

TRUCK – DUMP – CONVENTIONAL - 38,000 LB GVWR
HEAVY DUTY SINGLE AXLE DUMP TRUCK (TYPE II)

050950

TRUCK, DUMP, TYPE II, STAINLESS STEEL, AUTO, FRONT DISCHARGE SPREADER (050950)

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TOD September 5, 2013

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

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I. GENERAL TRUCK SPECIFICATIONS: (Continued)

A. INTENT STATEMENT:

The purpose of these specifications is to describe a conventional cab, single-rear axle dump truck, equipped with dual rear wheels, 11 foot dump body, 7 cubic yard (approximate load capacity without side-boards) 304 stainless steel body of a radius design, dual auger, front discharge, underbody center mounted hydraulically adjustable directional spinner, hoist, hydraulic power system and snow plow hitch. The radius design shall provide consistent flow of materials to the dual auger without the need to raise the bed. Truck will be operated at up to an 18 percent grade. It shall be capable of one-man operation while plowing snow and simultaneously spreading granular and liquid materials during winter operations (without the need to raise the bed), and of hauling, stockpiling and unloading maintenance materials into a chip spreader or paver during summer operations. Further, it shall be capable of being loaded with a front-end loader or self-propelled belt loader.

NOTE: Pennsylvania Department of General Services, PCID No. 1075, "*General Requirements for Bidding PennDOT Vehicles/Equipment*", most current version effective at the time and date of bid opening is included as a part of this specification. PCID No. 1075 may be reviewed and downloaded from the Department of General Services website, <http://www.dgs.state.pa.us>. Delivery as required per Department of General Service PCID NO. 1075 Section "G". All units must be delivered within **270** days after receipt of the purchase order by the successful bidder.

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

B. WEIGHT DISTRIBUTION:

Weight distribution charts must be submitted with the pilot model for all models being delivered. Weight distribution charts shall be submitted for two modes listed below.

1. Summer mode including the portion of the wing plow post and plow frame assembly that remains on the vehicle all year.
2. Winter mode with front plow, loaded pre-wet tank, spreader and complete wing plow.

Each item listed on Drawing EQN-507B shall be noted and individually calculated in the vendor's submission. Engineering certified weigh slips shall be provided with the pilot model and signed by the Manufacturer's Engineering Department. It is understood that the components specified are minimum and if the manufacturer's Engineering Department recommends or deems necessary, particular weight distribution, a larger component or a larger GAWR totally, the burden of responsibility is hereby placed upon the Manufacturer's Engineering Department to supply a unit that is totally engineered.

1. Frame
2. Axle
3. Tires
4. Steering unit and components
5. Rims
6. Suspension
7. Brakes
8. Any other items as required

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

B. WEIGHT DISTRIBUTION: (Continued)

1. The dynamic and static loads created by the unit, plus operational stresses, must be reviewed to ensure the Commonwealth of a properly designed/engineered unit.
2. Front and rear axle legal weight distribution apply to non-emergency applications only! Winter weight distributions are required for payload information purposes only since winter plowing and spreading operations are exempt from legal weight restrictions. However, the total weight rating shall not exceed the manufacturer's GVWR for the vehicle that is offered. The weight imposed on the front and rear axles using the total GVWR shall be shown. (Overweight shown on the axles in these winter modes is for information only).

In addition to the Engineering Certified weight distribution provided at the pilot model inspection, the following information is required with the pilot model.

The vehicle shall be certified for 38,000 LB Gross Vehicle Weight Rating (GVWR). The GVWR shall be identified in the cab or on the door as the final complete certification label (minimum rating).

ACTUAL TRUCK WEIGHT: (LB)

"Chassis only" (shall be signed by a certified weigh master.)

_____ Front Axle

_____ Rear Axle

_____ Total

"Chassis with body" (shall be signed by a certified weigh master).

_____ Front Axle

_____ Rear Axle

_____ Total

THE ABOVE MAY BE PERFORMED BY THE BODY COMPANY.

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

B. WEIGHT DISTRIBUTION: (Continued)

Truck GAWR's as Built (LB)

	<u>Front GAWR</u>	<u>Rear GAWR</u>
Axle	_____	_____
Tires	_____	_____
Springs	_____	_____
Rims	_____	_____

C. POWER TRAIN OVERVIEW:

ENGINE

DIESEL, MIN. 400 HP AT GOVERNED RPM, MIN. PEAK TORQUE OF 1450 LB/FT TORQUE, MIN. 12.4 LITER (actual engine liters).

TRANSMISSION

AUTOMATIC- ALLISION 4500 RDS 6 SPEED.

REAR AXLE

DANA S23 Series
MERITOR RS-23-160
MERITOR RS-23-186
MACK RA23R

NOTE: All rear axles must provide axle shafts with a minimum diameter of 2.19 inch at the spline. All rear axle(s) shall have an extended breather tube to prevent debris buildup from entering axle housing.

NOTE: Lubricants for front axle hubs, automatic transmission and all rear differentials shall meet or exceed all appropriate MIL and SAE specifications for synthetic lubricants and shall have all plugs identified as synthetic oil, or painted red.

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

D. VEHICLE COMPONENTS:

1. AXLE FRONT:

The front axle shall be rated at 18,000 LB minimum capacity. The front axle, drag links and tie rods shall have grease zerks installed. Kingpin or bushings shall be grooved to permit grease flow. Sufficient tire clearance at maximum turning angles. Complete "Stemco" oil seal assembly, including hub, plug type window, and "Guardian" seal, or approved equal. Each unit shall receive a front-end alignment prior to delivery. A setback axle is unacceptable.

2. AXLE REAR:

(See power train overview for acceptable models.)

NOTE: Aluminum or lightweight housing is unacceptable.

NOTE: All rear axles must provide axle shafts with a minimum diameter of 2.19 inch at the spline. All rear axle(s) shall have an extended breather tube to prevent debris buildup from entering axle housing. There shall be a torque-proportioning traction-assist device, which is full locking within the differential housing. The device shall provide maximum traction to the rear wheels when actuated and shall be a self-relieving designed to prevent gear damage and/or axle shaft breakage under extreme service conditions. The traction-assist device shall be driver actuated by a dash mounted traction control switch.

NOTE: Lubricants for all rear axles shall meet or exceed all appropriate MIL and SAE specifications for synthetic lubricants and shall have all fill plugs identified as synthetic oil, or painted red.

Stemco guardian rear wheel seals, or approved equal. All axles shall have magnetic drain plugs.

NOTE: Rear axle selection shall be made after the award and may be a mix of ratios as required. The successful vendor/manufacturer shall present three (3) computer runs showing the three most likely ratios for consideration for a top speed range of 55 MPH to 65 MPH max. This information shall be presented at the pre-build meeting. The rear axle ratios must be "identical" throughout the entire build.

3. BRAKES:

Full air antilock in compliance with the most current FMVSS requirements.

The ABS shall incorporate a diagnostic fault switch that is capable of illuminating a fault light for diagnostic purposes. The switch shall be easily accessible and can be either dash or under-dash mounted. A dash-mounted display that will show all SAE message descriptions for the ABS is an acceptable means of diagnostics in lieu of the fault switch.

Rear brakes: 16.5 inch x 7 inch "S" cam with quick-change type single or double pin. **(No substitute, standardization).**

Steer-axle-brake: 16.5 inch x 6 inch or a power front disc brake system providing equal performance. Quick-change type single or double anchor pin if drum type brakes are furnished.

Drum brakes shall have automatic slack adjusters and they shall be clearance-sensing type only, with adjustment on application of the brake. **(No substitute, standardization).** Backing plates shall be installed on all drum brakes.

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

D. VEHICLE COMPONENTS: (Continued)

3. BRAKES: (Continued)

Air compressor: Per truck manufacturer's recommendation. Compressor shall be fitted with a safety valve to prevent mechanical failure.

Buzzer-type, low air pressure indicator.

Parking brake: Rear wheel spring-type, MGM E 30/30 or Anchorlock 30/30 gold seal chambers. Parking brake shall provide modulated emergency braking via the foot valve in the event of a rear service system failure.

Rear service brake chambers and spring brake chambers shall be mounted to provide adequate clearance for backing into bituminous paving machines.

Air tank: Automatic drain valve, with heater on wet (first) tank. Each of the remaining air tanks shall have a manual drain valve.

Air dryer: With heater, inboard mounted, away from road splashing and a minimum of 20 inches above road surface. Dryer shall be compatible with the body company clearance requirements for sub-frame, valve body, etc. Per: Haldex DRYest or Bendix AD-IP installation made in concurrence with the air compressor manufacturer's recommendations.

Air dryer shall be placed to accommodate the changing of filter cartridges without disconnecting any hoses or removing dryer base from its mounting location.

All electrical connectors for drain valve and air dryer shall be covered with heat shrink material or have sealed connections.

System shall be equipped with anti-compounding valve to prevent mechanical failure of the foundation brakes, slack adjusters, etc.

Trailer air brake: Unit shall be equipped with factory installed trailer air brake control package. To include dash mounted, graduated, hand operated, trailer service brake trolley control valve. Body builder to mount and install Phillips STA-LOCK glad hands (1 each part numbers 12-4906 and 12-4908), location to be determined at pre build meeting Ref: EQN-81X.

4. CAB:

Aluminum or galvanized steel cab.

Grab handles shall be supplied on all cab entry locations. Three points of contact shall be achievable at all cab entry locations.

Hood: Fiberglass, tilting. Fenders shall be part of tilting hood. Grille shall be fixed.

Air suspension system for the cab shall be factory installed.

Air deflector: Clear or smoke, hood mounted. Manufacturer's standard full width for the truck model.

Access to front-end hood tilt handle shall not be blocked.

Fenders: Front fenders shall have a 5-inch minimum extension. Not to exceed 96 inch truck width.

Deluxe fresh air hot water heater and defroster, manufacturer's highest output.

Air Conditioning: Highest output available as OEM option.

AM/FM radio with weather band.

Air horn(s): Minimum 1 horn with snow-shield (not required if under hood mount).

All controls and knobs shall be properly identified.

Brake pedal, clutch pedal and throttle shall be suspended if available from the factory.

CB Power connections One (1) pair, on the dash, Ref: EQN-78.

I. GENERAL TUCK SPECIFICATION: (Continued)

D. VEHICLE COMPONENTS: (Continued)

4. CAB: (Continued)

Cab floor covering shall be heavy-duty rubber with closed cell rubber or heavy felt backing.

Cruise control

Cup holder in the cab within easy reach of the operator.

Dome light shall be provided

Dual sun visors.

Windshield: Manufacturer's standard heated windshield. One (1) or two (2) piece construction is acceptable, must be tinted. Safety glass throughout.

Drivers and passenger's side windows shall be power.

Driver's and passenger's doors shall be equipped with power door locks.

Dual windshield wipers, arctic type with the heaviest arms, linkages and motor available. Wipers shall be minimum 2-speed electric with intermittent feature.

Washer system shall be electric. Minimum capacity of two (2) quarts of washer fluid and shall be filled with an anti-freeze type solvent.

Mirrors: Drivers and passengers side power mirrors, west coast style minimum 6 inch X 16 inch manufacturers standard heavy-duty breakaway arms. Mirrors shall be heated with a lighted toggle switch mounted within accessible reach of the operator, automatic on/off is acceptable. The wires shall be fitted in such a way that the mirror glass/element can be changed by unplugging the two-wire lead. There shall be a heated convex mirror both sides, minimum 5.5 inch X 8.8 inch or 8" diameter, minimum. A blind-spot elimination heated mirror shall be mounted on the right front fender and it shall be 8-inch minimum diameter, stainless steel or aluminum head with mirror. Mirror shall be a conventional convex mirror, and shall not be of the half-round cross view type. All arm/s and hardware shall also be stainless steel. Fender type washers stainless, or aluminum, with rubber pads to be placed on both sides of the fender shall be included. Pedestal system shall be single, double or triple mounting assemblies (stainless steel or aluminum). Mirror shall be mounted in rubber or vinyl. Ref: Grote (800-628-0809)

Seats: Driver's seat shall be high back adjustable Bostrom air 915 Series with lumbar support or National 195 Series with lumbar or DuraForm Air Command Series (fabri form cushions with lumbar support), with body cloth insert and three-point retractable seat belt (Seatbelt shall be High Visibility Orange). A bellow-type or protective skirt shall cover the seat suspension mechanism.

Note: If due to cab configuration a Bostrom 915 or National 195 seat cannot be used, a Bostrom 910 may be substituted. All other requirements must be met.

There shall be an inside armrest on the driver's seat plus an outside armrest installed on the seat or the driver's door. **(No substitute, standardization)**. Color coordinated to cab interior.

Passenger seat shall be the manufacturer's standard non-suspension (static) high back type and shall have a three-point retractable seat belt (Seatbelt shall be High Visibility Orange). Color coordinated.

Steering wheel diameter shall be 18 inch (approx), Manufacturers standard.

There shall be either a RoadWatch road/air temperature system or a Vaisala Surface Patrol DSP100 road/air temperature system installed with control system integrated temperature display, per invitation to bid.

Steps: Drivers and passenger entrance steps: Shall be aluminum, serrated. The outer step edge must be serrated in lieu of plain. (Overlay is not acceptable). Step design material must be the same, both left and right side. Ref: Bustin No. NST4 full size, Ohio Grating No. JA21195G4 serrated, IKG. Industries Type B54 or Mack Part # 85QM423OM4. Top of the first step shall be approximately 21 inch above the ground.

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

D. VEHICLE COMPONENTS: (Continued)

5. CHASSIS:

The GVWR rating of the truck shall be 38,000 LB. A label stating this shall be affixed on the door or in the cab as the completion certification label.

(CA) dimension: 93 - 99 inch cab to axle approximate. Wheel base dimension 171 inch approximate. Wheelbase and CA dimension may be adjusted to provide the optimum legal weight distribution and to meet the vehicles intent statement.

The frame AF shall incorporate a cross member at the rear of the frame to reinforce the body pivot point. (Local installation is acceptable).

Front Bumper: Heavy duty swept back design, mounted to the frame with the inner face of the bumper against the chassis frame.

Frame mounted tow hooks or eyes: Two (2) front. These may be installed by the body company after completion of the plow hitch mounting, using grade 8 bolts (minimum) of sufficient length, and grade 8 elastic type self-locking nuts, or by full welding.

License plate bracket: Front and rear. Securely mounted to prevent damage when backing into material piles.

There shall be a centralized on board chassis lubrication system installed. Ref: EQN-501.

6. DRIVE LINE:

Main driveline: Spicer Life XL or Meritor RPL Series. "**Factory balanced**" greasable, (one zerk minimum). Heavy-duty driveline shall be engineered and be compatible to engine, drive train and transmission torque. Heavy-duty center bearing, if required, with due consideration to drive shaft angles, length, location, proper bolting based upon engine and transmission selection.

7. ELECTRICAL:

All copper system, negative ground.

Alternator: 160 amp minimum, high performance, solid state, brushless, with battery cable from battery negative terminal to starter motor or frame. All alternator and starter bolts shall be grade 8.

Batteries: Three (3), heavy-duty, 12 volt, maintenance-free, BCI Group Size 31, with stud-type posts and anti-corrosion treatment on each terminal. 2500 total cold cranking amperes (CCA) at 0 degrees F. 640 minutes of total reserve capacity at 80 degrees F as per SAE.

Battery Mounting: Mounting shall include the following:

- a.) 0.25 inch thick rubber shock pad under the battery.
- b.) Box with cover. Cover shall be constructed of fiberglass, poly, or aluminum (if aluminum there shall be an insulated liner).
- c.) Mounting bolts shall be grade 8 with self-locking nuts.

Mounting of accessories within the battery box is prohibited.

Cables shall conform to RCC Practice 105 with "sealed" terminal ends for stud-type battery posts.

Starter motor: With thermal over crank protection and high torque capacity. Suitable for the diesel engines offered as per starter manufacturer's recommendation.

Electrical system: System shall be circuit-breaker-equipped, in an easily accessible location and weatherproof. Fuses acceptable in circuit so identified by manufacturer as safety factor. Any fuse or circuit breaker liable to be damaged during truck operation shall have an easily removable protective cover. All wire splices in the cab shall be insulated with heat shrink materials

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

D. VEHICLE COMPONENTS: (Continued)

7. ELECTRICAL: (Continued)

Electrical chassis wiring: Factory heavy duty harness to power components in rear light module.

Flasher: (All) heavy-duty electrical, Ref: Tridon Model EL 12 or equal.

Note: If an audible alarm is supplied for the 4-way and turn signal circuit, it shall have on/off capability.

Lights: All lights shall meet all Federal and State regulations. The head Lights shall be Halogen with (DRL's) daytime running lights. Body lights shall have their own dedicated complete circuit. The chassis manufacturer shall route the dedicated body circuit/harness to the rear center portion of cab, with 4' of extra wire coiled on floor between seats. All pass-through points shall be properly sealed and protected. This shall be the access/connection point for the Whelen Model # PADOTSY1. Pass-through point and/or routing location determined at Pre-build Meeting.

Plow Lights: Plow Lights shall be LED Truck-Lite snow plow light kit model 80875. **(No substitute, standardization)**. Bracket design shall be either molded fiberglass or aluminum, with two (2) brackets mounted to the truck hood. Brackets shall be designed/constructed to provide sustained support of the light assembly while offering minimum vibration/jiggle. The height and width of the bracket will be governed by the application and shall meet all Federal and State lighting regulations. Final design shall be approved at the pre-build meeting. The factory chassis plow light circuit shall be used and all areas where the wires might contact a rub point shall be protected by grommets, loom, etc. All connections shall be made using sealed connections and dielectric grease. Ref: EQN-124.

GPS Combo Radio Antenna: There shall be a roof mount base with built-in GPS, PCTEL model GPPB-204-54-12-S1-M1 and a low profile black antenna, PCTEL model BMLPU700 Assembly shall be mounted in the roof of the cab with the antenna cable routed to the floor area between the seats, (centered, forward most position as practical) with the antenna cable routed (within protective conduit) to the floor area between the seats. There shall be a minimum of 4 feet of antenna cable coiled at the base of the floor to allow for connection of radio on spreader control pedestal. Antenna shall be prewired with a MINI - UHF MALE connection. **(No substitute, standardization)**. Antenna shall be mounted to not interfere with cab shield.

Power Distribution Center: There shall be a 4-way power/ground distribution center located near the console for connection of 800 MHz state radio. The lugs shall be configured in the following manner: (1) lug shall be a 30 ampere constant hot circuit, (1) lug shall be a 10 ampere ignition controlled circuit. (2) lugs shall be chassis ground. All connections shall be enclosed in a weatherproof enclosure.

Each circuit shall be supplied individually, labeled, properly sized, protected from weather and sealed to be watertight.

8. ENGINE:

Automatic idle shutdown shall be set to five (5) minutes.

ECM shall be set to a maximum of sixty five (65) miles per hour.

The engine components facing wheel areas, on both sides, and the areas to the rear of wheels shall be shielded. The shield shall protect the engine, fan, radiator and areas behind tires from stones and debris.

Replaceable heavy-duty oil filter(s) as recommended by the manufacturer and **bearing a legible OEM part number.**

Diesel Fuel Filter: There shall be a DAVCO 382 **(No substitute, standardization)** filtration unit installed and mounted (Higher than fuel tank) in a location to accommodate filter replacements, yet be protected from road debris. Unit shall be equipped with a coolant and 120 volt heater circuit. The 120 volt circuit and engine block heater shall be powered via the same electrical connection. **(No substitute, standardization)**

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

D. VEHICLE COMPONENTS: (Continued)

8. ENGINE: (Continued)

Cooling System: The system shall be the largest factory engine cooling capacity, compatible with engines and transmissions referenced for continuous high engine output under extreme temperatures and/or operating conditions due to prolonged snow plowing operations in low gears. The water pump shall be adequately sized to provide proper cooling and be of sufficient size to accommodate the larger pulley to adequately handle the specified options. Shall be fitted with provisions for visually monitoring coolant without necessitating removal of the cap from the radiator or expansion tank (e.g. sight glass, transparent expansion tank). The antifreeze solution shall meet all applicable EPA requirements. A non-charged spin-on coolant filter shall be installed if required by engine manufacturer.

9. ENGINE ACCESSORIES:

The oil dipstick must have tubing and dipstick with sufficient length to provide reasonable access for checking the oil level.

Engine Heater: Immersion in-block type, for cooling system, with waterproof plug, flush-mounted in an accessible location at the front/side of the vehicle, outside the cab/hood, 110 volt, 3-prong plug. The electrical cable from the heater to plug shall be one piece and waterproof. Location to be determined at the pre-build meeting.

Air Cleaner: Air filter shall be manufacturer's heaviest duty air cleaner that meets all the requirements of the extended engine warranty.

The air intake system shall be fitted with inside/outside air.

Fan: Thermostatically controlled viscous type or manufacturer's recommended automatic fan.

A screening system shall be installed that will protect the radiator from stones and bugs.

Engine Vibration Dampener: At PTO flange yoke. Ref: EQN-90.

Governor: Set at manufacturer's recommended maximum rpm.

Hoses: The air induction system and large radiator cooling system hoses shall be clamped with 0.500 inch wide, 150-inch LB stainless steel, constant torque, spring-loaded worm clamps. Ref: Wittek Manufacturing (Tel: (312) 492-9400) or Breeze Clamp Co, Constant Torque clamps with liner for silicone hoses. Cooling system hoses under 1 inch OD may use factory standard hose clamps, as a minimum acceptable standard.

Air intake hoses shall be 0.250-inch minimum thickness, molded hoses. Ref: Gates, Goodyear or equal. Silicone or premium rubber, radiator and heater hoses. Hoses shall not be painted.

Lubricating Oil Lines: High quality flexible wire-braid type, "Aeroquip" or approved equal system, minimum standard if hoses are used.

Drive Belts: Cog belts or serpentine (cog belts not required for power steering).

Engine Brake: Engine shall be equipped with a minimum 2 stage, full engine compression brake, Ref: Jacobs.

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

D. VEHICLE COMPONENTS: (Continued)

10. EXHAUST:

Vertical tailpipe with elbow and muffler system or horizontal muffler and vertical tail pipe with elbow. Exhaust system shall neither interfere with the operation of the dump body or equipment, nor shall it be close to any fluid tank, and **PERMIT WING PLOW AND PRE-WET TANK INSTALLATION**. The tail pipe shall be installed in a manner that will keep the muffler and tail pipe away from dump truck body. The flex in the body, when operating on an uneven terrain, must be considered in the design. The muffler, DPF and tail pipe shall be shielded or insulated to protect personnel from burns when entering or exiting the cab. The shield shall be 180 degrees to 360 degrees and shall be of non-rust able material such as stainless steel or aluminum. Ref: Riker or equal.

11. FAST LUBE OIL CHANGE SYSTEM (FLOCS):

This FLOCS system shall be installed with all fittings, brackets, clamps and hoses. The system shall be compatible with all fittings presently used by the Department. The final placement of the male half of the snap coupler, on the equipment, shall be determined at the pre-build meeting. Ref: EQN-351A.

12. FRAME AND FRAME EXTENSION:

Resisting Bending Moment (R.B.M.) shall be a minimum of 1.9 million inch LB per rail, including extension, for the entire length of the frame, including any frame liners. Where engine and radiator adjustments are required, a minimum of one million inch LB per rail R.B.M. will be accepted. Frame material shall be of at least 120,000-PSI yield strength. Minimum frame RBM shall be approved by manufacturer's Engineering Department. **If a larger RBM is required to perform the specified operational duties, the vendor shall bid a frame concurrent with the intent and spirit of this contract. Ref: Snow removal operations, full payload snowplow, right and/or left patrol wing plow, etc.** Mainframe and any required liners shall be either straight channel or offset channel, full length. **Bolt-on or welded extension will not be accepted.** Front frame shall accommodate the Department's standard hydraulic PTO shaft and pump (Ref: EQN-90) and the plow frame. It shall provide easy service accessibility.

13. INSTRUMENTATION:

All instruments and gauges shall be illuminated and dash-mounted, except where specified otherwise.

All standard instruments shall be supplied, including, but not limited to the following:

Oil pressure gauge with warning light or audible alarm.

Air pressure gauge(s) for dual circuit, dual indicator with low-pressure audible alarm and warning light.

Coolant temperature with warning light or audible alarm.

Transmission oil temperature gauge with warning light or audible alarm.

Fuel gauge.

Hour meter that records only when the engine is running. In – dash, integral with instrument panel and readable from the operator's seat.

DEF level gauge.

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

D. VEHICLE COMPONENTS: (Continued)

13. INSTRUMENTATION: (Continued)

Speedometer with odometer and a dual speedometer lead to interface with the ground speed spreader control system.

Tachometer.

Voltmeter.

Parking brake indicator light.

Hydraulic fluid level gauge.

Air Restriction Gauge: Flush, dash-mounted with indicator slide for engine air cleaner, Ref: Filter Minder, manufactured by Engineered Products Company. If the vehicle is OEM equipped with an electronic dash that incorporates an air restriction gauge or indicator light, it shall be acceptable.

14. PAINT:

Cab shall be painted PennDOT yellow Ref: DuPont F9885, PPG 85246, Sherwin Williams 73266, Sikens 4017, or NAPA 73266 for shade only. Frame and all underside components shall be painted black. Front bumper and plow frame shall be primed and painted black (with hardener) low VOC. All bare metal surfaces shall be coated using etching primer prior to paint. All surfaces shall be properly cleaned and prepared prior to paint, with all weld splatter and debris removed.

15. STEERING:

Power Steering: Dual integral or single integral type hydraulic power steering with right wheel power-assist cylinder. Glidecoat steering shaft, Bendix wedge lock lube-for-life shaft or prior approved equal. The steering system (e.g. flow, pressure, relief valve etc.) shall be selected considering the full front-GAWR axle loading. Hydraulic supply pump shall be vane or roller type design with sufficient oil flow to permit one (1) steering wheel revolution per second with front axle loaded to rated capacity, with plow on, in a "park" condition. Ref: Vickers V-20, Eaton or Borg Warner. The pump shall not be the integral filter type unit. Power steering reservoir shall be remote mounted, minimum 1.5-quart capacity, incorporating a filter that is easy to remove and replace. The remote filter referenced above shall be factory mounted, certified and engineering approved in conjunction with the appropriate pump.

16. SUSPENSION: FRONT:

9,000 LB capacity at ground, each front spring. The six (6) front spring pins or bearings/bushing shall be furnished with 360-degree grease grooves to insure adequate lubricant penetration. Spring hangers shall be heavy castings with sufficient pin and bearing surface to render trouble free service. Maintenance free front spring bushings are acceptable.

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

D. VEHICLE COMPONENTS: (Continued)

17. SUSPENSION: REAR:

11,500 LB capacity at ground, each rear spring. 2,250 LB capacity separate auxiliary spring each side. Suspension shall be tailored to axle loads and shall be adequate to sustain maximum GVW, without overload or permanent set. The spring hanger brackets shall be severe duty castings with sufficient bearing surface/wall thickness to prevent premature bolt wear. The spring center bolts shall be a minimum of .4375-inch size, preferably .5000 inch. The rear spring hanger pins shall be the grease able type. Bolts must be of sufficient length to go through the washer, spring bracket and truck frame with sufficient length to install a self-locking nut.

18. TANK - FUEL:

Safety- type fuel tank as per the requirements of FMVSS. **Dual tanks are unacceptable.** Trucks shall have one (1) 80 GAL minimum total capacity tank, frame mounted, under the left door. Tank mounting hardware and brackets shall be for "severe duty" applications. Heavy-duty aluminum or stainless steel, minimum 1.9-inch wide straps with rubber shims/liners shall be utilized. The fill pipe shall be accessible with the dump body in the down position; pipe can be located at either end of tank to avoid interference with steps. System shall be a top or side draw for suction and return lines.

19. WHEELS/TIRES:

The truck shall be equipped with hub piloted steel disc wheels for tubeless tires. The wheel end shall be equipped with outboard cast brake drums, and 15 degree tubeless steel wheels, hub piloted, 10 hole - 285.75mm bolt circle with 22mm two-piece flange nuts.

Front: Wheels: 22.5 x 12.25, 10 hole - 285.75mm bolt circle with 220mm bore, tubeless steel disc wheel rated at 10,000 LBS at a maximum inflation pressure of 120 PSIG. Accuride part number 29807. **(No substitute, standardization).**

Rear: Wheels: 22.5 x 8.25, 10 hole - 285.75mm bolt circle with 220mm bore, tubeless steel disc wheel rated at 7,500 LBS at a maximum inflation pressure of 120 PSIG. Accuride part number 28828 or 29169. **(No substitute, standardization).**

The dual rear wheel/tire assembly shall have clearance between the tires, which permits the use of dual tire chains.

Wheel-Guard Separators: The wheel ends shall be equipped with the Accuride part number 5903

Wheel Guard Separator as follows:

Front axle - between the wheel and the brake drum.

Rear axle - between the inner dual and the brake drum and between the inner and outer duals.

Paint: The wheels shall be topcoat painted with TGIC Polyester Powder Paint MLD-82008 High Gloss Gray or equal applied over Cathodic Electro-Disposition Gray Primer.

Tires: All tires shall be radials.

Front Tires: 385/65R22.5 (Load Range J).

Rear Tires: 12R22.5 (Load Range H).

MANUFACTURER

Goodyear
Michelin
Bridgestone

FRONT TIRE

G-296
XZY3
M844F

REAR TIRE

G-282 MSD / G622 RSD
XDN-2
L320

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

D. VEHICLE COMPONENTS: (Continued)

20. TRANSMISSION: See POWER TRAIN OVERVIEW for acceptable transmissions.

AUTOMATIC: (Code: 050950)

Dash mounted console with push button shift selector. There shall be an external oil cooler. The oil cooler for transmission is required due to prolonged transmission torque converter operation in low gears. Cooler size must be provided to keep the transmission fluid at an acceptable operating temperature under these prolonged conditions. (Water to oil type cooler). An Allison approved cooling system shall be installed regardless of whether retarder is incorporated in the system or not.

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

E. DUMP BODY AND EQUIPMENT MANDATORY MINIMUM SPECIFICATIONS:

1. DUMP BODY STRUCTURE, STAINLESS STEEL:

Intent: The purpose of these specifications is to describe a conventional cab, single-rear axle dump truck, equipped with dual rear wheels, 11 foot dump body, 7 cubic yard (approximate load capacity without side-boards) 304 stainless steel body of a radius design, dual auger, front discharge, under-body center mounted hydraulically adjustable directional spinner, hoist, hydraulic power system and snow plow hitch. The radius design shall provide consistent flow of materials to the dual auger without the need to raise the bed. Truck will be operated at up to an 18 percent grade. It shall be capable of one-man operation while plowing snow and simultaneously spreading granular and liquid materials during winter operations (without the need to raise the bed), and of hauling, stockpiling and unloading maintenance materials into a chip spreader or paver during summer operations. Further, it shall be capable of being loaded with a front-end loader or self-propelled belt loader.

NOTE: The body shall be reinforced to withstand SEVERE duty service and be capable of excavation with rip rap being dropped in the bed.

NOTE: There shall be a hydraulic lock out to the Floor Conveyor Augers when any of the following conditions exist. 1. Whenever the bed is raised. 2. The tailgate is unlatched to open. 3. Top Grate is opened or removed.

Body Guides: There shall be stainless steel body guides mounted to the longitudinal beams (both sides). There shall be mated stainless steel reinforced guides bolted to the truck frame. Stainless steel guides shall be constructed using minimum ¼" stainless steel.

Body Sides: Shall be constructed using a minimum of 3/16 inch 304 stainless steel and be a minimum of 36" high from top of bed floor to top of bed rails (one piece per side) and of a radius design to allow flow of material to the auger trough. Top rails shall be 4" boxed 304 stainless steel, continuous welding. Top rails shall be one-piece construction: NO SPLICING. Body width shall be 96 inches. There shall be integral side fenders fabricated from a minimum of 3/16 inch stainless steel, both sides of the body and full length of the body. These fenders shall slope away from the body to prevent excess material from building up on them. There shall be stainless steel gussets for side boards mounted to the top rail front, mid and rear. There shall be 2" by 10", full length, rough oak side boards securely installed on both sides. Ref: EQN-76, Sheet 1, "2" x 10" rough oak."

Shovel Holder: There shall be a Buyers stainless steel shovel holder model SH675SS (No substitute) welded to the curb side of the body (location of holder to be determined at the pre-build meeting)

Steel Body Props: There shall be two (2) props, (one per side) welded or bolted to the long bed beam. There shall be a three (3)-pocket rest bolted to the truck frame rail on each side. When released from the cradle, the body props shall be free to fall. Props shall fall into step retainer as bed is raised, un-assisted. Ref: EQN-62.

Floor / conveyor: There shall be an integral material conveyor consisting of two 7 inch diameter counter rotating augers that are centered and recessed along the full length of the floor. The conveyor trough shall be one piece construction utilizing 3/16 inch 304 stainless steel and designed to allow uninterrupted flow of material to material chute. Each auger shall be powered by a separate hydraulic motor/gear box combination to work in unison to provide calibrated flow range of material between 100 pounds pre lane mile to 800 pounds per lane mile. The opposite end of auger shall have greasable heavy duty flange bearings and shall be connected to the trucks on board grease system. There shall be a conveyor cover fabricated from 3/16 inch AR400 to cover the conveyor for normal dump body operation and shall be secured as to not allow material build up in the conveyor trough. The floor / conveyor shall be designed to not allow material to fall on chassis components. There shall be an anti flow plate located at the front discharge end of the trough to prevent flow by of material when conveyor is not running.

- I. GENERAL TRUCK SPECIFICATIONS: (Continued)
- E. DUMP BODY AND EQUIPMENT MANDATORY MINIMUM SPECIFICATIONS: (Continued)
 - 1. DUMP BODY STRUCTURE, STAINLESS STEEL: (Continued)

Spinner Assembly: There shall be an underbody center mounted hydraulically adjustable directional spinner to spread the material discharged from the floor conveyor. Spinner assembly shall be manufactured from 304 stainless steel. Spinner shall be adjustable to allow proper positioning under material chute. The spinner system shall be capable of being adjusted electronically in the cab to spread from 1 lane left, center, or right, 2 lanes left, center or right: or up to 3 lanes all at one time. Spinner discharge shall be hydraulically adjustable from left to right (180 degrees) from within the cab and be controlled by the central hydraulic system. Spinner discharge shall be controlled by a hydraulic cylinder and the rod shall be nitrated. Spinner assembly shall be easily removable for summer operations.

Material Chute: There shall be a 304 stainless steel material chute that is engineered to transfer winter materials from the floor auger conveyor to the spinner assembly. Chute shall be securely mounted under the bed auger opening, to pass to the driver's side allowing clearance of the chassis driveshaft and engineered as to not interfere with any driveline components under any load situation. Chute shall be engineered to not allow any material spillage.

Underbody Chassis Shield: There shall be an underbody chassis shield to protect the chassis components from winter materials being dispensed from the spinner assembly. Shield shall be engineered to deflect material toward the road surface. Shall be constructed of 304 stainless steel and be securely mounted to the chassis, but easily removable for summer operations.

Front Body Bulkhead: One-piece design fabricated from one-piece of minimum 3/16" 304 stainless steel, radiused and fully welded to the body sides, shall be 60 inches from top of conveyor to top front panel. Body front panel shall be completely clear of any type of recesses and or protrusions into the body area. There shall be a hoist mount on the front (cab side) of the front panel for the upper mount of the telescoping lift hoist.

Rear Corner Posts: Shall be constructed using 3/16" 304 stainless steel, both shall be full depth one-piece construction from the top of the tailgate to the bottom of the rear bolster and shall be free of holes. There shall be two-spreader chain holders on each rear corner post (top and bottom banjo style) fully welded. Final location to be determined at pre build meeting.

Cab Shield: One-half (1/2) cab shield constructed using 304 stainless steel with a 4" formed front face extending over the cab. There shall be a minimum of four (4) fully welded stainless steel braces that extend from the front lip of the cab shield back to the 4" channel at the rear of cab shield.

Tailgate: Double acting five-(5) panel tailgate shall be manufactured using 3/16" 304 stainless steel and shall be a minimum of 48" tall. All bracing shall be stainless steel. There shall be an inverted angle on top of the tailgate constructed using 1 1/2" stainless steel or approved equal dirt sheading design. There shall be two (2) "J" hooks welded to the tailgate as chain holders. There shall be two (2) 3/4" stainless steel round stock hand holds welded to the gate. There shall be four (4) tailgate chain brackets fully welded to the tailgate, two (2) on each side. The spreader chains shall be 3/8" and covered with black expandable braided sleeving monofilament. Tailgate latch pin shall be the full width of the body. Conspicuity required on the tailgate, Ref: EQN-76, EQN-122, EQN-81X.

Tailgate Hinges: Shall be steel construction severe duty attachment brackets with replaceable heavy-duty bushings and grease able fittings. Both hinge pins shall be a minimum of 1.25" with a tapered end and sufficient length for easy removal. Both pins shall be chained to body and of non-rotating design. Ref: EQN-76

Wheel Chocks: There shall be a pair of wheel chocks with holder/s (location of holder to be determined at the pre-build meeting) As per EQN-82.

- I. GENERAL TRUCK SPECIFICATIONS: (Continued)
- E. DUMP BODY AND EQUIPMENT MANDATORY MINIMUM SPECIFICATIONS: (Continued)
- 1. DUMP BODY STRUCTURE, STAINLESS STEEL: (Continued)

Tailgate Latches: Shall be stainless steel construction and grease able. Air operated tailgate shall be a spring-over-air system and fail in closed position. The actuator shall be an AIRman Tailgater B300-259-H5. **(No substitute, standardization)**. Latch mechanism shall be operated via an in cab dash mounted pneumatic switch; (under dash mounted switches are unacceptable). Shall be dual linkage design, with a greasable cross over shaft. All air piping and connections must be D.O.T. approved, with minimum .25" nylon tubing and brass compression fittings. **Note:** **Tailgate hinge and latch design shall be approved prior to build.** Ref: EQN-78A

Top Grate: There shall be a top grate covering the entire top of the bed area. Grate shall be severe duty to withstand salt, anti-skid or any combination of materials being loaded into bed. Grate shall be constructed from a minimum of 3/8" steel rod welded together to form 2 1/2" squares, plus or minus 1/2". Grate shall have a non-freezable hinge point that runs front to rear. Top grates shall be a minimum of four sections. The entire top grate shall be removable in one piece and shall incorporate balanced lift points for removal. Grate shall be properly prepared and powder coated black. Grate shall be designed to work in conjunction with installed tarp system. The grates shall incorporate a safety lock system to prevent easy access to bed area. Safety lock system shall disable floor augers, bed operation shall remain operable. Design of safety lock system shall be approved by the Fleet Management Division prior to construction.

Tailgate Material Chute: Tailgate shall have one material chute constructed using 1/4" 304 stainless steel, to include the door, handle and ears. Welded ears on the chute door shall be made using 3/8" 304 stainless steel. There shall be two adjustable linkages per door, with an adjustable locking mechanism, and a stainless steel handle. The material door lower corners shall be cut on a 45-degree angle to allow easy cleaning. Ref: EQN-76.

Hoist Cylinder: Hoist cylinder shall be capable of the speed requirements in the Central Hydraulics section of this specification. Cylinder shall be a minimum 5 inch diameter, Class 60. Cylinder shall incorporate a metal identification tag with the manufacturers model number, serial number and manufacturers address.

Hoist Cylinder Mounting: The hoist cylinder shall be mounted to an upper & lower heavy-duty hoist mount with minimum 2" diameter pins and 2.125" x 1/2" greasable wall bushings shall be used. Note: the base shall be fabricated (no bolt together or cast mounts). There shall be a remote grease hose and fitting to all cylinder grease points. Location of fitting to be determined at prebuild meeting.

Hitch Assembly: Pintle plate shall be made using 3/4 inch steel. It shall be inserted within the frame rails, directly in front of the rear light module, with sufficient clearance for body dump pin. It shall extend the full width of frame rails and extend a maximum of 5 inches below the frame rails. The lower portion of the plate shall be channeled towards the front of the vehicle, with proper gussets added between frame rails and plate. There shall be two (2) safety chain hooks mounted to the plate. Ref: EQN-81X.

Pintle Hook: There shall be one of the following manufacturer's 25-ton pintle hooks with spring loading, swivel design mounted to the hitch assembly, Holland PH760, Buyers BP760A, Wallace Forge. Pintle hook mounted as Ref: EQN-81X.

- I. GENERAL TRUCK SPECIFICATIONS: (Continued)
- E. DUMP BODY AND EQUIPMENT MANDATORY MINIMUM SPECIFICATIONS: (Continued)
 - 1. DUMP BODY STRUCTURE, STAINLESS STEEL: (Continued)

Rear Light Module: There shall be a rear light module containing the following components:

- (1) One grommet mounted back-up alarm, Ecco model 450. **(No substitute, standardization).**
- (1) One license plate lamp, Trucklite Model 36140C.
- (1) One 7-way female electrical trailer plug connection. (Ref EQN:80A)
- (1) One 3-lamp cluster.
- (2) License plate mounting holes, with stainless steel hardware included.

All lamps shall be LED. Module construction shall be a minimum ¼-inch thick aluminum or stainless steel and shall be fully enclosed to eliminate material entering housing. It shall be a one-piece design that bolts between the chassis frame rails, minimum of (4) bolts. All electrical connections shall be made within the sealed module and powered through the original chassis harness, with a compression fitting used at the wire pass-through location. All electrical connections shall be coated with di-electric grease. Component placement on the module as per EQN: 81X.

Body Lighting System: Whelan model # PADOTSY1. Whelan control panel shall be mounted within the cab with easy accessibility. Ref: EQN-81X.

Chain Boxes: Shall be aluminum with safety grating overlaid. There shall be a minimum of four (4) ¾" drain holes in the box floors. Final position of these boxes to be behind the swept back front bumper and outboard of the frame channels. Note: two (2) boxes with no wing, one (1) with left or right wing, zero (0) with dual wing applications. Ref: EQN-32

Splash Guards: Both front and rear splashguard assemblies shall be stainless steel and properly braced. Ref: EQN-66.

Rear: Stainless steel splashguards shall be attached to the dump body on each side, behind the rear-most dual wheel, and extend downward to accommodate a 30-inch or 36-inch flap in order to meet Pennsylvania State Inspection Requirements. Mud flap sizes permitted are 30 inch or 36 inch. **(No substitute, standardization)**. The rubber splashguards shall be bolted to these metal splashguards using self-locking nuts and metal strips. Flaps shall meet Federal Regulation of 22 degree. Flaps shall be heavy duty anti sail/anti spray and be razor split.

Front: The forward splashguards shall be stainless steel and extend downward ¾ of the length of the rear splash guard/mud flap, with a ¼" length, unmarked mud flap attached for the remaining distance. Forward splashguard shall have a 1-inch lip for entire length-outside extremity (90 degree) with bottom outside corner rounded and have rolled edges. Splashguards shall be full length and width with no holes cut in it to accommodate salt lights.

Spray Suppression: Spray suppression shall be installed full length between front and rear splashguards (both sides). It shall be bolted/screwed to the body. Ref: EQN-76, sheet 1.

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

E. DUMP BODY AND EQUIPMENT MANDATORY MINIMUM SPECIFICATIONS: (Continued)

1. DUMP BODY STRUCTURE, STAINLESS STEEL: (Continued)

Pre-wet: Twin 75 gallon minimum poly tanks and plumbing kit with stainless steel tank enclosure and mounting hardware. Pre-wet tanks shall be securely mounted inside of the integral body side fenders one tank per side. Pre-wet tanks shall empty simultaneously from each tank. Final mounting location shall be determined at pre-build meeting. Pre-wet liquid supply line shall be plumbed to and installed to the spinner assembly. Tank fill shall be at ground level utilizing a two inch male cam lock fitting with dust cap. Prewet pump shall be an Oberdorfer part # 25-N4000-RS3-02, Pump shall be drive hydraulically via a love joy connection. Hydraulic motor / pump assembly shall be housed in a NEMA enclosure large enough to facilitate servicing of unit, an electronic flow meter shall be installed to properly calibrate prewet. There shall be a low level switch to automatically shut down the prewet motor when empty and an indicator to the operator shall be supplied. Location of prewet enclosure to be determined at prebuild meeting. Prewet pump shall have a flushing system utilizing a common garden hose. Each tank shall include a vent tube mounted at the highest most point of the tank and shall have a non-collapsing hose plumbed (P type clamps shall secure hose at 12 inch intervals) to below the frame rail of the truck. All hose connections shall utilize appropriate sized worm type hose (screw) clamps.

Ladder: Shall be equipped with a fold down type ladder to gain access to bed area. Steps shall have a serrated edge, Ref; Bustin. Handrails shall be coated with non-skid paint (non-skid tape is not acceptable).

Tarp: Shall be equipped with a tarp that is resistant to black top.

Tarp Spool: Shall have a one piece aluminum wind deflector, this can be integrated into the body. It shall include an extruded aluminum roll pipe. Extrusion shall have a steel stub shaft to connect it to a grease able bearing on the idler end of the roll pipe. The steel stub shaft shall be corrosion resistant.

Gear Motor: Shall be a 12 volt Electric Gear Motor designed to operate at fewer than 35 amps. Gear case to be chrome plated. Gear case output shaft shall be corrosion resistant. Gear motor to have a minimum of a 3 year non-prorated limited warranty against wear out and manufacturing defects. Power supply from chassis to bed shall be made through a spring loaded contact plate mounted between the bed rail and chassis rail. All wiring shall be protected from corrosion.

Controls: System to be operated by a low voltage in cab switch - relay and all high voltage wires to be kept outside the cab of the truck. For safety there is to be a circuit breaker mounted at the power supply in the tarp system circuit.

Power supply from chassis to bed shall be made through a spring loaded contact plate mounted between the bed rail and the chassis frame rail. All wiring shall be protected from corrosion and water tight.

Pivots: Shall be mounted on the flat face of the shedder rail. Pivots shall contain coated spiral torsion spring or coated double helix spiral spring. The spring must have the ability to be pre-loaded with tension. Pivot arms shall be American made aluminum extrusion

Bow Set: Shall be a 3 piece aluminum straight arm extrusion set. Arms shall connect to the pivots in a telescopic fashion. Shall provide the following for varying truck configurations:

- 30° or 45° offset elbows.
- Shall be equipped with tension bow.

Tarp: The tarp material shall be fabric suitable for covering asphalt. Material to be able to handle heat up to 400 degrees. Tarp to have 18" Rear Corner reinforcements.

Shall be equipped with the following:

- 12" Side Flaps
- 12" Tail Flap
- Full Flap Length Shock Cords (for tie down purposes)

Ref: Roll Rite, Aero.

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

E. DUMP BODY AND EQUIPMENT MANDATORY MINIMUM SPECIFICATIONS: (Continued)

2. CENTRAL HYDRAULIC CONTROL:

Hydraulic Control Approved Manufacturer's:
Component Technology Freedom ACS.
Cirrus Spreadsmart.

Intent: The purpose of these specifications is to describe a conventional cab, single-rear axle dump truck, equipped with dual rear wheels, 11 foot dump body, 7 cubic yard (approximate load capacity without side-boards) 304 stainless steel body of a radius design, dual auger, front discharge, under-body center mounted hydraulically adjustable directional spinner, hoist, hydraulic power system and snow plow hitch. The radius design shall provide consistent flow of materials to the dual auger without the need to raise the bed. Truck will be operated at up to an 18 percent grade. It shall be capable of one-man operation while plowing snow and simultaneously spreading granular and liquid materials during winter operations (without the need to raise the bed), and of hauling, stockpiling and unloading maintenance materials into a chip spreader or paver during summer operations. Further, it shall be capable of being loaded with a front-end loader or self-propelled belt loader.

Intent/Installation Practices: The pressure compensated, load sensing central hydraulic system shall operate all functions (plows, dump body, dual auger spreader conveyor, hydraulically adjustable directional spinner, and pre-wet circuits) from an electric/hydraulic system independently and simultaneously, without interruption of any other hydraulic functions.

All controls and components shall be of the latest design and installed to provide simple and convenient operation.

All system operations shall be achieved from a single pump matching all required flow and pressure demands.

Hydraulic tool operation shall be included through both spreader circuits and will not require any type of cooling.

This system shall provide the most fuel efficient, safest, simplest and consistent operation possible.

All hydraulic components shall be installed and serviced by a single manufacturer.

Full responsibility for a serviceable system lies with the successful bidder.

All wiring shall be securely clamped at approximately 12 inch intervals, shielded from exhaust and include a protective sleeve where necessary to prevent damage and/or failure.

Upon start up, the hydraulic system shall be operated at maximum flow for not less than 15 minutes and then have a new hydraulic filter installed on the truck.

It shall be the sole responsibility of the successful truck manufacturer and hydraulic control manufacturer to ensure that the chassis and the ground speed control wiring harness is totally compatible.

NOTE: There shall be a hydraulic lock out to the Floor Conveyor Augers and the Front Auger Cross Conveyor when any of the following conditions exist. 1. Whenever the bed is raised. 2. The tailgate is unlatched to open. 3. Top Grate is opened or removed.

System Operation: The system shall communicate over a CAN Open system bus using CAN Open protocol and not a proprietary communication protocol. The system shall consist of four primary modules that reside on the Bus and allow flexibility in mounting configurations. The system shall be expandable and allow for additional modules to be added to the CAN Bus. All four primary components of the system shall be software upgradeable using a laptop and interface cable. The configuration file of a calibrated system shall be saved for transfer to other systems or as a backup providing the ability to use specific configurations for varying vehicle use or operator skill level. The original configuration file shall be maintained at the factory as a secondary backup and is traceable by part number. The in-cab control system panel shall be contained in an enclosure and mounted in an easily accessed position in the cab.

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

E. DUMP BODY AND EQUIPMENT MANDATORY MINIMUM SPECIFICATIONS: (Continued)

2. CENTRAL HYDRAULIC CONTROL: (Continued)

Control System Requirements: Central hydraulic system shall be capable of the following requirements in their entirety.

- All functions shall be recorded and time stamped, to include capturing all error messages.
- System shall allow data to be downloaded in a common format (Excel).
- System shall be ground speed controlled and shall respond at one MPH.
- System shall have multiple level security and be individually password protected; Administrator, Technician and Operator.
- System shall be calibratable to various pounds per lane mile.
- System shall capture and store storm totals by event (Event Log).
- System shall capture and store annual storm totals.
- Stored data shall be capable of being cleared at various levels of password protection.
- System shall be programmable to a minimum of six material types.
- Materials shall be programmable to various weights.
- System shall have a feeder (Auger) sensor, and capability of turning the sensor on or off.
- System shall have a directional spinner location sensor that is programmable to various settings and will control and display spinner direction in the cab.
- System shall have a gate control sensor that is programmable to various settings.
- Each unit shall be capable of having an individualized seven digit equipment number stored for identification purposes.
- System shall have a programmable prewet maximum / minimum settings at one gallon increments and capable of being set to various gallons per ton of dry material.
- System shall be capable of working in conjunction with the following products;
 - Wojanis hydraulic plow balance valve.
 - Roadwatch road temperature sensor.
 - Vasila road temperature sensor.
 - Prewet flow meter.
- System shall have a manual override in the event of sensor failures.
- Shall be capable of operating when truck is moving in forward and reverse directions.
- Each hydraulic valve section shall have individual overrides located at each valve section.
- No tools shall be required to calibrate the system.
- Shall be equipped with a pause button to disable the system momentarily.
- Shall be equipped with a blast button to allow full calibrated material to be dispensed.

Console Assembly: Shall be ergonomically designed for easy accessibility for operator from the driver's seat. Assembly shall be secured to the floor of truck as to not interfere with any original truck manufacture equipment. Assembly shall be properly braced as to not allow any excessive movement that could be detrimental to the integrity of the floor or mounting location. Console shall have a padded arm rest and be adjustable to accommodate various operators. Console shall not come in contact with the driver's seat. Console shall be capable of housing all hydraulic controls and switches. Console base shall be of steel construction conforming to drawing EQN-509 or prior approved equal. Base shall include an adjustable bracket for mounting of state radio. Ref: EQN-509.

- I. GENERAL TRUCK SPECIFICATIONS: (Continued)
- E. DUMP BODY AND EQUIPMENT MANDATORY MINIMUM SPECIFICATIONS: (Continued)
2. CENTRAL HYDRAULIC CONTROL: (Continued)

Display: The display shall be manufacturer's latest design and largest available screen, with an auto dimming backlight, user adjustable position. The display shall automatically resize to provide maximum readability with varying display content including a status window that provides the operator with system status messages. The display shall incorporate "soft key" switches that are defined by the system program via the display. The keys shall include a "plus" pattern navigation buttons used to navigate in the system software easily. When configured, the display shall incorporate granular rates, pre-wet rates, directional spinner position, road/air temperature, hydraulic pressure where designated, system status, error messages, plow float indication, auto/manual mode indication and material currently being used. Active functions that are not in use shall show "off" and the graphic be "grayed out" for ease of operator interpretation.

Software: The system shall incorporate three levels of security and access that is password protected and defined by the user. The three levels of access called operator, technician and administrator shall give the user varying levels of access to system setup, data configuration fields and parameters based upon access given. The "administrator" shall have full access to all menus in the system and have the ability to make system configuration changes as well as system parameter changes. Spreader and liquid functions, when controlled utilizing closed loop feedback, shall incorporate an "auto trim" feature that will allow the system to automatically set the PWM minimums and maximums when engaged. The system shall have "over speed" protection for the liquid functions that will alert the operator and shut down the liquid function when the driver has exceeded a user defined speed. The software shall incorporate a "test speed" mode for use in testing the system safely without requiring the truck to be moving or the drive axles engaged.

Control Console: The control console shall contain two individual joysticks to control hydraulic functions. Body hoist stick shall contain an interlock button to protect against unintended operation. The plow stick shall be a two axis joystick. All joystick functions shall be protected by a software based safety system to protect against unintended operation due to a joystick failure. The console shall contain the operator interface for the spreader control, joysticks, low oil override switch, plow balance control switch, wing float control switches, and a body up indicator light. All controls shall be securely attached, within easy reach of operator and console mounted. All controls shall be connected to the valve/s via an electronic cable and utilize CAN network communications. Console base shall be of steel construction conforming to drawing EQN-509. Base shall include an adjustable bracket for mounting of state radio. Ref: EQN-509. Base shall be properly braced to eliminate floor flex. Unit shall be capable of adjustment vertically and horizontally to allow for comfortable positioning for the operator.

Wire Harness Kit: All wiring for the kit shall be included and be TPE type wiring only to the following specification: Wiring and harness system shall meet ISO rating IP68 and NEMA 6. The connectors shall be zinc die cast E-coated, similar to a MIL spec connector. Each shall have three sealing points- the lock ring itself, a raised portion of the molded plastic around each pin, and a viton O-ring that seals the entire connector. The cable jacket shall be TPE- thermoplastic elastomer, and molded to the connectors. Connectors and harness shall be rated and tested for a temperature range from - 30C to + 70C. Connectors shall be tested to be water tight when submerged in 6' of water for 24 hours, in 275' of water for 1 hour, and when subjected to a 1000-psi pressure wash. The connectors shall be designed to have NO corrosion after 500 hours in a 35C salt spray. Cabling shall be rated excellent in low temperature flexibility and in its resistance to oxidation, heat, oil, weather, sun, ozone, abrasion, electrical priorities, flame, water, acid, alkali, gasoline, benzol, toluol, degreaser solvents, alcohol, and weld slag.

- I. GENERAL TRUCK SPECIFICATIONS: (Continued)
- E. DUMP BODY AND EQUIPMENT MANDATORY MINIMUM SPECIFICATIONS: (Continued)
- 2. CENTRAL HYDRAULIC SYSTEM/HYDRAULICS: (Continued)

Combination Tank/Valve Enclosure: Combination tank/valve enclosure shall be frame mounted, in a location not to interfere with body, wing plow or exhaust components. Final mounting location shall be determined at pre-build meeting. Unit shall be constructed of ten gauge 304 stainless steel. The oil reservoir portion shall not be less than 40 GAL capacity, filled with ISO 32AW hydraulic oil and a baffle plate to prevent oil flow from venting directly to suction port. Tapered outlet shall be below oil level at all times to prevent air entrapment. A magnetic drain plug shall be installed into reservoir. Tank shall be clearly labeled “**HYDRAULIC FLUID ONLY**”. Lockable tank filler cap assembly, model 57XL-40 (40 micron with chain) L.C. as manufactured by Lenz. Tel: (937) 277-9364. An oil level sight gauge/thermometer shall be provided on the reservoir. A suction strainer shall be installed in the suction port of the tank. There shall be a provision for a low oil float to be installed. Low level float shall thread into the side of the assembly and shall have an M12 connector. The valve portion must be of weather-tight design and utilize a gasket to seal the lid to the body of the unit. Lid shall be retained by two rubber fasteners. Handles (two) shall be welded to the lid and constructed of stainless steel. A mounting location for the hydraulic control system module(s) shall be provided as part of the enclosure design. Stainless steel shields to protect exterior wiring shall be provided. The valve shall be installed in the enclosure by the hydraulic system supplier and pre-plumbed to the outside of the enclosure through the use of bulkhead style fittings. No hoses shall enter the weather-tight area of the enclosure. Valve to be pre-wired inside the enclosure and **di-electric grease** shall be applied to all connections as required. Return oil flow shall be through the reservoir mounted filter assembly. Return filter shall be provided as part of the tank/valve enclosure assembly. It shall be rated @10 micron. There shall be a pressure switch with boot to activate a warning message on the control system screen. Cab mounted filter contamination indicator set at 23 PSI. Return filter housing shall have provisions for a service filter switch; connection shall be made via an M12 connector. Suction line/strainer shall have be 125 micron with 3 PSI bypass rated above 47gpm submerged at all times. Shall have a ¼ turn, 2.5 inch full flow ball valve in the suction line as close to the tank as possible Strainer integral mounted in a 4 inch NPT female opening in the bottom of reservoir with a 3” female NPT opening. There shall be a 5600 series complete quick coupler (with dust cover) located in the pressure line entering the main valve assembly located inside the valve enclosure. Quick disconnect shall be bracket mounted to the inside of the enclosure, easily accessible so that a shop pressure gauge (not to be installed or included) maybe easily visible for test purposes. Final location shall be determined at the pre-build meeting. REF: EQN – 508. Wire harness covers shall be installed on the enclosure to protect the wiring harness where it enters/exits the modules.

- I. GENERAL TRUCK SPECIFICATIONS: (Continued)
- E. DUMP BODY AND EQUIPMENT MANDATORY MINIMUM SPECIFICATIONS: (Continued)
- 2. CENTRAL HYDRAULIC SYSTEM/HYDRAULICS: (Continued)

Directional control valve: The hydraulic control valve shall be a Sauer Danfoss PVG32 with aluminum manifold to control spinner and prewet functions. (One Manual control lever is to be supplied per unit to control manual override of valve.)

Sections shall be provided as follows: (non wing)

Body hoist – PVG 32 Turbo Spool (34 GPM) section, double acting with 1500 psi down relief and 2000 psi up relief.

Plow raise/lower, double acting.

Plow angle, double acting, motor spool.

Dual auger floor conveyor, double acting, motor spool.

Return manifold: There shall be a return line manifold mounted on the chassis, location to be determined at the pre-build meeting. Ref: EQN – 23. Return manifold shall be an 8 port header block with 8 # 16 SAE openings and 2 #24 SAE openings at each end. Header shall be an Alamo, Damon or Hycoa or equal.

There shall be a 3 port valve block to control spinner, auger, and pre-wet as part of the main valve assembly. There shall be two (2) return lines from the control valve to the return manifold.

Body Limit Switch: Switch shall inform the operator by an illuminated dash-mounted or console mounted light. An audible alarm (Steady Buzzer) (Ref: Floyd Bell part # TMC-V86-948-Q or prior approved equal) shall be installed. Switch shall be set at 49 degrees +/- 1-degree dump angle to alert the operator and prevent the hoist cylinder from going full stroke. Switch shall be mounted in an accessible area of the body located away from road splash. Ref: Scott Electric (Siemines) switch – SIA3SEO3-AR1 and lever SIA3X03-KL200. Note: shall be mechanical, Mercury type switches are unacceptable.

Body-up Alarm System: There shall be a body-up alarm (Chime) (Ref: Floyd Bell part # TCH-V86-530-QM or prior approved equal) system to alert the operator of the body being in the raised position. Warning shall include a dash mounted warning light with audible alarm. Alarm and light shall function as soon as the body is raised from the rested position. All wiring shall be routed to prevent damage from heat, sharp edges and moving parts. Switch shall be mounted within the hoist cradle assembly. Note: shall be mechanical, Mercury type switches are unacceptable.

Hydraulic Pump: Rexroth Part Number R910979162, Model A10V0100 LH rotation: KEYED Crankshaft Driven, **(No substitute, standardization)**. Pump shall include a low oil shut down with console-mounted override switch. Shutdown shall be direct mounted to the pump. Remote mounted valve will be unacceptable. Valve shall be a normally closed, energize to open cartridge valve. Valve shall be controlled by the hydraulic control system. The pump shall match system flow and pressure (horsepower) requirements to provide maximum fuel economy. Ref: EQN-90. An unloader or by-pass system is not an acceptable means of regulating excess oil flow.

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

E. DUMP BODY AND EQUIPMENT MANDATORY MINIMUM SPECIFICATIONS:

2. CENTRAL HYDRAULIC SYSTEM/HYDRAULICS:

Pump Mounting Bracket: Regardless of design the bracket shall be a minimum of 5/8" formed steel channel. The pump bracket shall be sloped to match the engine crankshaft. Width dimensions shall be full frame rail width. Bracketry to attach pump-mounting bracket to the truck frame rails shall be a minimum of 5/8" thickness. Brackets shall either be fully welded or use 3/4" grade 8 (eight) bolts of sufficient length and grade 8 (eight) locknuts, minimum of four (4) bolts per mounting side. Ref: EQN-90.

Hydraulic Pump Driveline: Hydraulic pump SHALL BE DRIVEN by a Spicer 1310 series or NEAPCO factory balanced drive shaft. Driveline shall be capable of 130-foot pounds of torque and have a tubular shaft of 1141 steel. Tubular shaft shall have 16-spline heat treated to 40 Rockwell hardness. A groove shall be machined the length of the shaft to provide proper phasing of universal joints at time of shaft assembly. Driveline installation shall be in accordance to manufacturer's recommended procedures. Slip assembly shall provide a minimum of 2.25 inch of travel to allow ease of engine drive belt replacement. The truck engine radiator and frame construction shall readily accommodate the installation of a front mounted crankshaft driven hydraulic pump. The engine crankshaft pulley or vibration damper shall be drilled and tapped to accommodate a power take off drive shaft adapter plate required under hydraulic system section of these specifications. Loc-tite shall be used for the installation of all mounting bolts. Ref: EQN-90.

Hydraulic Hose: All hoses and hose ends shall be matched and assembled on a hose machine to prevent hose failure. All hydraulic plumbing practices shall conform to JIC H11 standards. Pressure hoses shall be 100R2, return lines shall be 100R1, and suction lines shall be 100R4. Velocity in pressure lines shall not exceed twenty (20) feet per second, return lines not to exceed ten (10) feet per second, and not to exceed four (4) feet per second in suction lines. All hoses shall include JIC female swivel ends with the exception of the suction line. All hydraulic components shall have SAE porting wherever possible. All hydraulic hoses shall be securely clamped at approximately 18 inch intervals, shielded from exhaust and include a protective sleeve where necessary to prevent damage and/or failure. All hoses shall have JIC swivel connections at each end and be located in such a manner to aid in easy component replacement.
Ref: EQN-94.

Bed Speed requirements:

Bed speed shall be tested at 1500 rpm at normal operating temperature.
Bed speed full up shall be 17 seconds maximum.
Bed speed full down shall be 13 seconds maximum.

- I. GENERAL TRUCK SPECIFICATIONS: (Continued)
- E. DUMP BODY AND EQUIPMENT MANDATORY MINIMUM SPECIFICATIONS:
- 2. CENTRAL HYDRAULIC SYSTEM/HYDRAULICS: (Continued)

Hydraulic Alarm and Shutdown System: There shall be a low hydraulic oil alarm system to alert the operator of a low hydraulic oil situation and allow ample time to take preventative action and avoid damage to the central hydraulic system pump. It shall be operated via a 12 volt system. All wiring shall be routed to prevent damage from heat, sharp edges and moving parts. An in-tank float switch shall be mounted to provide a signal to the control system. The on screen message and audible alarm shall come on whenever the oil level drops below a safe reserve, and the pump mounted low oil shutdown manifold shall deactivate to prevent pump damage. A console mounted low-oil override switch shall be provided to allow momentary operation in an emergency.

All electronics associated with the hydraulic system shall be protected against and shall not cause interference to the operation of the vehicle or the land mobile radio communications system when properly installed in the vehicle.

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

F. GENERAL PLOW MOUNTING/ACCESSORIES:

Front Plow Hitch: Side-mounting plates shall be constructed using $\frac{3}{4}$ " Steel. Lower plow mount bracket center shall be 14" to 16" from ground (both sides). Trucks that do not have a wing, "X" braces shall be installed using .31" wall 2" x 2" steel tubing. There shall be a minimum of five (5) $\frac{7}{8}$ " grade eight (8) bolts per side with washers and lock nuts to mount the plow frame to the truck frame. Lift height shall be sufficient to afford unrestricted lift for PennDOT plows, (16" minimum lift). Side strengthening bars (two per side) shall be fabricated using $\frac{3}{4}$ " steel, 16" long by 2" wide and mounted to the external side of the plow hitch. All grease zerks shall be surrounded by a short length of pipe (welded in place) or be in a recessed hole. The zerks for the plow arm bushings shall be mounted on the underside of the bracket. Ref: EQN-50.

The hydraulic connections on the plow hoist cylinder shall be positioned as to keep them from being stuck and damaged, while connecting or disconnecting the front plow. All other hydraulic connections mounted to the plow frame shall also be positioned to keep them from damage.

Plow Saver: There shall be a Wojanis part number WSC-072-4-00 plow saver device installed. **(No substitute, standardization)**. Plow saver shall have the following specifications:

Valve to be designed to offset a specific (adjustable) plow weight when activated. Valve to be of cartridge and manifold design, and electrically activated. The valve shall be activated by a single solenoid.

The plow balance system shall not alter the operation of any other hydraulic function on the vehicle or have an adverse effect on the performance of other hydraulically operated equipment including wing plow, body hoist, plow hoist or angle, or spreader functions. All normal operations of the plow lift/lower function must be maintained without additional tasks. Operation of any electrical switches beyond the normal up/down command to raise or lower the plow shall not be acceptable. The use of a relay circuit to allow the plow to remain in the up position shall not be acceptable.

To guarantee safe operation of the vehicle, the plow balance system must operate with the following parameters: The system will remain electrically activated when lifting the plow from the road surface. Plow lift must be immediate. It is not necessary to turn off the system for plow lift. Plow lowering and return to balance mode must be done by activating the plow lever or switch to the lower mode.

The plow balance system must be able to hold the plow in the up position indefinitely.

The plow balance manifold shall be of cartridge style valving utilizing "floating" style cartridge valves. The valve body must be constructed of aluminum and have minimum construction hole plugs. All solenoid valve coils shall have manual override capabilities. Manifold must include a pressure test point for use when checking balance pressures. The pressure test point must be capable of tapping into the system at pressures of up to 5000 PSI.

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

G. INSTALLATION PRACTICES:

Any place steel and aluminum contact each other Mylar or an approved equal shall be used as a buffer. Laminate rubber is unacceptable.

All welding shall be in accordance with standard welding practices as set forth by the American Welding Society.

All vertical and horizontal seams of the body sides shall be continuous welds with full penetration.

All corners shall be angled or rounded for safety.

All mounting procedures shall be in accordance with NTEA standards.

All hydraulic circuits shall be tested for proper operation and flow. Control systems shall be tested/calibrated and programmed for Department material spread rates prior to delivery. Material spread rates will be disclosed at the pre-build meeting.

All electrical connections shall be treated with di-electric grease.

All electrical wiring and harnesses shall have an engineered strain relief system designed to eliminate stress on electrical connections, harnesses, control modules and any other associated electrical system components.

Each electrical circuit shall be supplied individually and properly sized, protected from weather and sealed to be watertight.

The use of any of the following items or practices WILL NOT BE ACCEPTED.

The use of accumulators or auxiliary pumps.

Non-steel fittings or piping on hydraulic pressure lines.

Excessive use of elbows on hydraulic lines.

Use of thread tape on hydraulic fittings.

Use of galvanized fittings or components on hydraulic system.

Improper hydraulic line size.

Use of high-pressure hose for hydraulic suction line.

Scotchlok-type wire splices.

Non-insulated wire splices.

Improper hose or wire routing near exhaust, over-sharp edges or through holes without grommets, or sharp edges.

Improperly prepared, primed and painted surfaces.

Non-fused electric circuits.

Hydraulic circuits without pressure relief protection.

Laminated Rubber

All zerk fittings shall be threaded.

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

H. SAFETY:

All entry points and egress points shall have three points of contact.

All necessary placards shall be included with the truck insert to include personnel safety hazard warning.

Handrails shall be coated with non-skid paint (non-skid tape is unacceptable).

All entrance steps shall be Bustin No. NST4 full size, or Ohio Gating No. JA2I19SG4 serrated or IKG Industries Type BS4 serrated swage lock, with end band for aluminum body.

Compliance shall be made per EQN-118.

Cab and body shall have reflective enhancement per EQN-122 and 127A.

Emergency triangle warning kit, with hold down. Warning Triangle Flare Kit, Ref: KD 610-4645, KD Lamp Co. (Tel: (513) 621-4211) or equal, stowed (fastened) in the cab. Ref: EQN-66A

Fire extinguisher: Rechargeable with vehicle mount, 3A: 40B: C minimum. Mounted in the cab for easy and quick access.

There shall be a permanent decal, 2 inch high red letters on white background affixed by the driver side door handle stating the overall maximum height of the completed and unloaded unit.

Example: HT-__' __" Ref: EQN-552

II. DRAWINGS:

EQN-23	dated	Rev.	11-03-09	1 sheet	RETURN MANIFOLD
EQN-32	dated	Rev.	07-17-07	1 sheet	DUMP TRUCK CHAIN BOXES
EQN-50	dated	Rev.	06-10-13	4 sheets	FRONT PLOW HITCH ASSEMBLY
EQN-62	dated	Rev.	07-02-12	2 sheets	BED PROP SYSTEM DUMP TRUCK
EQN-66	dated	Rev.	07-20-09	2 sheets	SPLASH GUARDS – RUBBER
EQN-66A	dated	Rev.	07-20-09	1 sheet	TRIANGLE STORAGE BOX
EQN-76	dated	Rev.	07-25-12	sheets 1,5,6,7	SINGLE AXLE DUMP BODY
EQN-78	dated	Rev.	10-27-06	1 sheet	CB RADIO CONNECTIONS
EQN-78A	dated	Rev.	05-30-13	3 sheets	AIR TAILGATE, HARDWARE
EQN-80A	dated	Rev.	11-12-09	1 sheet	7-WAY CONNECTOR
EQN-81X	dated	Rev.	05-20-13	2 sheets	TYPE IV REAR MODULE
EQN-82	dated	Rev.	09-28-11	1 sheet	CHOCK AND HOLDER
EQN-90	dated	Rev.	07-20-09	2 sheets	PUMP ASSEMBLY
EQN-94	dated	Rev.	04-18-13	2 sheets	HOSE AND CLAMP HYCON
EQN-118	dated	Rev.	06-26-09	1 sheet	UNDERRIDE PROTECTION
EQN-122	dated	Rev.	05-20-13	2 sheets	DUMP BODY REFLECTIVE SHEETING
EQN-124	dated		10-27-09	1 sheet	AUXILARY SNOW PLOW LIGHT
EQN-127A	dated	Rev.	01-02-09	1 sheet	CONSPICUITY TAPE STRIPING
EQN-351A	dated	Rev.	06-19-13	2 sheets	FAST LUBE OIL CHANGE SYSTEM
EQN-501	dated		06-08-09	2 sheets	CENTRALIZED LUBE SYSTEM
EQN-507B	dated	Rev.	07-20-09	1 sheet	CONVENTIONAL DUMP TRUCK WEIGHT DISTRIBUTION DATA
EQN-508	dated		11-03-09	1 sheet	VALVE ENCLOSURE/TANK COMBO
EQN-509	dated		11-03-09	1 sheet	SPREADER CONTROL BASE
EQN-552	dated		05-29-13	1 sheet	MAX TRAVEL HEIGHT STICKER

NOTE: Drawings appear in SAE.

The above referenced drawings shall become part of these specifications.

These drawings reflect the intent of the Department and any discrepancies shall be resolved at the pre-build meeting between the vendor and the Chief of the Equipment Division.

DRAWINGS APPEAR AT THE END OF THE SPECIFICATIONS.

III. MANUALS:

The successful vendor shall furnish all applicable manuals per unit:

- 1 Operator's
- 1 Parts
- 1 Service
- 1 Engine
- 1 Transmission (Automatic)
- 1 Body and Sub-frame (Parts and Service)
- 1 Complete set of manuals for any additional items/equipment added to a piece of equipment.
- 1 Electrical System Charts
- 1 Control System/Hydraulic and Electrical System Schematics
- 1 Lube System Grease/Electrical Schematics

The manuals listed above shall be official O.E.M. publications supplemented with technical manuals for all components as published by sub-vendors/manufacturers.

Parts Manual presented must be relative to "all" items utilized to build these units, with appropriate part numbers.

Delivery of these manuals shall be completed with delivery of each unit.

Manuals may be supplied on CD Disc in lieu of paper manuals.

Manuals may be supplied on a dedicated website in lieu of paper manuals.

IV. TRAINING:

See training information attachment in the bid package.

V. WARRANTY:

Per PCID No. 1075 Section E.1., and the additional specific warranty items stated below.

This warranty is in effect as follows, starting from date of acceptance by the Department. Warranty shall not be voided due to Department operation as explained in the Intent Statement. It is understood that the components specified are minimum and if the manufacturer's Engineering Department recommends or deems necessary a more robust component, other than specified, be installed to meet the vehicles intent statement and to not void the warranty, it shall be the bidders/vendors responsibility.

NOTE: WARRANTY REPAIRS SHALL BE COMPLETED AT THE MANUFACTURER'S LOCATION OR IN-HOUSE FIELD REPAIR COMPLETED BY PENNDOT. IT SHALL BE THE DEPARTMENTS DISCRETION TO REPAIR INTERNALLY OR TRANSPORT THE UNIT TO THE DEALERSHIP. THE MANUFACTURER SHALL REIMBURSE THE DEPARTMENT AT THE MANUFACTURERS STANDARD PUBLISHED IN-HOUSE LABOR RATE. THE LABOR RATE SHALL BE MUTUALLY AGREED UPON BETWEEN THE DEPARTMENT AND VENDOR/BIDDER. ALL IN-HOUSE WARRANTY DOCUMENTATION SHALL BE DELIVERED WITH THE PILOT MODEL. ALL WARRANTY DOCUMENTATION SHALL BE DELIVERED WITH THE PILOT MODEL.

BUMPER-TO-BUMPER WARRANTY:

1 year starting from the Departments acceptance date.

BRAKE WARRANTY:

Manufacturer's service and warranty policy for automatic slack adjusters shall be for two (2) years 100% parts only.

RADIATOR WARRANTY:

Manufacturer's service and warranty policy for radiator shall be for two (2) years, 100% parts and labor plus an additional three (3) years, 100% parts only.

ENGINE WARRANTY:

The successful vendor and or supplying OEM shall provide the Department with a 100% parts and labor engine warranty FOR 60 months / 150,000 miles / 5,400 hours minimum. In addition to the engine warranty, the engine block shall be warranted against external perforation from corrosion for 10 years, 100% parts and labor.

NOTE: The oil pan shall be warranted against corrosion, rust, rust thru etc. regardless of atmospheric conditions for 5 years, 100% parts and labor.

EMISSION WARRANTY: The successful vendor and or supplying OEM shall provide the Department with a 100% parts and labor warranty for all emission related components to include the diesel particulate filter (DPF) FOR 60 months / 150,000 miles / 5,400 hours minimum. Shall be warranted against corrosion, rust, rust thru etc. regardless of atmospheric conditions.

VI. WARRANTY: (Continued).

TRANSMISSION WARRANTY:

Manufacturer's service and warranty policy for automatic and manual transmissions shall be five (5) years 100% parts and labor.

DIFFERENTIAL/AXLE WARRANTY:

Manufacturer's service and warranty policy for differential and axles shall be for three (3) years 100% parts and labor.

DUMP BODY WARRANTY:

Constructability and durability of body shall be guaranteed for five (5) years, parts and labor. A decal shall be affixed to the driver's door, on the inside, stating the company's name, address and phone number.

Body hoist assembly 3 years, 100% parts and labor.

Tailgate spring-over-air cylinder system, 3 years 100% parts and labor.

CENTRAL HYDRAULIC SYSTEM:

Complete Central Hydraulic system and components 1-year 100% parts and labor including but not limited to the following:

- Rexroth Valve
- Controller
- Electronic Joysticks

All wiring harnesses shall be warranted for 5 years 100% parts and labor.

HYDRAULIC PUMP

Manufacturer's service and warranty policy for hydraulic pump shall be three (3) year 100% parts and labor.

BODY ELECTRICAL/LIGHTING:

Wiring harness shall be 5 years 100% parts. First year shall include 100% labor.

All LED lights shall be 5 years 100% parts.