/G6	3ft
75287	LED15T8/L48/DIM/835/SUB/G6	4ft	75129	LED12T8/L36/FG/835/SUB/G6	3ft
75288	LED15T8/L48/DIM/841/SUB/G6	4ft	75130	LED12T8/L36/FG/841/SUB/G6	3ft
75297	LED15T8/L48/DIM/850/SUB/G6	4ft	75131	LED12T8/L36/FG/850/SUB/G6	3ft

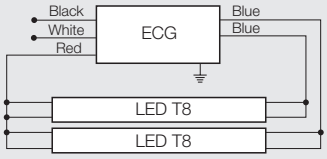
Item No.	LED T8 Description	Length	Item No.	LED T8 Description	Shape
75064	LED8T8/L24/FG/830/SUB/G6	2ft	75492	LED15T8/U/FP/830/SUB/G6	U-bend
75065	LED8T8/L24/FG/835/SUB/G6	2ft	75493	LED15T8/U/FP/835/SUB/G6	U-bend
75066	LED8T8/L24/FG/841/SUB/G6	2ft	75494	LED15T8/U/FP/841/SUB/G6	U-bend
75070	LED8T8/L24/FG/850/SUB/G6	2ft	75495	LED15T8/U/FP/850/SUB/G6	U-bend

*For additional SubstiTUBE LED T8 details, please refer to LED465.
For additonal SubstiTUBE CURVALUME IPS LED T8 details please refer to LED464.

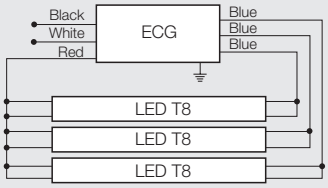
Wiring Diagrams



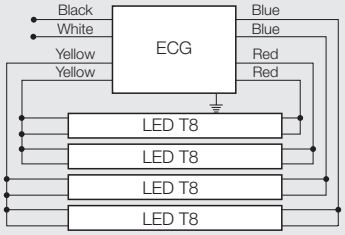
QHE LED 1 x T8



QHE LED 2 x T8



QHE LED 3 x T8



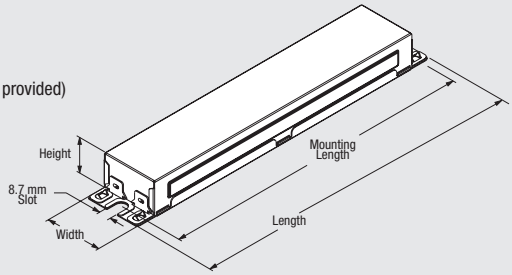
QHE LED 4 x T8

Use lamp holders with an internal shunt or ensure that lamp holders are wired in a shunt configuration.

Dimensions:
Overall: 9.5" L x 1.68" W x 1.18" H
Mounting: 8.90"

Product Weight:
14 oz each (approx.)

Wiring:
Leads only
(no connectors provided)



Ordering Guide

Item Number	**75307 QHE 1 x LEDT8 / UNV ISL - SC**	Case Size
QUICKTRONIC High Efficiency		Low Power System
Number of LED T8		Line Voltage
		SubstiTUBE LEDT8

Specification Data

Type	
Catalog #	
Project	
Comments	
Prepared by	

Performance Guide

Data based upon SubstiTUBE® LED T8 shown. QHE LED T8 Electronic Control Gear will operate LED15T8/L48, LED12T8/L36, LED08T8/L24 and LED15T8/U.

Specifications

System Output: Low Power
Circuit Type: Parallel
Ambient Operating Temperature: -4°F to 122°F (-20°C to 50°C)
Input Frequency: 50/60 Hz
Low THD: <20%
Power Factor: >90%
Voltage Range: ±10% of 120-277V rated line (108-305V)

cETLus Listed Class P, Type 1 Outdoor
70°C Max Case Temperature
FCC 47CFR Part 18 Non-Consumer
Class A Sound Rating
RoHS Compliant[1]
ANSI C62.41 Cat. A Transient Protection
Remote Mounting (Max. wire length from case to lampholder): 20 ft

1 Complies with European Union Restriction of Hazardous Substances (Directive EC 2002/95)

System Life / Warranty

QUICKTRONIC High Efficiency QHE LED products are covered up to 8 years by the SubstiTRONIC™ warranty, the most comprehensive LED system warranty in the industry. For additional warranty details, please refer to LED285.

For additional information refer to the warranty section of www.sylvania.com

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ULTRA LED™ MR16 Lamps

Dimmable

Key Features & Benefits

- Dimmable down to 10%*
- Long life: up to 25,000 hours (L_{70})
- Reduces energy consumption up to 82%
- Lasts up to 12.5 times longer than halogen lamps
- Can be used in enclosed fixtures
- No warm-up time, instant-on with full-light output and stable color
- 12V AC/DC input voltage
- UV and IR free
- Mercury and lead free
- Suitable for use in damp locations

* Performance may vary depending on dimmer used in application. Please refer to Dimmer Compatibility List (RETRO-DIM) for a list of compatible dimmers or visit www.SYLVANIA.com/LEDRetrofit

RoHS compliant

Intertek 4001425

ENERGY STAR

Long lasting, energy efficient, ULTRA LED MR16 lamps are now true halogen equivalent lamps when comparing lumen output and center beam candlepower. These MR16 lamps use just 9W, are available in 25 and 35 beam angles and are high quality replacements for halogen 50W MR16 lamps. These LED MR16 lamps are available in GU5.3 base configurations and dimmable down to 10%. Lamps boast a 25,000 hours life (L_{70}) providing 12.5 times longer life than halogen MR16 lamps thereby reducing maintenance costs. Lamps are available in 2700K and 3000K color temperatures and 80+ CRI. These products are free of UV and IR radiation, minimizing discoloration and fading of materials.

Product Offering

Ordering Abbreviation	Wattage	Color Temperature	Beam Angle
ULTRA LED MR16	9	2700K, 3000K	25°, 35°

Application Information

Applications

- Accent/display lighting
- Recessed downlighting
- Track lighting

Market Segments

- Art galleries and museums
- Commercial and office space
- Hotels
- Residential
- Restaurants
- Retail sector

Application Notes

1. Only install in operating environments ranging between -20°C and +40°C (-4°F and +104°F).
2. Not intended for use in emergency light fixtures or exit signs.
3. Suitable for damp locations – not for use where directly exposed to water.
4. Use only with Class 2 power supply.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. For FCC Part 15 user information, please see www.sylvania.com/fcc15b.

SYLVANIA

Specification Data

Catalog #	Type
Project	
Comments	
Prepared by	

Ordering Information

Item Number	Ordering Abbreviation	Wattage (W)	Base Type	Replaces	Input Voltage (V)	Average Rated Life (hrs.)[1]	CCT[3]	Typical Lumens (lm)[2]	CBCP (cd)	Beam Angle	CRI[4]	ENERGY STAR®
78199	LED9MR16/DIM/827/NFL25	9	GU5.3	50W MR16	12	25,000	2700K	700	2600	25°	80	Yes
78200	LED9MR16/DIM/827/FL35	9	GU5.3	50W MR16	12	25,000	2700K	700	1500	35°	80	Yes
74044	LED9MR16/DIM/830/NFL25	9	GU5.3	50W MR16	12	25,000	3000K	700	2600	25°	83	Yes
74042	LED9MR16/DIM/830/FL35	9	GU5.3	50W MR16	12	25,000	3000K	700	1500	35°	83	Yes

SYLVANIA submits most lamps for ENERGY STAR testing. Early qualification for ENERGY STAR lamps begin at 25,000 hours (L_{70}) regardless that the design of the lamp is manufactured for a greater life expectancy. As the lamps pass ENERGY STAR qualifications, manufacturers are able to increase rated life as dictated by Energy Star guidelines becoming either provisionally qualified or fully qualified. Please visit EnergyStar.gov for more information about testing requirements for ENERGY STAR qualified products.

1. Hours lifetime with 70% (L_{70}) lumen maintenance 2. Thermally stable typical lumens (±10%) 3. Thermally stable typical CCT (±10%) 4. CRI – Color Rendering Index

Ordering Guide

LED	9	MR16	/	DIM	/	830	/	NFL	/	25
LED Lamps and Retrofits	Wattage 9	Lamp Type: MR16		Dimmable		CRI, CCT: 830: 80+ CRI, 3000K		Beam Type: NFL = Narrow Flood FL = Flood		Beam Angle: 25°, 35°

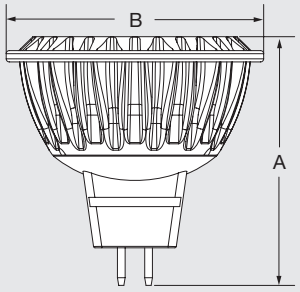
Energy Savings

Basic Product Description	LED Life (hrs.)	Similar Halogen	Halogen Life (hrs.)	Watts Saved	Energy Savings*	LED Life vs. Halogen Life
LED9MR16/DIM	25,000	50W MR16	2,000	41	$112.75	12.5x

*Energy savings over life of lamp calculated at $0.11/kWh

Lamp Dimensions

	(A) MOL inches	(B) Diameter inches
LED9MR16	1.89	1.97



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ULTRA LED™ Glass PAR16 Lamps

SYLVANIA ULTRA LED PAR16 lamps last 12 times longer than halogen PAR16 lamps and are a high quality replacement for 50W halogen PAR16 lamps. They are free of UV and IR radiation, minimizing discoloration and fading of materials. These LED lamps will reduce energy and maintenance cost when compared with conventional halogen light sources.

Key Features & Benefits

- True glass housing that mimics halogen PAR16
- Long life: rated up to 25,000 hours (L_{70})
- Available in 3000K color temperature
- UV and IR free
- Suitable for damp locations
- RoHS compliant
- Available in medium and GU10 base
- Dimmable down to 10%
- Mercury and lead free
- Lasts up to 12 times longer than halogen lamps
- No warm-up time, instant-on with full light output and stable color

* Performance may vary depending on dimmer used in application. Please refer to Dimmer Compatibility List (RETRO-DIM) for a list of compatible dimmers or visit www.SYLVANIA.com/LEDRetrofit

Product Offering

Ordering Abbreviation	Wattage	Beam Angle
PAR16	6	36°

Application Information

Applications

- Recessed downlighting
- Track lighting
- Wall washers

Market Segments

- Art galleries and museums
- Hospitality
- Offices
- Residential
- Restaurants
- Retail

Application Notes

1. Operating temperature range between -4°F and +104°F (-20°C and +40°C)
2. Suitable for outdoor use when used in a UL rated fixture where protected from the weather
3. Not intended for use with emergency light fixtures or exit lights
4. Use in open fixture

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. For FCC Part 15 user information, please see www.sylvania.com/fcc15b

Specification Data

Catalog #	Type
Project	
Comments	
Prepared by	

Ordering Information

Item Number	Ordering Abbreviation	Wattage (W)	Base Type	Replaces	Input Voltage (V)	Average Rated Life (hrs.)[1]	CCT[3]	Typical Lumens (lm)[2]	CBCP (cd)	CRI[4]	Beam Angle	Power Factor	ENERGY STAR®
78287	LED6PAR16/DIM/830/FL36/GL1/RP	6	Medium	50W	120	25,000	3000K	450	1000	82	36	0.95	Yes
78288	LED6PAR16GU10/DIM/830/FL36/GL1/RP	6	GU10	50W	120	25,000	3000K	450	1000	82	36	0.95	Yes
79287*	LED6PAR16/DIM/830/FL36/GL1/RP	6	Medium	50W	120	25,000	3000K	450	1000	82	35	0.95	Yes
79288*	LED6PAR16GU10/DIM/830/FL36/GL1/RP	6	GU10	50W	120	25,000	3000K	450	1000	82	35	0.95	Yes

SYLVANIA submits most lamps for ENERGY STAR testing. Early qualification for ENERGY STAR lamps begin at 25,000 hours (L_{70}) regardless that the design of the lamp is manufactured for a greater life expectancy. As the lamps pass ENERGY STAR qualifications, manufacturers are able to increase rated life as dictated by ENERGY STAR guidelines becoming either provisionally qualified or fully qualified. Please visit EnergyStar.gov for more information about testing requirements for ENERGY STAR qualified products.

*Phase out 79287 and 79288
1. Hours lifetime with 70% lumen maintenance 2. Thermally stable typical lumens (±10%) 3. Thermally stable typical CCT (±10%) 4. CRI – Color Rendering Index

Ordering Guide

LED	6	PAR16	/	GU10	/	DIM	/	830	/	FL	36
LED Lamps and Retrofits	Wattage: 6	Lamp Type: PAR16		Base Type: GU10		Dimmable		CRI, CCT: 830: 80+ CRI, 3000K CCT		Beam Type: FL: Flood	Beam Angle: 36°

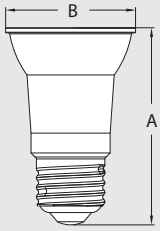
Energy Savings

Basic Product Description	LED Life (hrs.)	Similar Halogen	Halogen Life (hrs.)	Watts Saved	Energy Savings*	LED Life vs. Halogen
LED6PAR16	25,000	50PAR16	3,000	44	$121	8.3X

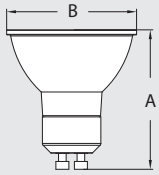
*Energy savings over life of lamp calculated at $0.11/kWh

Lamp Dimensions

	(A) MOL (inches)	(B) Diameter (inches)
LED6PAR16	2.9	1.9
LED6PAR16/GU10	2.1	1.9



LED6PAR16



LED6PAR16/GU10

Sample Specification

Lamps shall be SYLVANIA ULTRA LED PAR16 with a 25,000 hour average rated life. Lamps shall be energy efficient, UV & IR free. Should have a beam angle of 36 degrees.

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ULTRA LED™ Glass PAR Lamps

New Glass Housing Design

Key Features & Benefits

- Up to 75 LPW
- Dimmable*
- Long life up to 25,000 hours (L_{70})
- Color temperature available in 2700K, 3000K, 4000K and 5000K
- CRI >80
- Energy savings up to 87%
- Longer life than traditional halogen lamps
- No warm-up time, instant on with full light output and stable color
- Ideal for re-lamping when halogen lamps reach end of life
- Glass body with full optics – similar to halogen PAR lamps
- UL Wet rated
- Rated for use in enclosed fixtures

* Performance may vary depending on dimmer used in application. Please refer to Dimmer Compatibility List (RETRO-DIM) for a list of compatible dimmers or visit www.SYLVANIA.com/LEDRetrofit

The new aesthetically pleasing design of the ULTRA LED Glass PAR lamps make halogen retrofits easier to spot relamp to a more energy efficient lamp. Replacements for 60, 75, 100, 120 watt halogen lamps providing up to 87% energy savings and longer life up to 25,000 hours (L_{70}). These lamps can be used in many applications and are wet location rated and perfect for outdoor applications. All lamps are RoHS compliant, contain no mercury and emit no UV or IR radiation.

Product Offering

Ordering Abbreviation	Wattage	Beam Angle	Color Temperature	CRI
LED PAR20	8	25° & 40°	2700K, 3000K, 4000K & 5000K	81
LED PAR30	13	25° & 40°	3000K	82
LED PAR30LN	13	25° & 40°	2700K, 3000K, 4000K & 5000K	82
LED PAR38	14	12°, 25° & 40°	2700K, 3000K, 4000K & 5000K	82
LED PAR38	17	25° & 40°	3000K & 5000K	82

Application Information

Applications

- General lighting
- Recessed downlights
- Track lighting
- Wall washer

Market Segments

- Hospitality
- Offices
- Property management
- Residential
- Restaurants
- Retail
- Schools

Application Notes

1. Operating temperature -20°C to +45°C (-4°F to 113°F).
2. Not for use with emergency light fixtures or exit lights.
3. Suitable for wet locations.
4. Rated for use in enclosed fixtures.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. For FCC Part 15 user information, please see www.sylvania.com/fcc15b.

SYLVANIA

Specification Data

Catalog #	Type
Project	
Comments	
Prepared by	

Ordering Information

Item Number*	Ordering Abbreviation	Wattage (W)	Base Type	Replaces	Input Voltage (V)	Beam Angle	CBCP	Average Rated Life (hrs.)[1]	CCT[2]	CRI[3]	Typical Lumens (lm)[4]	Power Factor	ENERGY STAR®
78982	LED8PAR20/DIM/827/NFL25/GL1/W	8	Medium	50W	120V	25°	1700cd	25,000	2700K	81	500	0.95	Yes
78983	LED8PAR20/DIM/827/FL40/GL1/W	8	Medium	50W	120V	40°	950cd	25,000	2700K	81	500	0.95	Yes
78980	LED8PAR20/DIM/830/NFL25/GL1/W	8	Medium	50W	120V	25°	1700cd	25,000	3000K	81	500	0.95	Yes
78981	LED8PAR20/DIM/830/FL40/GL1/W	8	Medium	50W	120V	40°	950cd	25,000	3000K	81	500	0.95	Yes
78978	LED8PAR20/DIM/840/FL40/GL2/W	8	Medium	50W	120V	40°	950cd	25,000	4000K	81	500	0.95	Yes
74053	LED8PAR20/DIM/850/FL40/GL1/W/RP	8	Medium	50W	120V	40°	950cd	25,000	5000K	81	550	0.95	Yes
79372	LED13PAR30/DIM/830/FL40/GL1/W/RP	13	Medium	75W	120V	40°	1500cd	25,000	3000K	82	825	0.95	Yes
79373	LED13PAR30/DIM/830/NFL25/GL1/W	13	Medium	75W	120V	25°	3200cd	25,000	3000K	82	825	0.95	Yes
78229	LED13PAR30LN/DIM/827/NFL25/GL1/W	13	Medium	75W	120V	25°	3200cd	25,000	2700K	82	825	0.95	Yes
78230	LED13PAR30LN/DIM/827/FL40/GL1/W	13	Medium	75W	120V	40°	1500cd	25,000	2700K	82	825	0.95	Yes
78227	LED13PAR30LN/DIM/830/NFL25/GL1/W	13	Medium	75W	120V	25°	3200cd	25,000	3000K	82	825	0.95	Yes
78228	LED13PAR30LN/DIM/830/FL40/GL1/W	13	Medium	75W	120V	40°	1500cd	25,000	3000K	82	825	0.95	Yes
78224	LED13PAR30LN/DIM/840/FL40/GL2/W	13	Medium	75W	120V	40°	1500cd	25,000	4000K	82	825	0.95	Yes
74059	LED13PAR30LN/DIM/850/FL40/GL1/W/RP	13	Medium	75W	120V	40°	1500cd	25,000	5000K	82	900	0.95	Yes
74035	LED14PAR38/DIM/827/NFL25/GL1/W	14	Medium	100W	120V	25°	5500cd	25,000	2700K	82	1050	0.95	Yes
74037	LED14PAR38/DIM/827/FL40/GL1/W	14	Medium	100W	120V	40°	2000cd	25,000	2700K	82	1050	0.95	Yes
74036	LED14PAR38/DIM/830/SP12/GL1/W	14	Medium	100W	120V	12°	14,000cd	25,000	3000K	82	1050	0.95	Yes
74032	LED14PAR38/DIM/830/NFL25/GL1/W	14	Medium	100W	120V	25°	5500cd	25,000	3000K	82	1050	0.95	Yes
74034	LED14PAR38/DIM/830/FL40/GL1/W	14	Medium	100W	120V	40°	2000cd	25,000	3000K	82	1050	0.95	Yes
74088	LED14PAR38/DIM/840/FL40/GL1/W	14	Medium	100W	120V	40°	2000cd	25,000	4000K	82	1050	0.95	Yes
74064	LED14PAR38/DIM/850/FL40/GL1/W/RP	14	Medium	100W	120V	40°	2000cd	25,000	5000K	82	1050	0.95	Yes
74052	LED17PAR38/DIM/830/NFL25/GL1/W	17	Medium	120W	120V	25°	6500cd	25,000	3000K	82	1300	0.95	Yes
74070	LED17PAR38/DIM/830/FL40/GL1/W/RP	17	Medium	120W	120V	40°	2500cd	25,000	3000K	82	1300	0.95	Yes
74068	LED17PAR38/DIM/850/FL40/GL1/W/RP	17	Medium	120W	120V	40°	2500cd	25,000	5000K	82	1300	0.95	Yes

* Replacements: 78982 replaces 78992; 78980 replaces 78988; 78983 replaces 78994; 78981 replaces 78990; 74053 replaces 78873; 78229 replaces 78791; 78230 replaces 78814; 78227 replaces 78787; 78228 replaces 78789; 74059 replaces 78877; 74035 replaces 78442; 74037 replaces 78444; 74032 replaces 78474; 74034 replaces 78440; 74031 replaces 78448; 74064 replaces 78446; 74070 replaces 75171; 74068 replaces 75172

1. Hours lifetime with 70% lumen maintenance 2. Thermally stable typical CCT (±10%) 3. CRI – Color Rendering Index (typical) 4. Thermally stable typical lumens (±10%)

Ordering Guide

LED	14	PAR38 /	DIM /	8	30 /	FL	40 /	GL1 /	W
LED Lamps and Retrofits	Wattage: 8, 13, 14, 17	Lamp Type: PAR38 PAR30LN PAR30 PAR20	Dimmable	CRI = 80+	Color Temperature 2700K 3000K 4000K 5000K	Flood	Beam Angle 12°, 25° 40°	Glass Lamps	Wet Rated

Energy Savings

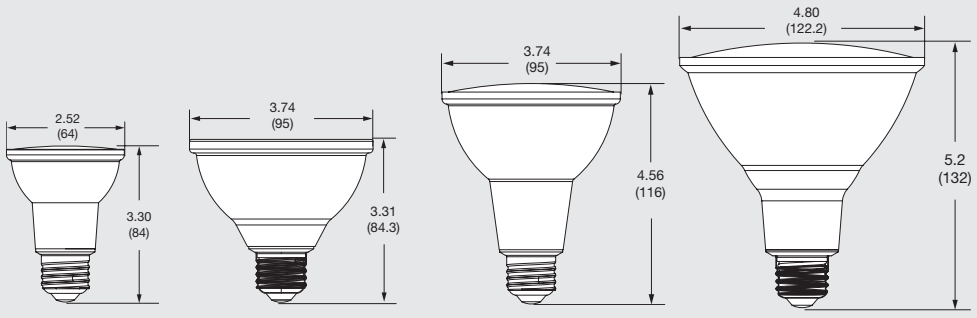
Basic Product Description	LED Life (hrs.)	Similar Halogen	Halogen Life (hrs.)	Watts Saved	Energy Savings*	LED Life vs. Incandescent
LED 8W PAR20	25,000	60W	2,500	52	$143.00	10X
LED 13W PAR30	25,000	75W	2,500	62	$170.50	10X
LED 13W PAR30LN	25,000	75W	2,500	62	$170.50	10X
LED 14W PAR38	25,000	100W	2,500	76	$236.50	10X
LED 17W PAR38	25,000	120W	2,500	73	$200.75	10X

* Energy savings over the life of the lamp calculated at $0.11/kWh

Lamp Dimensions

	MOL (inches)	Diameter (inches)
LED PAR20	3.30 in	2.52 in
LED PAR30	3.74 in	3.31 in
LED PAR30 LN	4.56 in	3.74 in
LED PAR38	5.20 in	4.80 in

Dimensions in inches (mm)



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ULTRA LED™ RT5/6 HO

Recessed Downlight Kit

SYLVANIA ULTRA RT5/6 HO is a universal input voltage 5" and 6" compatible LED recessed downlight kit that creates high performing white light and is optimized for new construction and retrofit applications utilizing pin based compact fluorescent lamps. Installation is done quickly and easily in most standard six-inch frames.

The RT5/6 HO downlight is offered in 650 lumen, 700 lumen, 900 lumen and 1500 lumen options and achieves up to 88 lumens per watt.

The RT5/6 HO is designed to deliver light output comparable to traditional 1x13W, 1x18W, 1x26W and 2x26W pin based compact fluorescent luminaires.

Application Information

Application Notes

1. Operating temperature range between -4°F and +104°F (-20°C and +40°C).
2. Suitable for dry, damp or wet indoor or outdoor locations.
3. Compatible with Philips Bodine ELI-S-20 Emergency Lighting Micro Inverter.
4. Designed to install in standard 6" CFL mounting frame. For a list of compatible housings, please refer to www.sylvania.com/RT6.
5. For detailed warranty information, please see www.sylvania.com/RT6.
6. The RT5/6HO 650 and 700 lumen is compatible with 120V Phase cut dimmers and 277V Leviton Dimmer model IPX06-70Z .
7. The RT5/6 HO 900 and 1500 lumen are compatible with Leviton 0-10V dimmer model IP710-DL.
8. For installation in non-insulated ceilings: If insulation is present, it may be placed around the retrofit kit as long as a three-inch space is maintained around the kit.
9. Installation performed as a stand-alone kit (without frame) is recommended for hard ceiling. Installation of a recessed incandescent frame is recommended for tiled ceiling application for proper support of the retrofit kit.

Key Features & Benefits

- Three input voltages:
  - 120V
  - 120-277V Universal
  - 347V
- Lumen package:
  - 650 lumens @ 8 watts (line voltage dimmable)
  - 700 lumens @ 8 watts (line voltage dimmable)
  - 900 lumens @ 13 watts (0-10V Dimmable)
  - 1500 lumens @ 17 watts (0-10V Dimmable)
- Replacement for 13W, 18W, 26W and 32W CFL pin based lamps
- Fits in standard 5" and 6" CFL mounting frame
- CCT: 2700K, 3000K, 3500K & 4000K
- CRI of >80 and >90
- 35,000 and 50,000 hour life (L_{70})
- Suitable for dry, damp and wet indoor or outdoor locations (650lm Indoor only)
- UL1598 Listed and Classified for stand-alone and retrofit applications
- Reduces energy consumption up to 34%
- Lasts up to 4 times longer than compact fluorescent lamps
- No warm-up time, instant-on with full light output and stable lamp to lamp color
- Integrated white trim and metal conduit adaptor (included) for direct replacement
- Suitable for use in 8" applications using optional trim extender accessory

Product Offering

Ordering Abbreviation	Wattage	CCT
LED/RT5/6/HO/650	8	3000K, 4000K
LED/RT5/6/HO/700	8	2700K, 3000K, 3500K, 4000K
LED/RT5/6/HO/900	13	2700K, 3000K, 3500K, 4000K
LED/RT5/6/HO/1500	17	3000K, 3500K, 4000K

Specifications and Certifications

SYLVANIA

Specification Data

Catalog #	Type
Project	
Comments	
Prepared by	

Specifications

Energy Data

Minimum Starting Temp: -20°C (-4°F)

EMI/RFI: RT6/HO 1500 lumen: FCC Title 47 CFR, Part 15, Class B
RT6/HO 900 lumen: FCC Title 47 CFR, Part 15, Class A

Sound Rating: <24dBA

Input Voltage: 120-277V

Power Factor: >0.90

Input Frequency: 60Hz

THD: <20%

Maximum Ambient Operating Temperature (Non-Insulated Ceiling): 40°C (104°F)

Lighting Data

Lumen Output: 650, 700, 900 and 1500

Color

Color Rendering Index (CRI): >80 and >90

Ordering Information

Item Number	Ordering Abbreviation	Recessed Housing	Replaced CFL Wattage	Nominal Wattage (W)	Delivered Light Output (lm)	Input Voltage	LPW	Color Temperature	Avg. Rated Life (hrs)*	Packaging Configuration	Dimmable
75331	LED/RT5/6/650/930	5" and 6"	13W	8	650	120V	72	3000K	35,000	2/case	YES (Phase Cut)
75332	LED/RT5/6/650/940	5" and 6"	13W	8	650	120V	72	4000K	35,000	2/case	YES (Phase Cut)
75228	LED/RT/5/6/HO/700/827	5" and 6"	13W	8	700	120-277V	87	2700K	50,000	4/case	YES (Phase Cut)
75229	LED/RT/5/6/HO/700/830	5" and 6"	13W	8	700	120-277V	87	3000K	50,000	4/case	YES (Phase Cut)
75230	LED/RT/5/6/HO/700/835	5" and 6"	13W	8	700	120-277V	87	3500K	50,000	4/case	YES (Phase Cut)
75231	LED/RT/5/6/HO/700/840	5" and 6"	13W	8	700	120-277V	87	4000K	50,000	4/case	YES (Phase Cut)
75137	LED/RT5/6/HO/900/827	5" and 6"	18W	13	900	120-277V	69	2700K	50,000	4/case	YES (0-10V Low Voltage)
75138	LED/RT5/6/HO/900/830	5" and 6"	18W	13	900	120-277V	69	3000K	50,000	4/case	YES (0-10V Low Voltage)
75140	LED/RT5/6/HO/900/835	5" and 6"	18W	13	900	120-277V	69	3500K	50,000	4/case	YES (0-10V Low Voltage)
75139	LED/RT5/6/HO/900/840	5" and 6"	18W	13	900	120-277V	69	4000K	50,000	4/case	YES (0-10V Low Voltage)
75327	LED/RT5/6/HO/900/840/347V	5" and 6"	18W	13	900	347V	69	4000K	50,000	4/Case	NO
72528	LED/RT5/6/1500/HO/830	5" and 6"	26W & 32W	17	1500	120-277V	88	3000K	50,000	4/case	YES (0-10V Low Voltage)
72529	LED/RT5/6/1500/HO/835	5" and 6"	26W & 32W	17	1500	120-277V	88	3500K	50,000	4/case	YES (0-10V Low Voltage)
72530	LED/RT5/6/1500/HO/840	5" and 6"	26W & 32W	17	1500	120-277V	88	4000K	50,000	4/case	YES (0-10V Low Voltage)
75328	LED/RT5/6/HO/1500/840/347V	5" and 6"	26W & 32W	17	1500	347V	88	4000K	50,000	4/case	NO

*LED lamp life is defined as the number of hours when 50% of an average group of identical lamps reached 70% of its initial lumens.

Ordering Guide

LED	/	RT5/6	/	1500	/	HO	/	8	30
LED		Product Name RT5/6 5/6 = fits 5" and 6" frames		Light Output 1500lm, 900lm, 700lm, 650lm		High Output		CRI >80	Color Temperature 2700K, 3000K, 3500K, 4000K

Energy Savings

Basic Product Description	LED Lumens	LED Life	Traditional Lamp Types	Lumens	Life	Watts Saved With RT6	RT6 Energy Savings*	RT6 Life Benefit
RT5/6 HO 8W	700	50,000	13W CFL DD, DT	800	16,000	5	$27	3X
RT5/6 HO 13W	900	50,000	18W CFL DD, DT	1200	16,000	5	$27	3X
RT5/6/HO 17W	1500	50,000	26W CFL DD, DT	1800	16,000	9	$49	3X
RT5/6/HO 17W	1500	50,000	32W CFL DD, DT	2400	16,000	15	$82	3X

* Based on $0.11/kWh over 50,000 hours life.

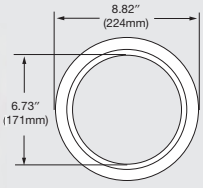
Accessories

RT5/6 Retrofit Trim	
75095	RT/5/6/TRIM/DKBZ
75097	RT/5/6/TRIM/BLK
75098	RT/5/6/TRIM/ORBZ
75099	RT/5/9/TRIM/SN
Trim Ring Extender	
75082	RT6/8/TRIMEXT
Rough In Frame	
71708	LED/RT6HO/FRAME

75097

75098

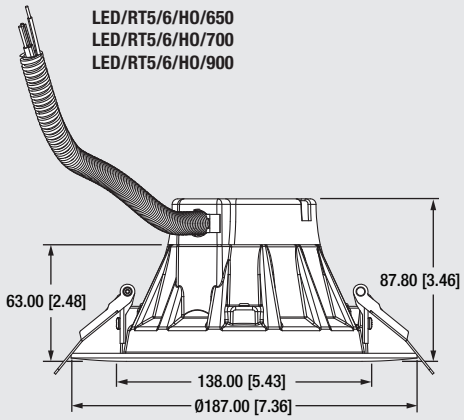
75099

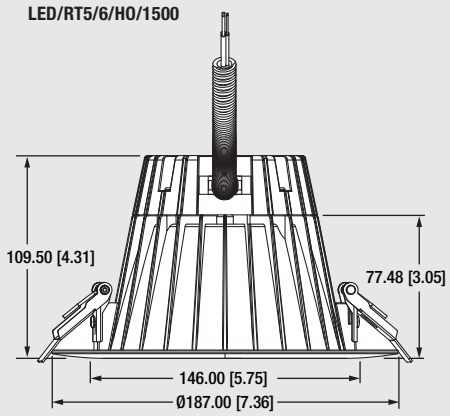


75082

71708

Assembly Diagram

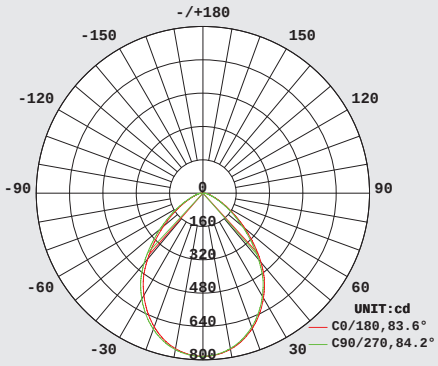




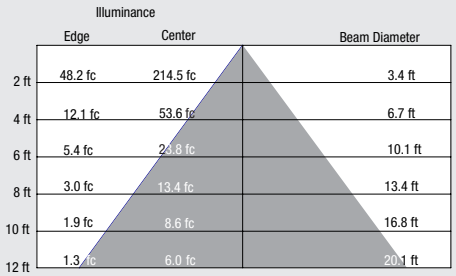
Dimensions are in mm [in]

Photometric Information

Luminous Intensity Distribution Diagram

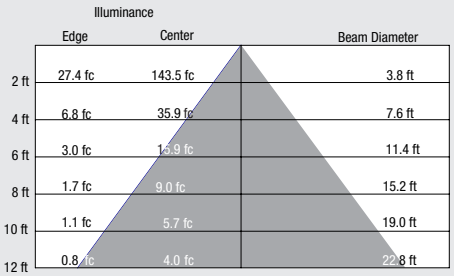


Illuminance at Distance



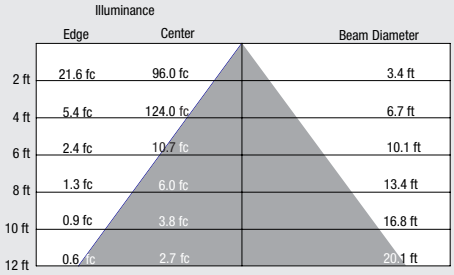
RT5/6 HO 1500 lumen

Illuminance at Distance



RT5/6 900 lumen

Illuminance at Distance



RT5/6 700 lumen

LEDVANCE LLC
200 Ballardvale Street
Wilmington, MA 01887 USA
Phone 1-800-LIGHTBULB (1-800-544-4828)
www.sylvania.com

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ULTRA LED™ RT8

Recessed Downlight Kit

The SYLVANIA ULTRA LED RT8 unit is an eight-inch LED recessed down-light kit creating high performing white light which is optimized for new construction and retrofit applications. Installation is done quickly and easily in most standard eight-inch frames.

Quality of Light

The SYLVANIA ULTRA LED RT8 provides excellent color rendering (up to 90 CRI), and a wide selection of color temperatures (3000K, 3500K, 4000K, 5000K). LEDs have virtually no UV or infrared radiation to damage or fade furnishings, art or other objects.

Optical Design

Optical design efficiently directs light output in an 80° beam angle with low glare.

Key Features & Benefits

- 0-10V Dimmable Lumen Packages:
  2000 lumens @24W (120/277V)
  3000 lumens @40W (120/277V)
  5000 lumens @54W (120/277V)
  8000 lumens @92W (120/277V)
- Non-Dimmable Lumen Packages:
  2000 lumens @23W (347V)
  or 27W (120/277V)
  5000 lumens @50W (347V)
- Replacement for 32W and 42W CFL pin base lamps
- Fits in standard 8" CFL mounting frame
- CCT: 3000K, 3500K, 4000K, 5000K (see offerings below)
- CRI of up to 90
- 50,000 hour life (L_{70})
- Suitable for dry, damp and wet locations
- UL1598 Listed and Classified for stand-alone and retrofit applications
- Reduces energy consumption up to 50%
- 120/277V or 347V input voltage
- Lasts up to 3 times longer than CFL pin base lamps
- No warm-up time, instant-on with full light output and stable lamp to lamp color
- Integrated white trim, white baffle reflector and metal conduit adaptor (included) for direct replacement
- Suitable for use in 10" applications using optional trim extender accessory
- Conduit attached for easy installation
- 8000lm product has a remote driver

Product Offering

Ordering Abbreviation	Wattage	Color Temperature	CRI
LED/RT8/2000	24, 27	3000K, 3500K, 4000K	82
LED/RT8/2000-347V	23	3000K, 4000K, 5000K	82
LED/RT8/3000	40	3000K, 3500K, 4000K	90
LED/RT8/5000	54	3000K, 3500K, 4000K	82
LED/RT8/8000	92	3000K, 3500K, 4000K	82
LED/RT8/5000-347V	50	4000K	82

Application Information

Applications

- Healthcare
- Hospitality
- Office
- Property Management
- Residential
- Retail

Specifications and Certifications

SYLVANIA

Specification Data

Catalog #	Type
Project/Job	
SYLVANIA Lamp	
SYLVANIA Ballast	
Prepared by	

Specifications

Energy Data

Minimum Starting Temp: 0°C to -20°C (32°F to -4°F)

EMI/RFI: FCC Title 47 CFR, Part 15, Class B

Sound Rating: <24dBA

Input Voltage: 120-277V & 347V

Power Factor: >0.90

Input Frequency: 60Hz

THD: <20%

Input Power: 23W, 24W, 27W, 40W, 50W, 54W, 92W

Maximum Ambient Operating Temperature (Non-Insulated Ceiling): 40°C (104°F)

Lighting Data

Lumen Output: 2000, 3000, 5000, 8000

Lumens per Watt: Up to 100

Color

Correlated Color Temperature (CCT): 3000K, 3500K, 4000K, 5000K

Color Rendering Index (CRI): 82, 90

R9: 15

Product Weight: 2.3 lbs.

Ordering Information

Item Number	Ordering Abbreviation	Input Voltage (V)	Recessed Housing	Replaced CFL Wattage	Nominal Wattage (W)	Delivered Light Output (lm)	LPW	Color Temperature	CRI	Avg. Rated Life (hrs.)*	Dimmable
72503	LED/RT8/2000/830	120/277	8"	2x26W CFL	27	2000	74	3000K	82	50,000	No
74466**	LED/RT8/2000/830	120/277	8"	2x26W CFL	24	2000	83	3000K	82	50,000	Yes (0-10V Low Voltage)
72504	LED/RT8/2000/835	120/277	8"	2x26W CFL	27	2000	74	3500K	82	50,000	No
74467**	LED/RT8/2000/835	120/277	8"	2x26W CFL	24	2000	83	3500K	82	50,000	Yes (0-10V Low Voltage)
72509	LED/RT8/2000/840	120/277	8"	2x26W CFL	27	2000	74	4000K	82	50,000	No
74468**	LED/RT8/2000/840	120/277	8"	2x26W CFL	24	2000	83	4000K	82	50,000	Yes (0-10V Low Voltage)
75397***	LED/RT8/2000/830/347V	347	8"	2x26W CFL	23	2000	86	3000K	82	50,000	No
75398***	LED/RT8/2000/840/347V	347	8"	2x26W CFL	23	2000	86	4000K	82	50,000	No
75399***	LED/RT8/2000/850/347V	347	8"	2x26W CFL	23	2000	86	5000K	82	50,000	No
72625	LED/RT8/3000/930	120/277	8"	2x26W CFL	40	3000	75	3000K	90	50,000	Yes (0-10V Low Voltage)
72626	LED/RT8/3000/935	120/277	8"	2x26W CFL	40	3000	75	3500K	90	50,000	Yes (0-10V Low Voltage)
72628	LED/RT8/3000/940	120/277	8"	2x26W CFL	40	3000	75	4000K	90	50,000	Yes (0-10V Low Voltage)
79740	LED/RT8/5000/830	120/277	8"	2x42W CFL	54	5000	92	3000K	82	50,000	Yes (0-10V Low Voltage)
79741	LED/RT8/5000/835	120/277	8"	2x42W CFL	54	5000	92	3500K	82	50,000	Yes (0-10V Low Voltage)
79742	LED/RT8/5000/840	120/277	8"	2x42W CFL	54	5000	92	4000K	82	50,000	Yes (0-10V Low Voltage)
75435***	LED/RT8/5000/840/347V	347	8"	2x42W CFL	50	5000	100	4000K	82	50,000	No
79754	LED/RT8/8000/830	120/277	8"	150W HPS/175W MH	92	8000	87	3000K	82	50,000	Yes (0-10V Low Voltage)
79755	LED/RT8/8000/835	120/277	8"	150W HPS/175W MH	92	8000	87	3500K	82	50,000	Yes (0-10V Low Voltage)
79756	LED/RT8/8000/840	120/277	8"	150W HPS/175W MH	92	8000	87	4000K	82	50,000	Yes (0-10V Low Voltage)

*LED lamp life is defined as the number of hours when 50% of an average group of identical lamps reached 70% of its initial lumens.

**74466 replaces 72503, 74467 replaces 72504, 74468 replaces 72509.

***347V kits are not ENERGY STAR® listed.

Ordering Guide

LED	/	RT8	/	2000	/	8	30	/	347V
LED		Product Name RT8 8 = fits 8" frames		Light Output 2000lm, 3000lm, 5000lm, 8000lm		8 = 80 CRI 9 = 90 CRI	Color Temperature 3000K, 3500K, 4000K, 5000K		Input Voltage 347V

Energy Savings

Basic Product Description	LED Lumens	LED Life	Traditional Lamp Type	Lumens	Life	Watts Saved With RT8	RT8 Energy Savings*	RT8 Life Benefit
RT8 24W	2000	50,000	Compact Fluorescent	2400	16,000	Up to 15	$82.50	3X
RT8 23W	2000	50,000	Compact Fluorescent	2400	16,000	Up to 19	$104.50	3X
RT8 40W	3000	50,000	Compact Fluorescent	2400	16,000	Up to 24	$132.00	3X
RT8 54W	5000	50,000	Compact Fluorescent	2400	16,000	Up to 30	$165.00	3X
RT8 92W	8000	50,000	Compact Fluorescent	2400	16,000	Up to 41	$225.00	3X

* Based on $0.11/kWh over 50,000 hours life.

Accessories

RT8 Trim	
75092	RT8TRIMALZAK (white trim and aluminum inner trim)
75093	RT8TRIMSN
Trim Ring Extender	
75083	RT8/10/TRIMEXT
74991	RT8/12/TRIMEXT
Rough In Frame	
71709	LED/RT8/FRAME

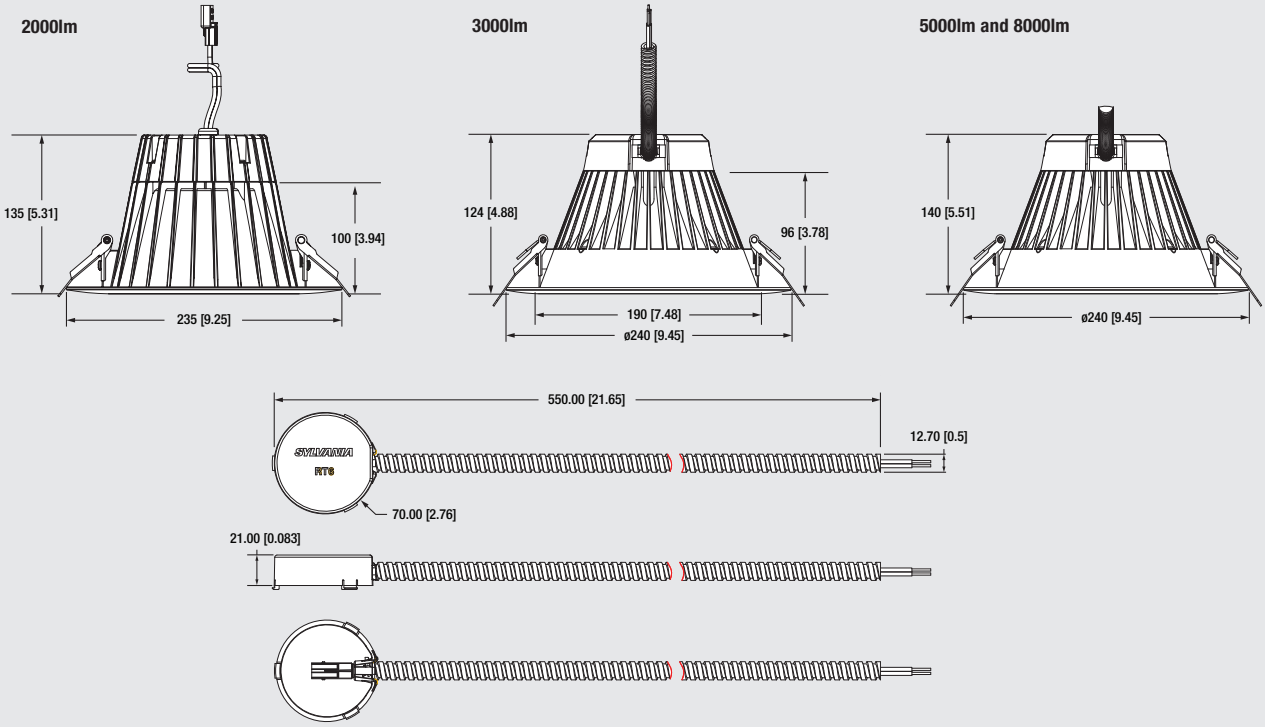
Alzak 75092

Satin 75093

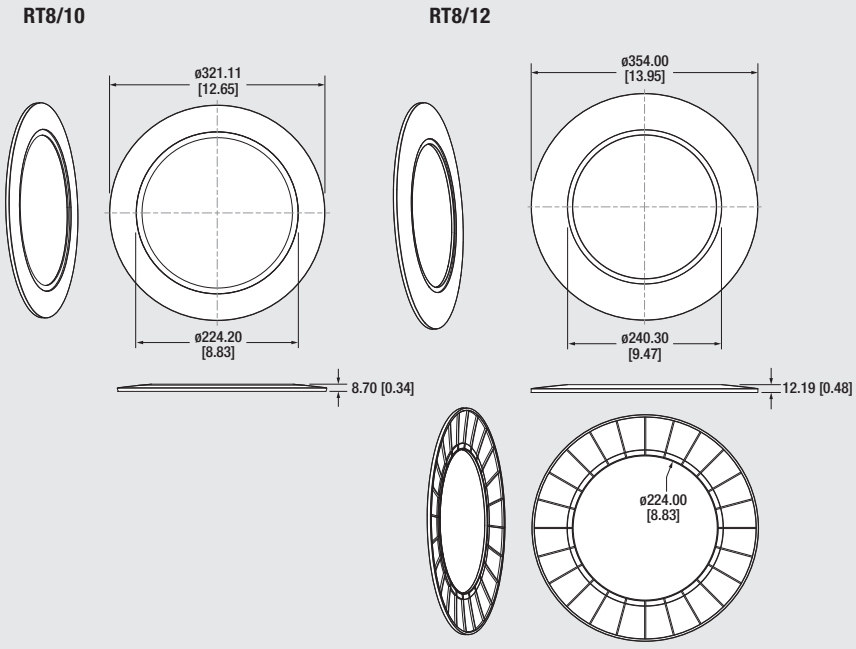
75083/74991

71709

Assembly Diagram



Trim Ring Extenders

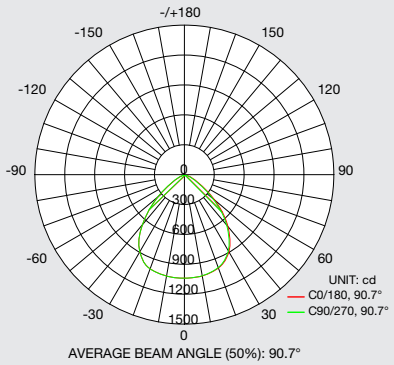


Dimensions are in mm [in]

Photometric Information

RT8 2000lm

Polar Chart

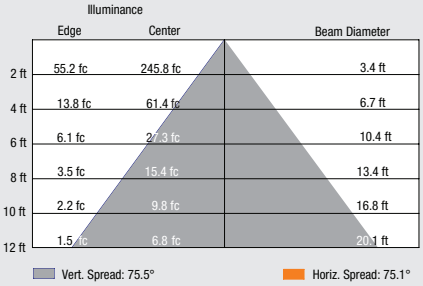


AVERAGE BEAM ANGLE (50%): 90.7°

Zonal Lumen Distribution

Zone	Lumens	% Retrofit Kit
0-20	384	19
0-30	822	41
0-40	1312	65
0-60	1943	97
0-80	2090	104
0-90	2106	105
10-90	2008	100
20-40	927	46
20-50	1330	66
40-70	734	3
60-80	146	67
70-80	43	2
80-90	16	0
0-180	2106	105

Illuminance at Distance

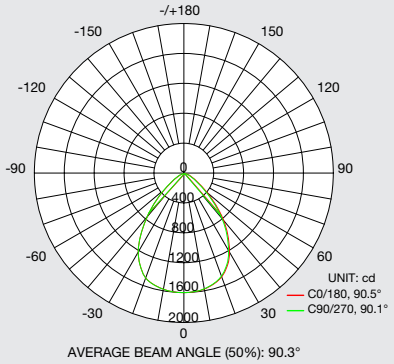


Spacing to Mounting Height Ratio

Spacing Criteria (0-180°)	1.16
Spacing Criteria (90-270°)	1.16
Spacing Criteria (Diagonal)	1.24

RT8 3000lm

Polar Chart

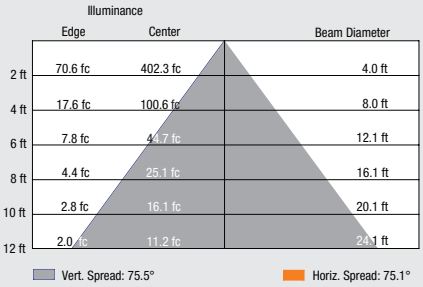


AVERAGE BEAM ANGLE (50%): 90.3°

Zonal Lumen Distribution

Zone	Lumens	% Retrofit Kit
0-20	576	17
0-30	1189	35
0-40	1871	56
0-60	2945	88
0-80	3289	98
0-90	3310	99
10-90	3159	95
20-40	1294	38
20-50	1916	57
40-70	1326	39
60-80	343	10
70-80	92	2
80-90	21	0.7
0-180	3326	100

Illuminance at Distance

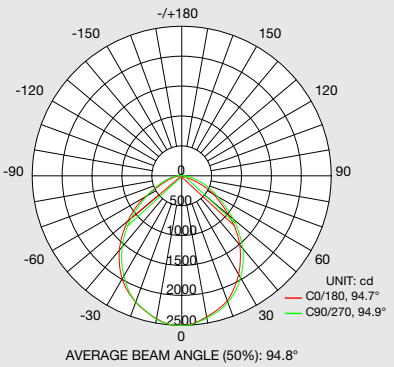


Spacing to Mounting Height Ratio

Spacing Criteria (0-180°)	1.14
Spacing Criteria (90-270°)	1.16
Spacing Criteria (Diagonal)	1.24

RT8 5000lm

Polar Chart

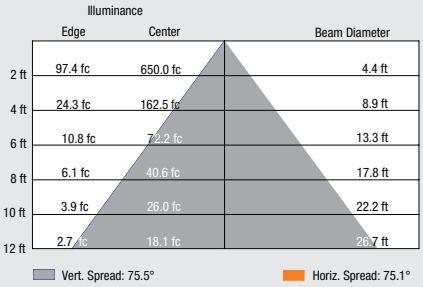


AVERAGE BEAM ANGLE (50%): 94.8°

Zonal Lumen Distribution

Zone	Lumens	% Retrofit Kit
0-20	930	16
0-30	1928	34
0-40	3061	54
0-60	4979	88
0-80	5618	99
0-90	5651	100
10-90	5407	95
20-40	2130	37
20-50	3211	56
40-70	2399	42
60-80	639	11
70-80	158	2
80-90	32	0.6
0-180	5651	100

Illuminance at Distance

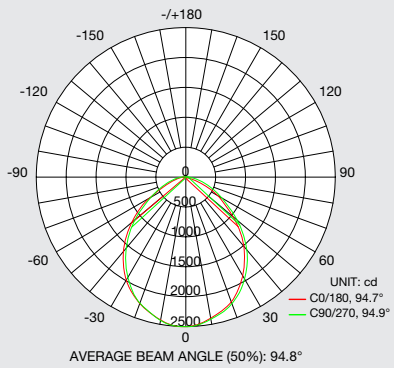


Spacing to Mounting Height Ratio

Spacing Criteria (0-180°)	1.16
Spacing Criteria (90-270°)	1.16
Spacing Criteria (Diagonal)	1.26

RT8 8000lm

Polar Chart

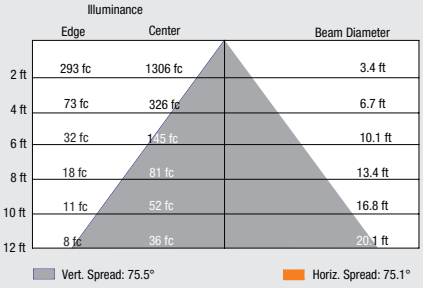


AVERAGE BEAM ANGLE (50%): 94.8°

Zonal Lumen Distribution

Zone	Lumens	% Retrofit Kit
0-20	1859	19
0-30	3843	39
0-40	5946	61
0-60	8593	88
0-80	9500	97
0-90	9594	98
10-90	9103	93
20-40	4086	42
20-50	5741	59
40-70	3226	33
60-80	906	9
70-80	327	3
80-90	94	1
0-180	9735	100

Illuminance at Distance



Spacing to Mounting Height Ratio

Spacing Criteria (0-180°)	1.16
Spacing Criteria (90-270°)	1.16
Spacing Criteria (Diagonal)	1.26

Application Information

Application Notes

1. Operating temperature range between -4°F and +104°F (-20°C and +40°C).
2. Suitable for indoor/outdoor use, including dry, damp and wet location environments.
3. Designed to install in standard 8" CFL mounting frame. For a list of compatible housings, please refer to www.sylvania.com/RT8.
4. For detailed warranty information, please see www.sylvania.com/RT8.
5. For installation in non-insulated ceilings: If insulation is present, it may be placed around the retrofit kit as long as a three-inch space is maintained around the kit.
6. Installation performed as a stand-alone kit (without frame) is recommended for hard ceiling. Installation of a recessed incandescent frame is recommended for tiled ceiling application for proper support of the retrofit kit.
7. Compatible with Philips Bodine model ELI-S-20 and IOTA model IIS-125 Emergency Lighting Inverters.

LEDVANCE LLC
200 Ballardvale Street
Wilmington, MA 01887 USA
Phone 1-800-LIGHTBULB (1-800-544-4828)
www.sylvania.com

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SubstiTUBE® LED T5HO Lamps

Energy saving replacement for fluorescent T5HO lamps

Key Features & Benefits

- CCT: 3000K, 3500K, 4100K, 5000K
- Beam angle: 180°
- Operates on programmed rapid start T5HO electronic ballasts
- Long life: 50,000 hour life (L_{70})
- Suitable for dry and damp locations (cannot come in direct contact with water)
- Suitable for open fixtures
- 5 year limited lamp warranty (24/7 operation)
- Reduces energy consumption up to 40%
- No UV emission

SYLVANIA SubstiTUBE LED T5HO lamps are an energy saving alternative, designed to replace traditional fluorescent T5HO lamps. These LED T5HO lamps mimic the look of traditional fluorescent T5 HO lamps, contain no mercury and provide a uniform light distribution with an optimized glass optic design.

Engineered to operate on select programmed rapid start electronic T5HO ballasts, these lamps minimize labor costs.

Product Offering

Lamp Type	Color Temperature	CRI
LED T5HO	3000K, 3500K, 4100K, 5000K	80+

Application Information

Applications

- Cove lighting
- General illumination

Specifications and Certifications

c UL us LISTED · NSF · RoHS compliant · Lead-Free · Hg · DLC QPL LISTED

SYLVANIA

Specification Data

Catalog #	Type
Project	
Comments	
Prepared by	

Specifications

Energy Data

Ambient Operating Temperature: -4°F to 122°F (-20°C to 50°C)

EMI/RFI: FCC Title 47 CFR, Part 18, Non-Consumer

Max Case Temperature: 140°F (60°C)

Lighting Data

Lumen Output: Up to 3500 lumens

Lumens per Watt: Up to 125 LPW

Correlated Color Temperature (CCT): 3000K, 3500K, 4100K, 5000K

Color Rendering Index (CRI): 82

Ordering Information

Item Number	Ordering Abbreviation	Lamp Power (W)[1]	Lamp Lumens (lm)[1]	Color Temp.	CRI	Beam Angle (°)	Package Quantity	DLC (Y/N)
79746	LED25T5HO/L48/FG/830/SUB/G6	25W	3300	3000K	82	180°	10	Y
79747	LED25T5HO/L48/FG/835/SUB/G6	25W	3300	3500K	82	180°	10	Y
79748	LED25T5HO/L48/FG/841/SUB/G6	25W	3500	4100K	82	180°	10	Y
79749	LED25T5HO/L48/FG/850/SUB/G6	25W	3500	5000K	82	180°	10	Y

[1]Lamp Power and Lamp Lumens rated on QHE2x54T5HO/UNV PSN
Please contact your SYLVANIA product sales representative for additional information.

Ordering Guide

LED	25	T5	HO	/	L	48	/	FG	/	8	41	/	SUB	/	G6
LED	Wattage	Lamp Type			Length	48 Inches		Frosted Glass		CRI 82	Color Temperature 41 = 4100K 30 = 3000K 35 = 3500K 50 = 5000K		SubstiTUBE® (Compatible LED T5HO for for use with select programmed rapid start – T5HO electronic ballasts)		Generation

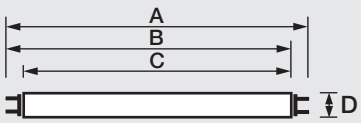
Application Information

Application Notes

1. Due to numerous ballast designs and topologies, this lamp should be tested on existing ballasts before mass quantities are installed.
2. All installation, inspection, and maintenance of lighting fixtures should be done with the power to the fixture turned off. Lamps should be installed and operated in compliance with the National Electrical Code (NEC), Underwriters Laboratories Inc. (UL) requirements, and all applicable codes and regulations.
3. Insert and align tubes properly in lamp holders. Partial insertion results in a poor or intermittent electrical contact that can result in short lamp life and arcing. Arcing at the lamp holder can result in localized overheating.
4. Operating temperature range between -4°F and 122°F (-20°C and 50°C).
5. Suitable for use in dry and damp environments.
6. Maximum mounting distance between tube and ballast is 20 feet.
7. Due to the programmed rapid start coil-heat circuitry, start times of lamps within a fixture may vary, but all reach maximum lumen output in less than one second.
8. Please read all installation instructions before attempting installation.
9. For detailed warranty information, please see www.sylvania.com.

Lamp Dimensions

	(A) Max. Overall Length (in./mm)	(B) Base Face to Opposite Pin (in./mm)	(C) Max. Base Face to Base Face(in./mm)	(D) Max. Outside Diameter (in./mm)
LED25T8	45.80/1163	Min. 45.42/1154 Max. 45.52/1156	Min. 45.16/1147 Max. 45.24/1149	0.67/17.0



Specifications & Lighting Data

Lamp	Ballast	Current (AMPS)	System Power (W)	System Lumens (lm)	System Efficacy (lm/W)	No. of Lamps
LED25T5HO	QHE2x54T5HO/UNV PSN	0.52/0.22	56	7000	125	2

Warranty

SubstiTUBE® LED T5HO lamps are covered by a 5 year limited warranty (24/7 operation).
For additional details, please visit www.sylvania.com/warranty.

LEDVANCE LLC
200 Ballardvale Street
Wilmington, MA 01887 USA
Phone 1-800-LIGHTBULB (1-800-544-4828)
www.sylvania.com

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SLICE - model: FM-41

dweLED™ Ceiling Flush Mounts

WAC LIGHTING
Responsible Lighting®

Fixture Type: _____

Catalog Number: _____

Project: _____

Location: _____

PRODUCT DESCRIPTION

Simple and sweet, Slice packs an illuminating punch of robust illumination. The round centerpiece imparts a rich glow and an understated contemporary style. A clean and simple luminaire that will blend with any interior.

FEATURES

- Etched ¾" thick pressed glass diffuser with interior ceramic glaze
- Mount as a ceiling fixture or wall sconce
- ADA compliant when mounted on wall
- FM-4115 is IP44 Rated; Protected from water splashes
- ETL & cETL damp location listed
- 100%-10% electronic low voltage (ELV) dimming
- Transformer located in J box
- 277V available (special order)
- CRI: 90
- Rated Life: 45,000 hours
- 5 year warranty

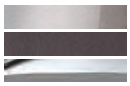
SPECIFICATIONS

Construction: Durable die-cast aluminum canopy, with thick opal glass.

Light Source: LED

Dimming: 100%-10% Electronic Low Voltage (ELV)

Standards: ETL & cETL damp location listed, Energy Star® rated

		Model	Color Temp	Watt	LED Lumens	Delivered Lumens	Finish
		FM-4109-27 **FM-4109-30**	*2700K* *3000K*	*17W* *17W*	*1600* *1620*	*590* *600*	
		FM-4111-27 **FM-4111-30**	*2700K* *3000K*	*29.5W* *29.5W*	*2900* *2940*	*1290* *1315*	**BN** *Brushed Nickel* **BZ** *Bronze* **CH** *Chrome* 
		FM-4115-27 **FM-4115-30**	*2700K* *3000K*	*24.7W* *25W*	*2557* *2753*	*1408* *1463*	

FM-41 [ ] – [ ] – [ ]

Example: **FM-4111-27-BN**

For 277V, add an "F" before the color temperature: **FM-4111F-27-BN**

waclighting.com
Phone (800) 526.2588
Fax (800) 526.2585

Headquarters/Eastern Distribution Center
44 Harbor Park Drive
Port Washington, NY 11050

Central Distribution Center
1600 Distribution Ct
Lithia Springs, GA 30122

Western Distribution Center
1750 Archibald Avenue
Ontario, CA 91760

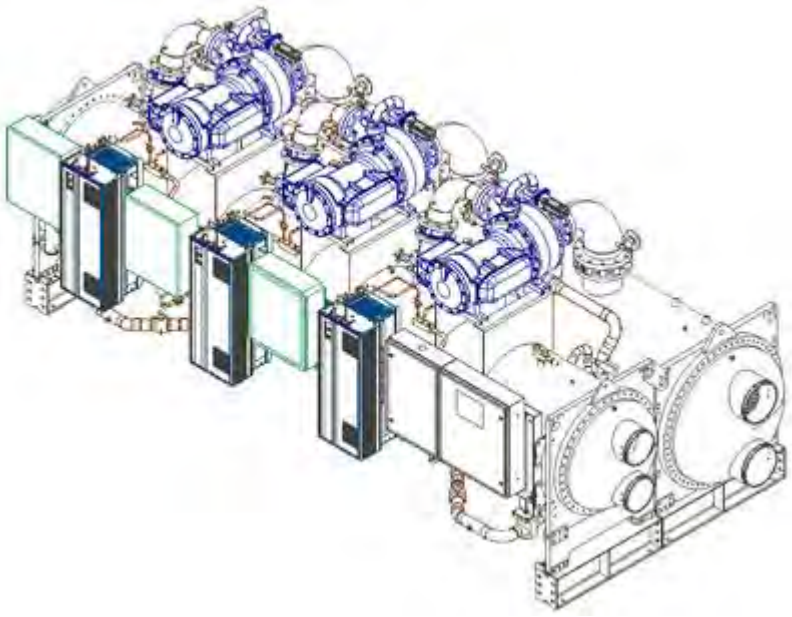
WAC Lighting retains the right to modify the design of our products at any time as part of the company's continuous improvement program. JAN 2018

APPENDIX D

Chiller Cut Sheets

- Preliminary Power Plant Chiller Replacement Drawings Have Been Submitted Under Separate Cover
- Preliminary L&I Chiller Replacement Schematic Drawings Have Been Submitted Under Separate Cover

January 24, 2018



Customer: Deckman Co.

Quoted for: Bill David

Customer Ref: Capitol Chiller Replacement – WB400.3U 2 Pass
Prepared By: Dempsey Lobo
Date: January 24, 2018

PART NUMBER	DESCRIPTION
WB400.3UG12.F2BENB.F2BMNB.TS0	Water Cooled Chiller

INCLUDED BY SMARDT:

- Chiller(s) to be shipped Standard - Unit shipped fully assembled
- Chillers are ETL listed and certified to CSA C22.2 No.236
- Conforming to ANSI/UL 1995
- Power connection style: Single Point Power Connection
- Nema 1 Control enclosures - indoor use only
- Mechanical HP/LP switch.
- ASME certified horizontal shell-and-tube heat exchangers.
- Supporting baffles inside Standard EVAP and COND tubesheets
- High efficiency enhanced tubes
- Evaporator Insulation: Standard Thermal Insulation 3/4" (19mm)
- Evaporator water boxes rated to 145psig fitted with Grooved Pipe Connection
- Condenser water boxes rated to 145psig fitted with Grooved Pipe Connection
- Chilled water : IFM – Thermal Dispersion Switch
- Condenser water : IFM – Thermal Dispersion Switch
- Dual pressure relief valves on evaporator and condenser mounted on changeover valve.
- Factory Startup: Certified Startup Agent
- Connectivity: Modbus RTU (RS485)
- Flash Tank economiser for full chiller

NOT INCLUDED BY SMARDT:

- Vibration isolation pad (not required by manufacturer)
- Rigging and providing access for equipment.
- Piping from refrigerant pressure relief valves to outside.
- Grooved flange couplings.
- Refrigerant monitor.
- Seismic certification.
- Performance test.
- Sound test.
- Harmonic or EMI Filters
- Extended warranties.
- Any other item not mentioned above.

PERFORMANCE INFORMATION

Description	Capacity	Model
Centrifugal liquid chiller	1200 tonsR	WB400.3UG12.F2BENB.F2BMNB.TS0

Options
W620 | E0 | C268 | XXXXXXXXXXXXX.XXXX.XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX.XXXXXXXXXX.XXXXXXXXXXXXXXX

Evaporator Data			
Fluid Type	Water	Fluid Concentration (%)	0%
Flow Rate	1920 US gpm	Tube Material	Cu 0.025" Enhanced Surface
Entering Fluid Temp	56.94°F	Tube Wall Thickness	0.025Inch
Leaving Fluid Temp	42.00°F	Circuit number of passes	Two(2)
Fouling Factor	0.000100 h•ft²•°F/Btu	Variable speed flow min (pressure drop at flow)	759.96 USGPM (0.83 PSI)
Pressure Drop	5.29 psi (12.2 ft H2O)		

Condenser Data			
Fluid Type	Water	Fluid Concentration (%)	0%
Flow Rate	3600 US gpm	Tube Material	Cu 0.025" Enhanced Surface
Entering Fluid Temp	85.00°F	Tube Wall Thickness	0.025Inch
Leaving Fluid Temp	94.28°F	Circuit number of passes	Two(2)
Fouling Factor	0.000250 h•ft²•°F/Btu	Variable speed flow min (pressure drop at flow)	1093.44 USGPM (2.19 PSI)
Pressure Drop	11.9 psi (27.4 ft H2O)		

Equipment Details			
Capacity(TR)	1200 tonsR	Type of compressor	VTT1200-C5S
Unit Power(kW)	695.0 kW	Full load Efficiency	0.5792 kW/tonsR
Number of compressors	3		
Compressor Power (kW) each	231.7 kW	R134A	

Unit power characteristics			
Supply Power	460V	MCA	1041 A
Amps	961 A	MOCP	1361 A

17.1.0.0 January 24, 2018

AHRI CERTFIED PER 550/590

Program Scope

1.3.1 ***Program Scope Inclusions*.**

1.3.1.1 ***60 Hz WCCL Product Inclusions*.**

- All compressor types;
- Chillers rated with capacities >0 and ≤3000 tons[a] [10,551 kW][b];
- Hermetic & open type, electric motor driven;
- Units selected for use within the range of Application Rating Conditions as per the Standard (part-load performance no less than 25% of the rated full load capacity);
- Chillers with voltages ≤15,000 volts; and

- Positive Displacement Units intended for use with glycol or other secondary coolant for freeze protection with a leaving chilled fluid temperature above 32°F [0°C] are certified when tested with water at Standard Rating Conditions.

Notes:
a. Capacity refers to the capacity of Packaged Units rated at full load AHRI Standard 550/590 (I-P) Rating Conditions and the capacity of Configurable Units rated at application full load operating conditions provided these conditions are within the scope of AHRI Standard 550/590 (I-P).
b. kW conversions provided for reference only.

1.3.1.2 ***50 Hz WCCL Product Inclusions***

- All compressor types;
- Chillers rated with capacities ≥200 and ≤3000 tons[a] [703 and 10,551 kW][b];
- Optional certification for chillers rated with capacities >0 and <200 tons[a] [703kW][b] (The Certify-All Policy does not apply to these units.);
- Hermetic & open type, electric motor driven;
- Units selected for use within the range of application rating conditions as per the Standard (part-load performance no less than 25% of the rated full load capacity);
- Chillers with voltages ≤15,000 volts; and
- Positive Displacement Units intended for use with glycol or other secondary coolant for freeze protection with a leaving chilled fluid temperature above 32°F [0°C] are certified when tested with water at Standard Rating Conditions.

Notes:
a. Capacity refers to the capacity of Packaged Units rated at full load AHRI Standard 550/590 (I-P) Rating Conditions and the capacity of Configurable Units rated at application full load operating conditions provided these conditions are within the scope of AHRI Standard 550/590 (I-P).
b. kW conversions provided for reference only.

1.3.2 ***Program Scope Exclusions.*** The following are exclusions for 50 Hz and 60 Hz WCCL products:

- Condenserless chillers;
- Evaporatively-cooled chillers;
- Chillers that are not electrically driven
- Chillers with motors not supplied with the unit by the Participant; and
- Heat recovery & heat pump ratings are not certified; however, Participants may elect to certify these chillers in the cooling mode with this option turned off.
- Units with condensers intended for use with glycol or other secondary coolants.
- Units with evaporators intended for use with glycol or other secondary coolants not included in Sections 1.3.1.1 and 1.3.1.2.

Certified in accordance with the AHRI Water-Cooled Water Chilling Packages Using Vapor Compression Cycle Certification Program, which is based on AHRI Standard 550/590 (I-P) and AHRI Standard 551/591 (SI). Certified units may be found in the AHRI Directory at www.ahridirectory.org

WB400.3UG12.F2BENB.F2BMNB.TS0
17.1.0.0

IPLV : 0.3224 kW/tonsR (EER 37.22 (Btu/W*h))

% Load	Capacity	Perf	kW	Chw Flow	Chw In	Chw Out	Cw Flow	Cw In	Cw Out
100	1200	0.5592	671.0	2867	54.00	44.00	3593	85.00	94.30
75	900.0	0.3973	357.6	2867	51.50	44.00	3593	75.00	81.66
50	600.0	0.2824	169.4	2867	49.00	44.00	3593	65.00	69.31
25	300.0	0.2769	83.07	2867	46.50	44.00	3593	65.00	67.15

NPLV : 0.3431 kW/tonsR (EER 34.97 (Btu/W*h))

% Load	Capacity	Perf	kW	Chw Flow	Chw In	Chw Out	Cw Flow	Cw In	Cw Out
100	1200	0.5792	695.0	1920	56.93	42.00	3600	85.00	94.28
75	900.0	0.4164	374.7	1920	53.20	42.00	3600	75.00	81.68
50	600.0	0.3026	181.5	1920	49.46	42.00	3600	65.00	69.32
25	300.0	0.2990	89.71	1920	45.72	42.00	3600	65.00	67.16

PPLV : 0.3431 kW/tonsR (EER 34.97 (Btu/W*h))

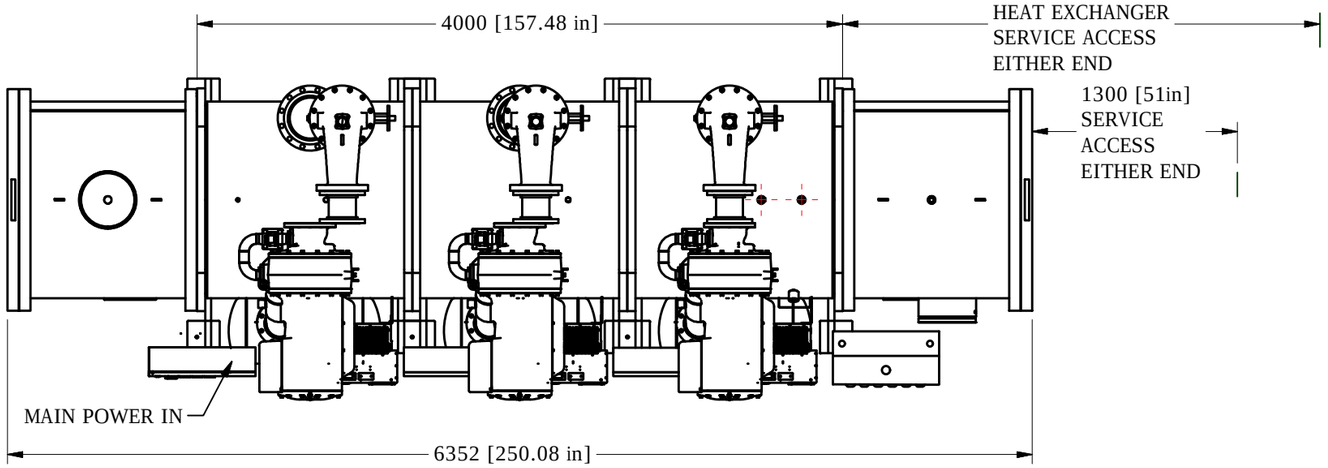
% Load	Capacity	Perf	kW	Chw Flow	Chw In	Chw Out	Cw Flow	Cw In	Cw Out
100	1200	0.5792	695.0	1920	56.94	42.00	3600	85.00	94.28
75	900.0	0.4164	374.7	1920	53.21	42.00	3600	75.00	81.68
50	600.0	0.3026	181.5	1920	49.47	42.00	3600	65.00	69.32
25	300.0	0.2990	89.71	1920	45.74	42.00	3600	65.00	67.16

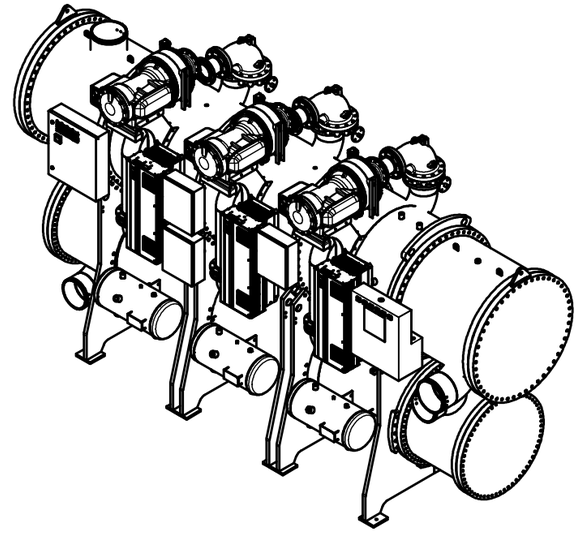
Sound Data

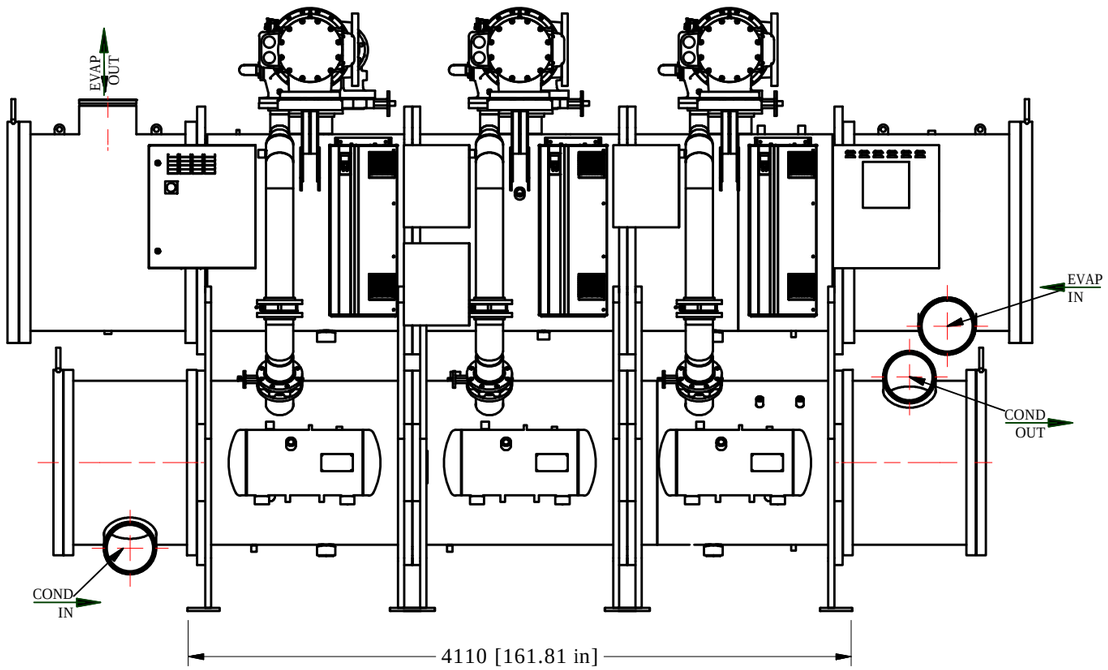
Description	Global	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
Lw dB	103.1	87.3	90.9	93.1	97.5	96.9	95.3	92	91.2
Lw dB(A)	101.9	61.1	74.8	84.5	94.3	96.9	96.5	93	90.1
Lp dB(A) at 3.3 ft	85	43.4	57.1	66.8	76.6	79.2	78.8	75.3	72.4

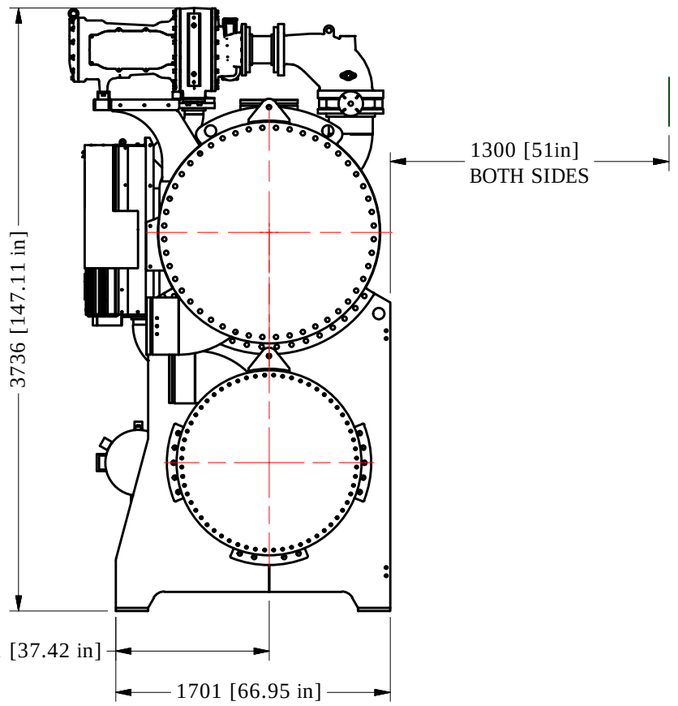
WB400.3UG12.F2BENB.F2BMNB.TS0
17.1.0.0

NOTE: DUE TO SMARDT POLICY OF CONTINUOUS PRODUCT IMPROVEMENT, THE INFORMATION PROVIDED BY THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE.









ONE MOUDLE EMPTY WEIGHT(WITHOUT WBOX): 14280 LBS

WEIGHT (lbs)		
EMPTY	CHARGE	OPERATION
57200	EST.3000	EST.69250

CRAETE DATE: 2017.12.29

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TITLE: WB400.3UXXX.F3CGKB.F3CUKB.TN0

DRAWN BY: LS

DWG. NO.: 45-1855

SHEET: 1 OF 1

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Specification – Smardt Water Cooled Chillers – PA DGS Capital GES A 2017-1

GENERAL

1.1 SUMMARY
Section includes design, performance criteria, refrigerants, controls, and installation requirements for water-cooled centrifugal chillers.

1.2 REFERENCES
Comply with the following codes and standards:
AHRI 550/590
ANSI/ASHRAE 15
ASME Section VIII
ETL Listed
ANSI UL 1995
CSA C22.2 No. 236 (Canada)
MEPS / (Australia)

1.3 SUBMITTALS
Submittals shall include the following:

A. Dimensioned plan and elevation drawings, including required service clearances and location of all field piping and electrical connections.

B. Electrical and water quality requirements during operation, standby and shutdown.

C. Control system diagram showing points for field interface and connection to external BMS systems. Drawings shall show, both field and factory wiring.

D. Installation and Operating Manuals.

E. Manufacturers certified performance data as per AHRI at full load and IPLV or NPLV.

1.4 QUALITY ASSURANCE
A. Regulatory Requirements: Comply with the standards in Section 1.2.

1.5 DELIVERY AND HANDLING
A. Chillers shall be completely assembled, Factory Performance Tested per AHRI 550/590, then disassembled and delivered to the job site, Knocked Down, for field reassembly, with Factory Supervision.

B. Comply with the manufacturer's instructions for transporting and rigging.

1.6 WARRANTY and MAINTENANCE
A. The chiller manufacturer's warranty shall be for a period of one year from date of equipment start up or 18 months from the date of shipment, whichever occurs first.

B. The warranty shall include parts and labor costs for the repair or replacement of parts found to be defective in material or workmanship.

C. Maintenance of the chiller equipment, while under warranty is mandatory and shall be the responsibility of the purchaser unless supplied by the manufacturer.

D. 2-5 year chiller and compressor parts warranty.

PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Smardt Inc.

2.2 PRODUCT DESCRIPTION

A. Provide and install as shown on the plans a factory assembled water-cooled packaged chiller.

B. Each unit shall include at least 3 Turbocor, magnetic bearing, and variable-speed centrifugal compressors. Integrated variable frequency drive shall operate without inlet guide vanes. Chillers shall operate with HCF-134a refrigerant not subject to phase-out by the Montreal Protocol and the U.S. EPA Phase-out schedule.

C. The evaporator, condenser, and expansion valve shall be configured to operate as three separate refrigerant circuits. The chiller unit compressors shall be designed for mechanical and electrical isolation to facilitate service and removal.

2.3 DESIGN REQUIREMENTS

A. Each Unit shall consist of at least 3 magnetic bearing, oil-free centrifugal compressors with integrated variable frequency drive, refrigerant flooded evaporator, water cooled condenser, flash tank refrigerant economizer and operating controls with equipment protection.

B. Performance: Refer to schedule for specific operating conditions. While using model VTT1200 compressors the chiller shall be capable of stable operation down to 35 tons. All these ratings measured at standard AHRI entering relief condenser water temperatures and without utilizing hot gas bypass.

C. Acoustics: Sound pressure for the unit shall not exceed the following specified levels, and be less than 87 dBA, measured at 1 meter (3.28 feet). Sound data shall be measured according to AHRI Standard 575-87.

D. Chiller shall be equipped for single-point power connection.

E. Evaporator shall be designed to allow for the flow rate to be reduced to the rate of 1 gpm per ton without entering laminar flow to allow for variable chilled water flow and facilitate chilled water pump energy savings. The chiller shall be able to operate in a stable fashion at this condition for at least 8 hours continuously independent of condenser water flow rate or condenser water temperature relief.

F. Condenser shall be designed to allow for the flow rate to be reduced to 1.5 gpm per ton without entering laminar flow to allow for variable condenser water flow and facilitate condenser water pump energy savings. The chiller shall be able to operate in a stable fashion at this condition for at least 8 hours continuously independent of chiller water flow rate or condenser water temperature relief.

G. Minimum entering condenser water temperature shall be 1°F above leaving chilled water temperature. Chiller shall be able to operate in these conditions for at least 8 hours continuously to provide condenser water relief and allow compressor energy savings. Chiller shall be able to vary the condenser water temperature to the minimum condition independently of condenser water flow rate and chilled water flow rate.

H. Each compressor shall be electrically and mechanically isolated so that if a compressor fails or needs service it can be serviced or removed from the chiller without disabling the other compressors or the chiller. The chiller shall be able to operate with the remaining compressors with (1) or more compressors removed.

I. All chillers equipped with (3) or more compressors shall be equipped with individual compressors staging valves to channel discharge gas from the outlet of the compressor to the evaporator in order for the ramp up during a high pressure ratio application.

2.4 CHILLER COMPONENTS

A. Compressors:

1. Compressors shall be of semi-hermetic centrifugal design and operate oil-free with multiple Danfoss, Turbocor compressors or have N+1 redundant chiller, Two-stages of compression, magnetic bearings, Intra Flow Technology and integrated variable frequency drive module.

2. Automatically positioned and controlled Intra Flow technology shall operate with compressor speed controls.

3. The compressor shall be capable of coming to a controlled stop in the event of a power failure. The unit shall be capable of initializing an automatic restart in the case of power failure.

4. Each compressor shall have integrated microprocessor control capable of capacity and safety control.

5. Each compressor shall be installed with individual suction, discharge and motor cooling refrigerant line isolation valves.

6. Refrigerant Discharge line shall has a combination of shut off and check valve,

7. EMI/RFI filters installed for each compressor.

B. Prime Mover:

1. Permanent-magnet, synchronous hermetically sealed motor of sufficient size to effectively provide compressor horsepower requirements. Motor shall include soft-start capabilities. Motor shall be liquid refrigerant cooled with internal thermal overload protection devices embedded in the winding of each phase.

2. Compressor motor and chiller unit shall include variable-frequency speed controls to match cooling load demand to compressor speed and Intra Flow Technology.

3. Each compressor shall be equipped with Built in DC coils eliminate the needs for line reactor and individual disconnect or circuit breaker

C. Evaporator:

1. Evaporator shall be shell-and-tube type and have separate shells. Heat exchangers shall be designed, constructed, tested and stamped according to the requirements of the ASME Code, Section VIII Code Case 1518-5. Tubes shall have a copper wall of 0.025 in. wall thickness (23 BWG), and one inch, nominal diameter. In the evaporator, refrigerant shall be in the shell and water inside the tubes. The water sides shall be designed for a minimum of 150 psig. Evaporator shall be designed for minimum of 842.2 GPM flow rate. The water connections for the evaporator and condenser shall be grooved suitable for Victaulic couplings. Vents and drains shall be provided. The refrigerant side of each vessel shall bear the ASME Code stamp, code case section VII. Vessels shall pass a test pressure of 1.1 times the working pressure but not less than 100 psig. The evaporator water connections shall also be equipped with right-hand or left-hand connection, interchangeable.

2. The evaporator shall be provided with spring loaded reseating-type dual pressure relief valves according to ASHRAE-15.

3. Tubes shall be individually replaceable and have internally and externally enhanced surfaces designed for refrigeration duty. Tubes shall have smooth full tube wall landings at the tube-sheet ends and at intermediate tube supports. Tubes shall be mechanically roller expanded into steel tube sheets containing a minimum of three concentric grooves.

4. Minimum evaporator exiting water temperature shall be 38°F, unless otherwise specified.

5. Provide factor-mounted and wired, thermal dispersion switches water flow switches on evaporator to prevent unit operation with no water flow.

6. Provide Marine Water Boxes, with Hinged Covers.

C. Condenser:

1. Condenser shall be shell-and-tube type and have separate shells. Heat exchangers shall be designed, constructed, tested and stamped according to the requirements of the ASME Code, Section VIII Code Case 1518-5. Tubes shall have a copper wall of 0.025 in tube wall thickness (23 BWG), and one inch, nominal diameter. In the condenser, refrigerant shall be in the shell and water inside the tubes. The water sides shall be designed for a minimum of 150 psig or as specified. The water connections for the evaporator and condenser shall be grooved suitable for Victaulic couplings. Vents and drains shall be provided. The refrigerant side of each vessel shall bear the ASME Code stamp, code case section VII. Vessels shall pass a test pressure of 1.1 times the working pressure but not less than 100 psig. The condenser water connections shall also be equipped with right-hand or left-hand connection, interchangeable. Condenser vessel shall be designed for variable flow rate at a minimum rate of 1231.13 GPM.

2. The condenser shall be provided with dual pressure relief valves equipped with a transfer valve so one valve can be removed for testing or replacement without loss of refrigerant or removal of refrigerant from the vessel.

3. Tubes shall be individually replaceable and have internally and externally enhanced surfaces designed for refrigeration duty. Tubes shall have smooth full tube wall landings at the tube-sheet ends and at intermediate tube supports. Tubes shall be mechanically roller expanded into steel tube sheets containing a minimum of three concentric grooves.

4. Provide factory-mounted and wired, thermal dispersion switches water flow switches on condenser to prevent unit operation with no water flow.

5. Provide Marine Water Boxes, with Hinged Covers.

D. Liquid level controls

1. Control of refrigerant flow shall utilize a single or multiple 6,000 step electronic expansion valve (EXV), to operate within the full range from full load to the lowest loading capacity for the chiller. The EXV liquid line shall have a sight glass with moisture indicator and temperature sensor connected to control system for validation of sub-cooling.

2. The EXV valve shall be controlled by condenser level float control for better efficiency and to avoid compressor slugging.

3. Condenser shall be provided with a capacitive type liquid level transducer with a resolution of not less than 1024 discrete steps. Transducer shall be wired to chiller control system. Condenser liquid level measurement shall be used in electronic expansion valve control algorithm with a minimum level set point to ensure adequate liquid seal is maintained in condenser to provide compressor motor cooling during operation. Condenser liquid level shall be clearly displayed on graphical operator interface in a minimum of two screens.

F. Chiller Controls

The controller fitted to the oil-free centrifugal chiller package shall be an embedded real time microprocessor device that utilizes control software written specifically for chiller applications. User operation shall be accomplished using a panel mounted color touch-screen interface. The status of the compressors and all system parameters including compressor alarms and temperature trends shall be viewable.

1. Chiller control system shall have the capability to store one year of operational data. No less than 60 points of information shall be sampled at a maximum of 15 minute intervals.

2. Chiller control system shall have full web based remote control capability including the capability for remote operation and software updates.

3. There shall be a backup superheat control on inlet of the compressor in order to control the EXV in the event of a failure of the primary level sensing device.

Controller features must include the following:

1. Selectable control mode – leaving chilled water, entering chilled water or suction pressure control.
2. 12 inch, 65,000 colors, touch panel operator interface operating windows XP embedded.
3. Chiller documentation shall be viewable via touch panel in pdf format.
4. Operator interface shall be capable of connecting directly to compressors via serial communication protocol and display compressor information using Turbocor compressor monitoring/ commissioning software.
5. Chiller control panel shall contain a minimum of three processors; all control functionality shall be carried out on a dedicated real time processor and data served to a remote graphical user interface via an open Ethernet protocol. Proprietary protocols between any pc based or micro based processor strictly prohibited.
6. Native BACnet capable via IP.
7. Chiller control shall be capable of controlling up to eight Turbocor compressors on up to eight individual refrigerant circuits serving the same chilled water stream.
8. Chiller control panel user interface shall be capable of remote control via an internet connection without the use of any third party gateway device or additional hardware or software.
9. Chiller control shall be able to operate in headless mode (no touch panel connected) and utilize standard windows 7 or higher computer to display user interface via Ethernet connection.
10. Real time chiller control processor shall be capable of emailing a predefined list of recipients should a fault occur. Email shall include details of fault, possible reason for fault, attachment of monthly data log of 195 or more compressor and chiller variables at a minimum interval of 30seconds and indication of severity of fault.
11. Ability to place all outputs in a manual state (hand, off, auto) via graphical user interface.
12. Alarm screen shall be capable of filtering faults into specific categories such as compressor, chiller and system faults in order to provide rapid diagnosis and separation of failure modes.
13. Variable speed cooling tower control.
14. Tower bypass valve control.
15. Ability to turn on/off duty standby chilled water pumps.
16. Ability to turn on/off duty standby condenser water pumps.
17. Ability to operate chiller isolation valves for both evaporator and condenser,
18. Multiple compressors staging algorithm shall operate at the optimized power curves of each compressor simultaneously and shall reset automatically every second during operation.
19. Continuous data logging for operational trending and bin analysis shall be exportable to “CSV” format. (12 months data stored).
20. Built-in stepper motor controls for EXVs

21. Controls lockup protection
22. Ramp rate control - Peak energy demand limiting algorithms.
23. Three levels of alarm safety for minimum chiller down time
24. Chiller control software shall employ an active fault avoidance algorithm to reduce chiller capacity and/or power level in the case the chiller approaches within 10% of any trip limit value such as suction pressure, discharge pressure, chiller amp limit, leaving chilled water temperature limit etc...
25. Store up to 32,000 alarm and fault events stored with date / time stamp.
26. Real time data trending viewable via Touch panel.
27. Chiller load profile charts viewable via Touch panel.
28. Chiller control graphical user interface shall be capable of displaying data in SI or I-P units without affecting control or BAS protocol units.
29. Controls shall identify within 60 seconds a compressor that is not starting or ramping properly. Upon this identification, the compressor shall be disabled, the remaining compressors shall be operated in an optimized fashion and an alarm shall be sent to alert the operator.
30. Chiller faults (14) possible conditions.
31. Each compressor alarm (9) possible conditions.
32. Each compressor fault (13) possible conditions.
33. Each compressor bearing fault (8) possible conditions.
34. Each compressor bearing fault (16) possible conditions.

Data on Main Display Screen shall include (& shall communicate via protocol):

a) Entering and leaving chilled water temperatures.
b) Entering and leaving condenser water temperatures.
c) (7) states available
d) Active timers
e) Chiller enable status
f) Chiller water flow proof status
g) Condenser water flow proof status
h) Indication of compressor readiness
i) Indication of clearance to run
j) Chiller set point
k) Total chiller kW
l) Total chiller current input
m) Three pages of data trends with zoom functionality
n) Graphical dial indicators that clearly indicate safe and unsafe operating values
o) Graphical representation of evaporator and condenser showing gas movement when chiller is running.
p) Current alarms (announce and manual reset provision)
q) Compressor actual rpm, maximum rpm, minimum rpm
r) Compressor alarm description & fault description
s) Compressor percentage motor demand.
t) Compressor safety interlock status
u) Compressor modbus communication health status
v) Compressor suction and discharge pressures
w) Compressor suction and discharge temperatures
x) Compressor internal cooling system temperatures and status.
y) Compressor motor kW and amps.
z) Compressor pressure ratio.

EXECUTION

3.1 INSTALLATION

A. Install per manufacturer's IOM documentation, shop drawings, and submittal documents.

B. Align chiller on foundations or mounting rails as specified on drawings.
C. Arrange piping to enable dismantling and permit head removal for tube cleaning.
D. Coordinate electrical installation with electrical contractor.
E. Coordinate controls and BMS interface with controls contractor.
F. Provide all material required for a fully operational and functional chiller.
G. The manufacturer's Representative shall inspect the installation, and approve it, prior to Commissioning.

3.2 START-UP

A. Units shall be field charged with HFC-134a refrigerant.
B. Factory Start-Up Services: Provide factory supervised start-up on-site for a minimum of two working days ensure proper operation of the equipment. During the period of start-up, the factory authorized technician shall instruct the owner's representative in proper care and operation of the equipment.

APPENDIX D

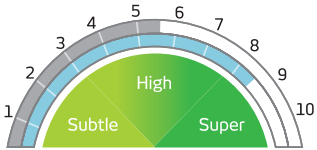
Window Film Cut Sheets

Silver 20

OPTICAL & SOLAR PROPERTIES

	Single Pane	Double Pane
Visible Light Transmitted	18 %	17 %
Visible Light Reflected (Int)	62 %	62 %
Visible Light Reflected (Ext)	61 %	61 %
Ultra Violet Block	99 %	99 %
Total Solar Energy Reflected	55 %	49 %
Total Solar Energy Transmitted	13 %	12 %
Total Solar Energy Absorbed	32 %	38 %
Emissivity (Room Side)	0.71	0.71
Glare Reduction	80 %	79 %
Shading Coefficient	0.25	0.35
Solar Heat Gain Coeff. (G-Value)	0.22	0.30
U-Value Winter (IP)	0.97	0.46
U-Value Winter (SI)	5.51	2.62
Luminous Efficacy	0.72	0.49
Total Solar Energy Rejected	78 %	70 %

R06922W - Silver 20 Water Activated Adhesive
R05822S - Silver 20 Pressure Sensitive Adhesive



Energy Savings

Energy Efficiency

solar zone

Hanita Coatings

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