

SECTION 02222

EXCAVATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Work under this section shall include all labor, materials, equipment and services as required to excavate the site for construction for all site structures.

1.02 FIELD MEASUREMENTS

- A. Verify that survey benchmark and intended elevations for the Work are as indicated.

1.03 DEFINITIONS

- A. *Excavation* shall include any material encountered, including surface pavement, removed to the depth of the outside bottom (called “grade”) of pipe and manholes, plus the extra digging to the depth (called “subgrade”) required for bedding, and to the grade depth for structures.
- B. *Extra Excavation* shall include excavation below subgrade or grade as required by the Engineer because of poor bearing soil or underground utilities or similar unforeseen conditions.
- C. *Extra Rock Excavation* shall mean rock excavation required for reasons similar to those under B above.

1.04 CODES

- A. All excavation work shall be performed in accordance with:
 - 1. Commonwealth of Pennsylvania Department of Labor and Industry “Regulations for Trenches and Excavations” latest edition.
 - 2. All local, state, and other laws and regulations governing blasting.

PART 2 PRODUCTS

(Not Used)

PART 3 EXECUTION

3.01 PREPARATION

- A. Identify required lines, levels, contours and datum.

3.02 EXCAVATION

A. Excavation Limits

1. Trenches shall be dug to depths and widths as specified herein or as approved or directed by the Engineer. Sides of trench shall be as nearly vertical as possible.
2. Trenches shall be excavated true to line so that a clear space of eight inches (8") is provided on each side of the pipe bell to a height not less than the top of the pipe. These dimensions are applicable to the inside face of sheeting, if such is required at the elevation of the pipe. Trenches may be wider above the top of the pipe.
3. When width below top exceeds bell plus 16 inches, the Engineer may call for stronger pipe at no expense to the Owner or HTWSA.
4. Where a section of trench has, by the Contractor's own mistake, been excavated to a greater depth than specified, it shall be brought to the proper grade using 2A crushed stone compacted to a minimum 90% Standard Proctor Density. Furnishing and placing of this stone shall be at the Contractor's expense.
5. The Engineer shall have the right to limit amount of trench opened in advance of completed sewer. Excavation shall be completed at any location, except for final grading and shaping, a minimum of twenty feet (20') in advance of pipe installation. This amount of pipe laid in advance of backfilling shall not exceed one hundred feet (100').
6. Excavation limits for manholes and structures shall be to the minimum horizontal limits in which a man can work efficiently. Excavation for footings shall be to outside footing dimensions and the footing poured around without side forms.
7. Pipe trenches and manholes (when they have pre-cast bases) shall be excavated six inches (6") deeper than elevations shown on the plans in order to provide space for bedding.

B. Disposition of Excavated Material

1. The Contractor shall classify, separate and store materials as may be required for re-use in backfilling, re-paving or replacing topsoil. If the Contractor prefers not to separate surface materials, he shall furnish replacement materials of at least equal quantity and quality as directed to replace displaced material.
2. Excavated material shall be placed so as not to interfere with traffic on streets and driveways in an unreasonable manner.

C. Trench De-Watering

1. All excavations shall be free of water during construction of structures, pipe laying and backfilling operations. The Contractor shall provide and place all necessary flumes, channels or pipes required to temporarily divert water from the excavation. All water from any source shall be pumped or bailed to provide a dry hole. All

water pumped from the excavation shall be discharged in such manner as shall not cause injury to work completed, damage to property, health hazards or impediment of traffic. In no case shall water be permitted to rise into or flow through a completed sewer unless permitted by the Engineer.

D. Underground Utilities and Structures

1. The presence, location, character, and size of existing underground features, if any, shown on the drawings is in accordance with the best available information. The Contractor shall be responsible for determining the exact location of utilities and underground structures. Encountering other underground installations not shown on the drawings shall not constitute basis for a claim by the Contractor for damage or extra compensation, for either delay or extra work.
2. All utility services encountered shall be supported by timber struts or by other suitable means approved by the respective utility owner. Utilities or other structures located transversely across the trench shall be protected from damage or displacement.

E. Rock Excavation

1. Rock excavation will be accomplished by drilling and wedging or blasting as permitted by the HTWSA. Rock shall be fully taken out at least twenty-five feet (25') in advance of pipe laying. The bottom width shall not exceed the widths of the trench for the specified pipe. When rock is found in spots so that hard rock areas alternate with softer earth areas, the rock shall be excavated an extra six inches (6") below subgrade. The bottom of the excavated trench shall be raised to subgrade elevation with crushed stone and the cost of this material shall be included in the unit bid price for sewer construction. Stretches of rock extending between manholes need, however, be excavated only to normal subgrade depth.
2. All excavated rock material, which is unfit for backfilling shall be immediately removed from the site at the Contractor's expense.

F. Shoring

1. Excavation for pipe and structures shall be properly and adequately shored as required by the Occupational Safety and Health Administration (OSHA). Tight wood sheeting (approved steel sheeting optional) shall be installed for the protection of workmen, adjoining property and the work. Voids found behind sheeting shall be immediately filled with granular material and compacted. Sheeting left in place, if so permitted by the Engineer, shall be cut off approximately four feet (4') below ground surface.
2. All sheeting and bracing which may not be left in place under the foregoing provisions of these specifications shall be removed in such manner as not to endanger other structures. All voids left, or caused by, withdrawals of sheeting shall be immediately refilled with sand by ramming with tools especially adapted to such purpose, by watering, or otherwise as may be directed. The cost of furnishing,

placing, and removing such sheeting and bracing shall be included in the unit price bid for sewers.

G. Protection of Trees

1. Where trees are within eight feet (8') of the centerline of the trench and are not indicated to be removed, they shall be protected by boards wired to the trees to prevent scarring of the bark. Where branches of the trees hang over the trench or are sufficiently close to be hit by the boom of the backhoe, such limbs shall be neatly sawed off at the tree truck or otherwise protected to prevent breaking of the limb at junction with the trunk.

H. Error in Excavation

1. Contractor shall excavate to the elevations shown on the plans, or as directed by the Engineer. If the Contractor excavates below elevations specified for trenches, he shall bring the excavation back to proper elevation (except as hereinafter noted) by backfilling with #2 stone, free of organic matter, and tamping to provide a compact base. Backfill material must be approved by the Engineer before being placed.
2. If the Contractor excavates below elevations specified for footings or for other structures, the Engineer may require that he shall not backfill the excavation to bring it to proper elevation, but the footings or other structures will be revised to meet the new grades caused by the Contractor's over excavation. In these cases, and for any other structure designated by the Engineer, the footings must bear on undisturbed soil or rock.
3. Any increase in cost resulting from backfilling or increasing the size of footings or foundations because of over-excavation shall be borne by the Contractor at no expense to the Owner.

3.03 FIELD QUALITY CONTROL

- A. Provide field tests of bearing surfaces to assure minimum required bearing capacity.
- B. Submit 2 copies of reports to Authority Engineer prior to construction.

3.04 PROTECTION

- A. Protect excavations by methods required to prevent cave-in or loose soil from falling into excavation.
- B. Protect bottom of excavations from freezing.

END OF SECTION