

**Northumberland County State Route 54 Pipe Lining  
Scope of Work**

**I-1. Statement of the Project.**

The Pennsylvania Department of Transportation (PennDOT) is seeking an Offeror to repair a pipe culvert on SR 54 through the installation of a High Density Polyethylene pipe culvert liner from a manufacturer listed in PENNDOT Publication 35 (Bulletin 15) Section 601.2(a)6.a and grouting from a manufacturer listed in PENNDOT Publication 35 (Bulletin 15) Section 220.2(d) of annular space between the existing pipe and liner pipe.

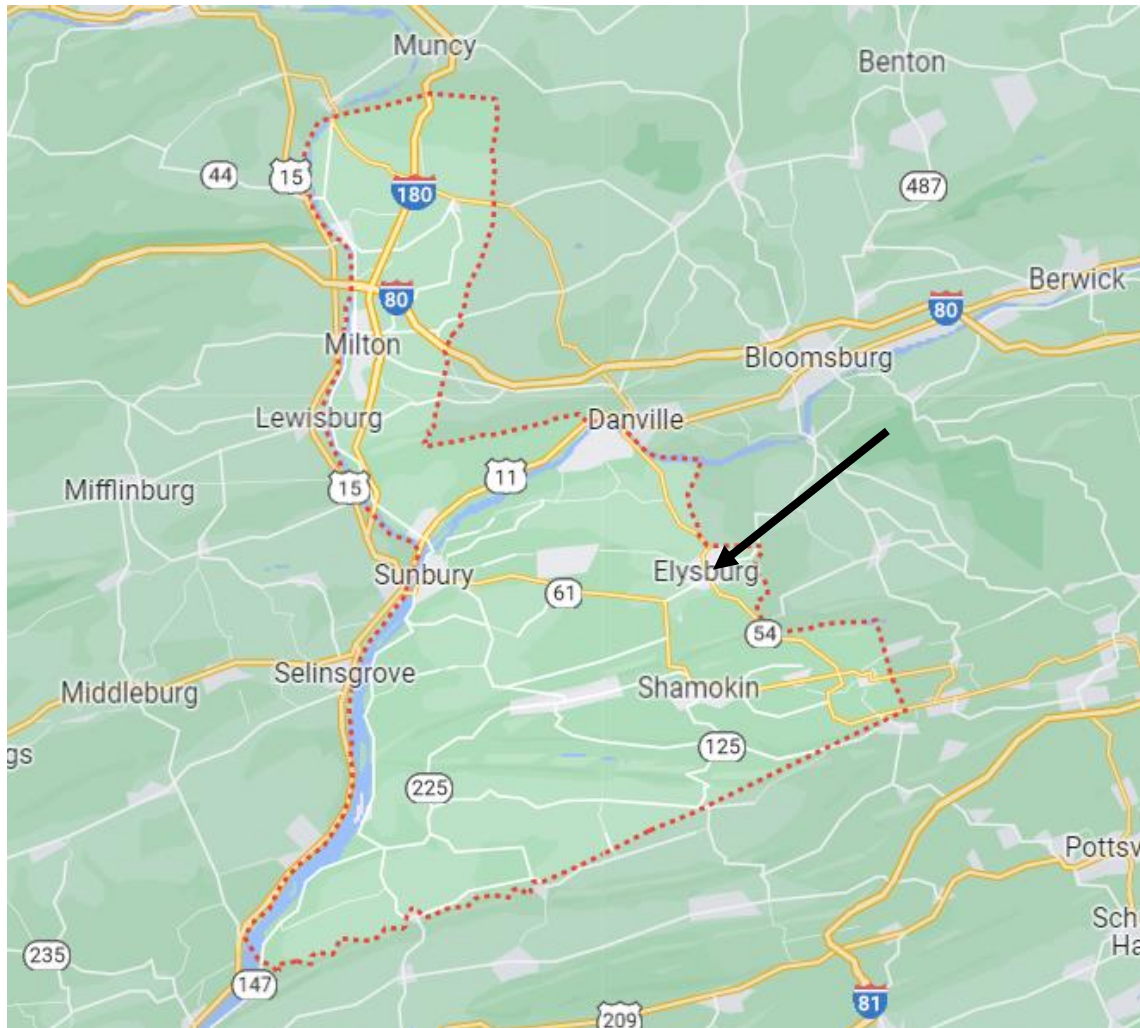
Existing Pipe: SR 54 segment 350 Offset 1332: 66 linear feet of 18 inch existing corrugated steel culvert pipe;

The Project Engineer will be known as the Project Manager.

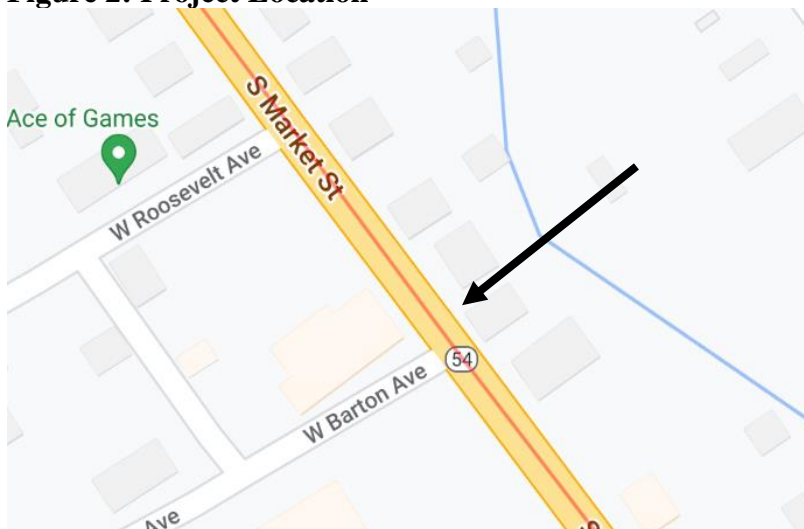
**A.** The selected Offeror shall:

- 1.** Determine the necessary diameter and liner thickness based upon depth, diameter, shape, traffic loading, groundwater pressures and condition for this pipe segment.
- 2.** Ensure calculations are prepared and stamped by a professional engineer.
- 3.** Construct Access and working area on the inlet side of the pipe.
- 4.** Dewatering as necessary.
- 5.** Install the liner.
- 6.** Ensure that the annular space between the existing pipe and the liner pipe is completely filled with grout.
- 7.** Remove any obstructions.
- 8.** Re-establish access road and working area to pre-project conditions.
- 9.** Patch existing pavement as needed, patch should match existing material in thickness and type and sealed along joints.
- 10.** Re-establish positive flow in inlet box, with grouted bottom.

**Figure 1: General Site Location**



**Figure 2: Project Location**



## **B. Construction Items:**

- 1. Installation of a High Density Polyethylene Pipe Culvert Liner:** This work is for slip lining existing 18 inch corrugated metal pipe and grouting of annular space between the existing pipe and liner pipe.

The work, including but not limited to the following, are incidental to the pipe Linear Foot item:

Determine the necessary diameter and liner thickness based upon depth, diameter, shape, traffic loading, groundwater pressures and condition for this pipe segment; Contractor shall conduct a site visit prior to bidding on the project to determine pipe lengths to be used in the lining process. Individual liner section lengths shall be a minimum of 6 feet but shall not exceed 20' unless pre-approved. This Linear Feet price shall be for cleaning existing pipe; for furnishing, hauling, installing liner pipe and placing grout; for all connections, for all labor, tools equipment, materials, clean-up and incidentals.

Submit detailed shop drawings showing all dimensions of liner pipe, material list, bracing details, bulkhead details, grout port locations, grout flow control details, and complete construction sequencing to the Department Representative. Ensure calculations are prepared and stamped by a professional engineer.

Construction schedule shall be submitted 3 weeks prior to starting work to allow time to coordinate with property owners. The Department will coordinate with affected property owners.

Prepare the existing pipe for the installation of the liner pipe by removing all sediment and objects or parts of the existing pipe that could damage the liner pipe during installation. PennDOT's Project Manager complete a final inspection and will notify the offeror if an internal inspection reveals an obstruction that cannot be removed by conventional cleaning equipment; and provide written guidance on how the obstruction will be resolved.

Install the liner pipe in accordance with approved shop drawings. Maintain consistent spacing around the liner pipe using spacers or other acceptable devices.

Ensure that the annular space between the existing pipe and the liner pipe is completely filled with grout. Patch holes and fill voids in and around existing pipe with material as required by PennDOT's Project Manager.

- 2. Access, site preparation and restoration:** This work is clearing and grubbing, constructing access to the inlet side of the pipe, constructing work area for pipe placement and site restoration.

The Offeror shall deploy applicable BMP's as shown in Publication 464. Submit a detailed plan showing: access points, proposed disturbed area and any foreseeable Erosion and Sediment Controls 3 weeks prior to starting work. Effort should be made to minimize proposed disturbed area. Provide sufficient detail, including dimensions, on the plan providing the Department a clear understanding of what earth disturbance is proposed. The site shall be restored to pre-work conditions.

3. **Maintenance and Protection of Traffic** —This work is the furnishing, installing, maintaining, and relocating of traffic control devices according to Publication 212, Publication 213, and the MUTCD. This work may include flagging and pilot car operation for guidance of traffic through the temporary traffic control zone and dust control.
4. **Grout inlet box positive flow**
5. **Drive Pavement Repair for removal of terracotta pipe inserted into pipe, includes removal of terracotta pipe & patch of pipe.**

**C. Construction Meeting.** The Offeror shall send a representative to attend a construction meeting after the purchase order is issued. The time and location will be provided by PennDOT’s Project Manager. The Offeror shall be prepared to discuss access, site preparation, proposed BMP’s, Traffic Control and construction sequence at the meeting.

**D. Mobilization:** This work is the assembly and set-up of the general plant required to comply with the contract and with local and State laws and regulations. General plant includes Contractor's offices, shops, plants, storage areas, and sanitary or other facilities. This work includes obtaining the required permits, insurance, bonds, and any other initial items required for the start of the work. This work is incidental to the project.

**E. Flow Control.** The selected Offeror shall, perform work with no flow or rainfall in the foreseeable future during work or curing processes.

**F. High Density Polyethylene pipe culvert liner specifications:**

- The liner pipe shall be made of high-density polyethylene resins in accordance with the requirements of ASTM D-3350-02 and Table 15 below. The cell classification will be 345464C and shall have the Plastic Pipe Institute designation of PE 3408.
- TABLE 15: HDPE Resin Specifications

Property	Specifications	Unit	Nominal Value
Material Designation	PPI/ASTM		PE3408
Cell Classification	ASTM D-3350-02		345464C
Density	ASTM D-1505	gm/cm3	0.955
Melt Index	ASTM D-1238	gm/10 min.	0.11
Flexural Modulus	ASTM D-790	psi	135,000
Tensile Strength	ASTM D-638	psi	3,200
Slow Crack Growth			
ESCR	ASTM D-1693	hours in 100% igepal	>5,000
PENT	ASTM D-1473	hours	>100
HDB @ 73 deg. F	ASTM D-2837	psi	1,600
UV Stabilizer	ASTM D-1603	% C	2.50%

- The diameter dimension of the polyethylene plastic liner (PPL) shall be capable of maintaining a minimum flow rate equivalent to 100% of the original in-place culvert or a flow rate specified herein.
- The PPL shall be capable of being joined into a continuous length by an approved interlocking method. The joints shall not create an increase in the outside diameter of the liner pipe to eliminate coupling hang-

ups. The joints must be water-tight with gaskets that are capable of handling pressures in excess of 25 feet of head per ASTM D-3212. The joining system for the liner pipe shall be bulletin approved.

- Each PPL section shall have a male and a female end.
- Each length of PPL furnished shall be permanently marked by the manufacturer with the manufacturer's name and applicable ASTM designation. The markings shall be such that it will not be removed during handling, shipment, or placement.
- The supplier shall furnish the manufacturer's certification stating that the material in the pipe meets the requirements of ASTM D 3350-02 with cell classification of PE 345464C and with the properties stated above. The supplier shall certify the dimensions meet the requirements of ASTM F 714 or as indicated in these specifications or drawings.

#### **G. Flowable Backfill, Type D. or Low-Density Cellular Concrete (LDCC)**

1. Work Included: This work shall consist of batching, mixing, and placing LDCC of the appropriate density as indicated by the specifications or as directed by the engineer. A trained LDCC installer shall furnish labor, material, equipment, and supervision for the installation of the LDCC in accordance with the drawings and specifications.
2. Use skilled labor that is thoroughly trained, experienced, and familiar with the specified requirements and the methods for proper performance of this work.
3. Foam Liquid Concentrate: Shall comply with the standard specifications of ASTM C 869 when tested in accordance with ASTM C 796.
4. Cement: The portland cement shall comply with ASTM C 150. Other supplemental cementitious material such as fly ash may be used when approved by the project engineer. Supplementary cementitious materials should be tested prior to the start of the project for compatibility with the foaming agent.
5. Admixtures: Admixtures for accelerating, water reducing, and other specific properties may be used when specifically approved by the project engineer. Admixtures should be tested prior to the start of the project for compatibility with the foaming agent.
6. Water: Use water that is potable and free from deleterious amounts of alkali, acid, and organic materials, which would adversely affect the setting or strength of the LDCC.

#### **EXECUTION**

##### **(1) SUBGRADE CONDITIONS**

- (a) Examine the areas and conditions under which work of this section will be performed. Correct conditions that may be determined to be detrimental to timely and proper completion of the work. Do not proceed until satisfactory conditions are established.
- (b) The area to be filled shall not have any standing water in it prior to placement of LDCC.
- (c) Any items to be encased in LDCC shall be properly set and stable prior to the installation.

##### **(2) WEATHER CONDITIONS**

- (a) Avoid freezing before the initial set of LDCC occurs.
- (b) Do not place at temperatures lower than 32 degrees Fahrenheit or when freezing conditions are expected in less than 24 hours.
- (c) If these conditions cannot be met, consult PennDOT's Project Manager to determine precautions necessary to assure acceptable installation.

##### **(3) MIXING AND CONVEYING**

- (a) Use job site proportioning, mixing, and placing equipment approved by project engineer.

- (b) Mix the materials according to the mix design and convey promptly to point of final placement.
- (c) Avoid excess handling of LDCC according to industry standards.
- (d) Place LDCC in lifts not to exceed 48 inches in depth, unless otherwise approved by the PENNDOT project manager.
- (e) Use silt fabric around the LDCC if recommended by the engineer.

(4) TESTING

(a) WET DENSITY

- (i) During placement of the initial batches, check the density and adjust the mix as required to obtain the specified cast density at the point of placement per ASTM.
- (ii) Four (4) specimens shall be taken for each 100 cubic yards of LDCC or as recommended per the project engineer.

**H. Service.** This work will be completed in accordance with this statement of work to complete the installation, including but not limited to, labor, equipment, material, tools, excavation, cleaning, pipe liner, liner reinforcement, fittings, seals, specified joint system, filling embankment voids, backfilling and restoration.

**I. Final Inspection.** In lieu of a final report, a final inspection will occur to determine completeness. The selected Offeror shall notify the Project Manager that the work has been successfully completed, and PennDOT's Project Manager, or designee, shall provide the date and time of the inspection. The selected Offeror's representative is required to attend this meeting. If other work is deemed necessary, a punch list will be established by the Project Manager that the Offeror will complete w/ project manager review and sign off on prior to invoice/billing final payment.

**J. Special Invoice and Billing Instructions.** Upon completion of the service, the selected Offeror will complete the attached Confirmation of Service form (OS-501) and compile a billable summary report containing all necessary information to prepare an invoice for the work completed. The OS-501 and the Billable Summary Report will be mailed to the Project Manager, or designee, in the county in which the work is being performed. The Project Manager, or designee, will confirm work performed as required at the final inspection and the call the vendor to correct any mistakes on billing.

The selected Offeror shall submit a commercial invoice to the address shown on the first page of the Purchase Order. The selected Offeror's invoice must include the date of service, a description of the work performed, and all other information as required by the Terms and Conditions including purchase order number, item numbers and unit prices.

**K. General Requirements. The selected Offeror shall:**

1. Furnish all personnel, materials and equipment of the type, condition and quantity necessary for the proper and productive execution of the contracted work;
2. Maintain all equipment in good condition, subject to acceptance by the PennDOT Project Manager, prior to and during use in connection with this contract;
3. Ensure all equipment and operators are in conformance with applicable PA Motor Vehicle laws and relevant federal regulations; and

4. Provide all fuel and other materials in connection with this contract.

**L. Emergency Preparedness.** To support continuity of operations during an emergency, including a pandemic, the Commonwealth needs a strategy for maintaining operations for an extended period of time. One part of this strategy is to ensure that essential contracts that provide critical business services to the Commonwealth have planned for such an emergency and put contingencies in place to provide needed goods and services.

**M. Safety and Environmental Requirements.** The selected Offeror shall be well-informed of the latest Department of Environmental Protection (DEP) safety and OSHA regulations when entering confined areas. When working in confined areas, the selected Offeror will ensure that all precautions are taken as required by these regulations. All traffic control, if needed, is the responsibility of the Offeror.

**N. Strategic Environment Management Program (SEMP) Requirements.** PennDOT has implemented a Strategic Environment Management Program (SEMP). As part of this program, the Commonwealth has established a Green Plan Policy, which can be found at [www.dot.state.pa.us](http://www.dot.state.pa.us) by typing “SEMP” in the search field, selecting the magnifying glass and selecting “Pollution Prevention”. The selected Offeror shall review the information found on this website.

The Green Plan Policy is designed to protect the environment, conserve resources and comply with environmental laws and regulations. The selected Offeror shall ensure that its personnel are aware of the Commonwealth’s commitment to protecting the environment, are properly trained about the environmental impacts of their work and are competent, through appropriate work experience, job training or classroom education, to perform the work outlined in the statement of work.