

33 05 00 COMMON WORK RESULTS FOR UTILITIES

1. Applicability

- 1.1. The installation, construction, alteration, and repair of the water utility, sanitary sewer utility, and storm sewer utility systems beginning five feet from the building foundation on any and all University of Minnesota property in the state of Minnesota.

2. Buried Pipe Installation

2.1. Installation

- 2.1.A. Contractor shall handle and install all pipe and appurtenances as recommended by the manufacturer, Engineer of Record, plans, specifications, and any special provisions.
 - 2.1.B. Trench excavation and bedding preparations shall proceed ahead of pipe placement for proper laying and joining of the units and the correct grade and alignment.
 - 2.1.C. Trench backfill shall be placed in maximum lifts of 12", loose thickness, and compacted to a minimum density of 92 percent in accordance with Modified Proctor Density, ASTM D1557.
 - 2.1.C.1. For structural backfill, required around plastic pipes, maximum lift thickness shall not exceed 8", loose thickness, or 6" compacted. All flexible pipe shall be bedded in accordance with ASTM D2321.
 - 2.1.D. All foreign matter or dirt shall be removed from the inside of the pipe and fittings before they are lowered into position in the trench and shall be kept clean.
 - 2.1.E. Entrance of foreign matter into pipeline openings shall be prevented at all times to the extent that suitable plugs or covering can be kept in place over the openings without interfering with the installation operations.
 - 2.1.F. Bell and spigot pipe shall be laid with the bell ends facing upgrade and the laying shall start on the downgrade end and proceed upgrade.
 - 2.1.G. All pipe and fitting joints shall fit tightly and be fully closed.
 - 2.1.H. All joints shall be soil tight and watertight in sanitary sewer and storm sewer pipe.
 - 2.1.I. Where necessary to make satisfactory closure, grade or alignment, deflections at joints shall not exceed that which will assure watertight joints and shall comply with the pipe manufacturer recommendations.
 - 2.1.J. HDPE pipe shall be temperature normal before attaching fittings.
 - 2.1.J.1. Cooling of pipe may cause shrinkage, resulting in the pipe separating from valves.
- 2.2. Bulkheading open pipe ends
- 2.2.A. Pipes may be installed and bulkheaded for future connections when approved by the UMN civil engineer.
 - 2.2.B. See section 10 below for bulkhead requirements.

3. Trenchless Utility Pipe Installation

3.1. Horizontal Directional Drilling

- 3.1.A. The boring/drilling pit locations shall be included in the project plans, and approved by the UMN Civil Engineer or the Engineer of Record before construction.

- 3.1.B. The drilling equipment shall be capable of placing the pipe as shown on the plans. The installation shall be by a steerable drilling tool capable of installing continuous runs of pipe between appurtenances such as valves, manholes, etc., without intermediate pits.
- 3.1.C. The guidance system shall be capable of installing pipe within one and 1½” of the planned vertical dimensions and 2” of the planned horizontal dimensions. The Contractor shall remove and reinstall pipes in which those tolerances are not met.
 - 3.1.C.1. **PROHIBITED:** Negative slope, sags, bellies, or dips in gravity flow pipes.
- 3.1.D. If a void develops, the jacking or boring operation shall be stopped immediately and the void shall be filled by an approved method.

4. Identification and Signage for Utilities

- 4.1. Tracer wire shall be installed on the following utilities:
 - 4.1.A. Water
 - 4.1.A.1. All watermains and service laterals shall have tracer wire.
 - 4.1.A.2. UMD: Irrigation lines greater than 1” diameter shall have tracer wire.
 - 4.1.B. Storm and Sanitary
 - 4.1.B.1. Storm and sanitary mains and service laterals may require tracer wire.
 - 4.1.B.1.a. Exception: Tracer wire is not required on straight sections of pipe between access structures where there is a clear line of sight.
 - 4.1.B.2. Underground permanent stormwater treatment systems shall have tracer wire surrounding the outer limits of the system.
 - 4.1.B.2.a. For example, an underground pipe gallery shall have tracer wire installed on all outer pipes.

5. Insulation of Water Utilities

- 5.1. Acceptable Products
 - 5.1.A. Insulation shall be extruded rigid board material having a thermal conductivity of 0.23 BTU/hour/square foot/degree Fahrenheit/per inch thickness, maximum, at 40°F mean, a comprehensive strength of 35 psi minimum, and water absorption of 0.25% by volume minimum.
 - 5.1.B. Unless otherwise specified in plans or specifications, board dimensions shall be 8’ long by 2’ or 4’ wide, and 1”, 1-1/2”, 2”, or 3” thick.
- 5.2. Installation
 - 5.2.A. Insulation boards shall be placed within the pipe encasement zone, 6” above the pipe, on flattened soil so that the board does not break.
 - 5.2.B. Insulation boards shall be placed with the long dimension parallel to the centerline of the pipe. Boards shall be placed with tight joints. No continuous joints or seams shall be placed directly over the pipe.
 - 5.2.B.1. If two or more layers of insulation boards are used, each layer shall be placed to cover the joints of the layer immediately below.
 - 5.2.C. The contractor shall exercise caution to ensure that all joints between boards are tight during placement and backfilling with only extruded ends placed end to end or edge to edge.

5.2.D. Backfill material shall be placed in such a manner that construction equipment does not operate directly on the insulation, and compacted with equipment which exerts a contact pressure of less than 80 psi.

6. Mortar

6.1. Mortar used in masonry construction shall meet the requirements of MnDOT Specification 2506.2 B.2 and ASTM C270.

7. Concrete

7.1. Concrete used for cast-in-place masonry construction shall be produced and furnished in accordance with the provisions of MnDOT Specification 2461. The requirements for Grade B concrete shall be met where a higher grade is not specified. Type 3, air-entrained, concrete shall be furnished and used in all structures having weather exposure.

8. Cathodic Protection

8.1. Any pipe of metallic construction that has contact with soil that could cause the pipe to corrode shall be cathodically protected. The type of cathodic protection shall be determined by the Engineer of Record.

9. Pipe Casing

- 9.1. Pipe casing shall be required when a utility line is routed under any above grade, at grade, or underground structure or facility that would impede the excavation and maintenance of the utility in the future.
- 9.2. The casing diameter shall be sized to provide a minimum of 4” between the inside of the casing pipe and the largest outside diameter of the carrier pipe (including pipe bells) to allow for deflection of the casing pipe and installation of casing spacers.

10. Bulkheading Open Pipe Ends

10.1. All pipe and fitting ends left open after abandoning/removing sections of pipe or for future connection shall be bulkheaded by approved methods prior to backfilling.

10.2. Bulkhead Type:

Pipe Diameter	Bulkhead Type
24” and Smaller	Prefabricated Plug or Cap
Greater than 24”	Masonry Bulkhead

10.2.A. Prefabricated plugs and caps:

10.2.A.1. Shall be of the same material as the pipe material, or approved alternate material.

10.2.A.2. Shall be installed with watertight seal as required for the pipeline joints.

10.2.B. Masonry bulkhead:

10.2.B.1. Shall be constructed with clay or concrete brick to a wall thickness of 8”.

Building Standards

Division 33-05 Common Work Results for Utilities

END OF SECTION