

ADDENDUM NO. 1

November 10, 2008

To the  
STANDARD CONSTRUCTION AND MATERIAL SPECIFICATIONS FOR  
SANITARY SEWER SYSTEM EXTENSIONS

DIVISION 2 – SITE WORK  
SECTION 02725 – PRESSURE WASTEWATER SEWER

For the

WEST HANOVER TOWNSHIP WATER & SEWER AUTHORITY  
DAUPHIN COUNTY, PENNSYLVANIA

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This Addendum is made part of the above noted Contract Documents. It represents an addition to the existing specification section allowing for the use of High Density Polyethylene Pipe (HDPE) in Horizontal Directional Drill Applications.

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PART 1 GENERAL

1.02 REFERENCES

B. American Society for Testing and Materials

- 28. ASTM D 638 Standard Test Method for Tensile Properties of Plastics
- 29. ASTM D746 Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact
- 30. ASTM D1238 Standard Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer
- 31. ASTM D1505 Standard Test Method for Density of Plastics by the Density-Gradient Technique
- 32. ASTM D2837 Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials
- 33. ASTM D3035 Standard Spec for Polyethylene Plastic Pipe (DR-PR) Based on Controlled Outside Diameter
- 34. ASTM D3261 Butt Heat Fusion Polyethylene Plastic Fittings for Polyethylene Plastic Pipe
- 35. ASTM D 3350 Standard Specification for Polyethylene Plastic Pipe and Fittings Material
- 36. ASTM F714 Standard Specification for Polyethylene Plastic Pipe (SDR-PR) Based on Outside Diameter

37. ASTM F1473 Standard Test Method for Notch Tensile to Measure the Resistance to Slow Crack Growth of Polyethylene Pipes and Resins

C. American Water Works Association:

4. AWWA C901 Polyethylene Pressure Pipe and Tubing: 1/2-inch through 3-inch

D. Plastic Pipe Institute

1. TR-33/2005 Generic Butt Fusion Joining Procedure for Field Joining of Polyethylene Plastic Pipe

1.04 QUALITY ASSURANCE

B. Source Quality Control

1. Shop Tests: In accordance with Article 1.06 of the General Instructions, each pipe manufacturer must have facilities to perform the listed tests. The Engineer reserves the right to require the manufacturer to perform such additional number of tests as the Engineer may deem necessary to establish the quality of the material offered for use.

<u>MATERIAL</u>	<u>TEST METHOD</u>	<u>NUMBER OF TESTS</u>
d. Polyethylene Plastic Pipe	ASTM D638 ASTM D746 ASTM D 1238 ASTM D 1505 ASTM F1473	As specified

PART 2 PRODUCTS

2.01 PIPE AND PIPE FITTINGS

F. High Density Polyethylene Pipe (HDPE) and Fittings, Horizontal Directional Drilling: All HDPE pipe and fittings shall be from a single manufacturer, who is fully experienced, reputable and qualified in the manufacture of the HDPE pipe to be furnished. The pipe shall be designed, constructed and installed in accordance with the best practices and methods and shall comply with these Specifications.

1. Materials used for the manufacture of HDPE and fittings shall be made from a PE 3408 high density polyethylene resin compound meeting cell classification 345434E as per ASTM D3350.

2. HDPE pipes shall comply with AWWA Specifications C901.

3. If rework compounds are required, only those generated in the Manufacturer's own plant from resin compounds of the same class and type from the same raw material supplier shall be used.

4. Dimensions and workmanship shall be as specified by ASTM D3035. HDPE fittings and transitions shall meet ASTM D3261. All HPDE pipe shall and fittings shall have a Hydrostatic Design Basis of 1,600 psi.

5. HDPE pipe and accessories 2-inch and less in diameter shall be 160 psi at 73.4°F, meeting the requirements of Standard Dimension Ratio (SDR) 11 as minimum strength.
6. Fittings:
  - a. All molded fittings and fabricated fittings shall be fully pressure rated to match the pipe SDR pressure rating to which they are made. All fittings shall be molded or fabricated by the manufacturer. No Contractor fabricated fittings shall be used unless approved by the Engineer.
  - b. The manufacturer of the HDPE pipe shall supply all HPDE fittings and accessories as well as any adapters and/or specials required to perform the work.
  - c. All fittings shall be installed using butt-fused fittings, thermo-fused fittings, or flanged adapters and must be approved by the Engineer. No size on size wet taps shall be permitted.
  - d. All transition from HDPE pipe to ductile iron or PVC shall be made per the approval of the Engineer and per the HDPE pipe manufacturer's recommendations and specifications. A molded flange connector adapter within a carbon steel back-up ring assembly shall be used for pipe type transitions. Ductile iron back-up rings shall mate with cast iron flanges per ANSI B16.1. A 316 stainless steel back-up ring shall mate with a 316 stainless steel flange per ANSI B 16.1.
  - e. Fittings shall be marked with the manufacturer's name (or trade mark), the designation ASTM D3350 and ASTM F714, and the manufacturer's code identifying the resin manufacturer, lot number and date of manufacture.
7. Pipe and fittings shall be homogeneous throughout and free of: serious abrasion, cutting, or gouging of the outside surface extending to more than 10 percent of the minimum wall thickness in depth; cracks; kinking (generally due to excessive or abrupt bending); flattening; holes; blisters; and other injurious defects. They shall be uniform as commercially practical in color, opacity, density, and other physical properties. Any pipe and fittings not meeting these criteria shall be rejected.
8. The average outside diameter and wall thickness of pipe shall conform to either IPS or DIPS when measured in accordance with ASTM D2122.

## PART 3 EXECUTION

### 3.03 PRESSURE WASTEWATER SEWER CONSTRUCTION METHODS

- C. Pipe Laying and Joining: Perform pipe laying and joining in strict accordance with the manufacturer's installation instructions, reference standards as included, and such additional requirements as specified herein.
6. Laying/joining HDPE
  - a. The pipe shall be joined with butt, heat fusion joints as outlined in ASTM D2657 and conform to the Generic Butt Fusion Joining Procedure for Field Joining of Polyethylene Pipe, Technical Report TR-33/2005, published by the Plastic Pipe Institute (PPI). All joints shall be made in strict compliance with the manufacturer's recommendations. A factory qualified joining technical as designated by the pipe manufacturer or experienced, trained technical shall perform all heat fusion joints.

b. Lengths of pipe shall be assembled into suitable installation lengths by the butt-fusion process. All pipe so joined shall be made from the same class and type of raw material made by the same raw material supplier.

c. On days butt fusions are to be made, the first fusion shall be a trial fusion in the presence of the Engineer. The following shall apply:

(1) Heating plates shall be inspected for cuts and scrapes. The plate temperature shall be measured at various locations to ensure proper heating/melting per manufacturer's recommendations.

(2) The fusion or test section shall be cut out after cooling completely for inspection.

(3) The test section shall be 12 inches or 30 times (minimum) the wall thickness in length and 1 inch or 1.5 times the wall thickness in width (minimum).

(4) The joint shall be visually inspected as to continuity of "beads" from the melted material, and for assurance of "cold joint: prevention (i.e. joint shall have visible molded material between walls of pipe.) Joint spacing between the wall to the two ends shall be a minimum of 1/16 inch to a maximum of 3/16 inch.

d. Mechanical connections of the HDPE pipe to auxiliary equipment such as valves, pumps, and clean-outs shall be through flanged connections which shall consist of the following:

(1) A polyethylene flange shall be thermal butt-fused to the stub end of the pipe.

(2) The polyethylene flange adapters at pipe material transitions shall be backed up by stainless steel flanges conforming to ANSI B16.1 and shaped as necessary to suit the outside dimensions of the pipe.

(3) The flange adapter assemblies shall be connected with corrosion resisting bolts and nuts of Type 316 stainless steel as specified in ASTM A 726 and ASTM A307.

(4) All bolts shall be tightened to the manufacturer's specified torques. Bolts shall be tightened alternately and evenly. After installation apply a bitumastic coating to bolts and nuts.

e. Flange connections shall be provided with a full-face neoprene gasket.

f. Care shall be taken in loading, transporting and unloading to prevent injury to the pipe. Pipe and fittings shall not be dropped. All pipe and fittings shall be examined before installation, and no piece shall be installed which is found to be defective. Any damages to the pipe shall be repaired as directed by the Engineer. If any defective pipe is discovered after it has been installed, it shall be removed and replaced with a sound pipe in a satisfactory manner.

g. All HDPE pipe shall be field-tested using water. Pressure testing shall be conducted per the manufacturer's recommendations and as approved by the Engineer, in accordance with ASTM F2164 "Standard Practice for Field Leak Testing of Polyethylene Pressure Piping Systems using Hydrostatic Pressure." The contractor shall submit his plan for testing to the Engineer for review no less than ten (10) days before starting the

test. The Engineer shall be notified a minimum of forty-eight (48) hours prior to the start of the test.

E. Horizontal Directional Drilling, HDPE Pipe

1. Drilling Materials. The drilling materials used by the Contractor to aid in the horizontal drilling operations shall be of the Contractor's choosing. However, such products shall comply with Environmental Regulations as applicable to this Project.

a. Drilling Water: Water required for drilling operations is the responsibility of the Contractor to obtain.

b. Drilling Fluids: Drilling fluids used in the drilling operation shall be mixtures of bentonite and water or such other fluids of the Contractor's choosing.

(1) Disposal of such drilling fluids shall be the responsibility of the Contractor and shall be conducted in compliance with all relative environmental regulations, right-of-way and work space agreements and permit requirements.

(2) Minimize to every extent possible, the occasions of inadvertent returns of drilling fluids at locations other than the planned entry and exit points.

(3) Perform disposal of drilling fluids in compliance with all relative environmental regulations.

(4) Perform immediate clean-up of inadvertent drilling fluid returns at all locations where they occur.

2. Installation

a. General: Perform the necessary general access earthwork operations as required for the set-up and erection of horizontal drilling equipment at the rig site.

(1) At all times during the working hours, maintain instrumentation in operation which will accurately locate the pilot hole drilling head, and which will accurately measure the drilling fluid flow discharge rate and pressure.

(2) Engineer shall have access to such instrumentation for observation purposes only.

b. Pilot Hole. The pilot hole shall be drilled along the path indicated on the Drawings and to the following general tolerances.

(1) Elevation: Plus zero feet; minus 5 feet.

(2) Alignment: Maximum offset 5 feet.

(3) Exit Point Location: The pilot hole shall be within plus 10 feet and minus zero feet of the exit point.

(4) Should the pilot hole fail to meet the above requirements, perform such additional work, including providing additional easements if necessary, to satisfactorily meet the requirements.

c. Reaming. Prereaming operations shall be conducted at the discretion of the Contractor. Reaming operations shall be conducted to reduce the pulling loads imposed on the HDPE piping.

d. Drilling Mud and Cuttings Disposal. Provide for the safe disposal and treatment of drilling mud and cuttings within the limitations of any Federal, State or Local Regulations. Such disposal and treatment work shall be considered incidental to the work.

3. Pipe pulling operations

a. HDPE Pipe Pulling. Handle the HDPE pipe in a manner that does not overstress the pipe. Should the pipe be buckled or otherwise damaged, the damaged pipe section (or sections) shall be removed and replaced at no increase in Contract Price. Additional precautions as follows:

1. The Contractor is solely responsible for construction easements and location of overhead and underground utilities with respect to pipe pulling operations.
2. The maximum allowable tensile load imposed on the HDPE pipe shall be within the limits of the pipe grade and wall section strengths. The Contractor shall be responsible for determining pulling loads required for his method of installation. Such loads shall be minimized as required to prevent failure of the pipeline during installation.
3. Torsional stress shall be minimized as much as possible by use of swivel type assemblies on the pipeline pull section.
4. Pull section support shall be provided by such means necessary to allow the pipe line to move freely and to prevent damage to the corrosion protection coatings.