

SECTION 3720 - TRENCH EXCAVATION FOR GRAVITY SEWERS

PART 1 - GENERAL

1.1 SCOPE OF WORK:

Provide all labor, materials, equipment and services required for sewer line trench excavation.

PART 2 - EXECUTION

2.1 EXCAVATION FOR PIPELINE TRENCHES:

- A. Trenching shall be accomplished in accordance with these specifications and the Standard Details.
- B. Unless otherwise directed by the ENGINEER, trenches in which pipes are to be laid shall be excavated in open cut to the depths shown on the plans, the cut sheets, or as specified by the ENGINEER.
- C. Care of Surface Material for Reuse - All surface materials that, in the opinion of the ENGINEER, are suitable for reuse in restoring the surface shall be kept separate from the general excavation material, as directed by the ENGINEER.

2.2 EXCAVATION OF TRENCHES IN ROCK:

- A. A bed of crushed stone or crushed gravel shall be placed to provide continuous support for the pipe as described in Section 3730.
- B. Blasting Rock - No blasting of rock shall be done within 40 feet of pipes or structures without specific permission from the ENGINEER. Blasts shall be properly covered and the pipe or structure properly protected. Warning shall be given to all persons in the immediate vicinity. Blasting shall be at the risk of the CONTRACTOR who shall be liable for all damages to persons or property. Necessary permits shall be secured and paid for by the CONTRACTOR.
- C. Pipe Clearance in Rocks - Ledge rock, boulders, and large stones shall be removed to provide a clearance on all sides of all pipe and fittings as described in Part 2.3 below. The specified minimum clearance is the minimum clear distance that will be permitted between any part of the pipe or appurtenances being laid and any part, projection, or point of such rock, boulder, or stone.

2.3 EXCAVATION AND PREPARATION OF TRENCH:

- A. Trench Width - Widths of trenches shall be held to a minimum to accommodate the pipe and appurtenances. The trench width shall be measured at the top of the pipe barrel and shall conform to the following limits:
 - 1. Minimum: Outside diameter of the pipe barrel plus 12 inches, i.e., 6 inches each side.
 - 2. Maximum: 30 inches or the outside diameter of the pipe barrel plus 16 inches, whichever is greater.
- B. Excessive Trench Width - If the trench width exceeds the maximum trench width defined in Paragraph 2.3 A for any reason, the CONTRACTOR, subject to approval of the ENGINEER, shall provide additional strength pipe, concrete encasement, or approved alternate, at no cost to the OWNER.
- C. Trench Depth - The trench shall be excavated to a point not less than 6 inches or more than 12 inches below the barrel of the pipe. All loose material shall be removed from the trench bottom. No pipe shall be laid directly on rock.
- D. Excessive Trench Depths - Unauthorized excavation below the trench bottom shall be filled with

compacted crushed stone or crushed gravel at no cost to the OWNER.

- E. Before laying the pipe out of the downstream manhole, any obstructions upstream of the manhole that may necessitate changing the line or grade of the pipeline shall be uncovered. The CONTRACTOR shall verify alignment, elevations, and grades prior to proceeding. The CONTRACTOR will be responsible for any necessary relaying and/or relocating of the pipe if the pipe is laid before verifying locations and elevations of known potential obstructions.
- F. The trench shall be straight and uniform so as to permit laying pipe to lines and grades given by the ENGINEER. It shall be kept free of water during the laying of the pipe and until the pipeline has been backfilled. Removal of water shall be at the CONTRACTOR's expense.
- G. Bell Holes - Bell holes shall be provided at each joint to permit the joint to be made properly and the pipe to be supported along its full length by the bedding material. Allowing the pipe to be "bridged" by the bell is not acceptable.
- H. Excavation Below Grade - Excavation shall be undercut to a depth below the required invert elevation that will permit laying the pipe on at least six inches (6") of bedding material to provide continuous support for the bottom of the pipe. Before the pipe is laid, the subgrade shall be made by placing bedding as per Section 3730. The layers shall be thoroughly tamped as directed by the ENGINEER so as to provide a uniform and continuous bearing and support for the pipe at every point between pipe bells, except that it will be permissible to disturb and otherwise damage the finished surface over a maximum length of 18 inches near the middle of each length of pipe by the withdrawal of pipe slings or other lifting tackle. The finished subgrade shall be prepared accurately by means of hand tools. The subgrade beneath the centerline of the pipe shall be finished to within 0.08 feet of a straight line between pipe joints, and all tolerances shall be above the specified grade.
- I. Excavation in Poor Soil and Refilling to Grade - In wet, yielding mucky locations or other locations where the bottom of the trench at subgrade is found to be unstable or to include ashes, cinders, refuse, vegetable or other organic material, or large pieces or fragments of inorganic material that in the judgement of the ENGINEER should be removed, the CONTRACTOR shall excavate, remove and dispose of such unsuitable material to the width and depth ordered by the ENGINEER. The excavated unsuitable material shall be replaced with Foundation Aggregate, AASHTO M-43 Size No. 2, 24 or 3 to a level that is 6" below the bottom of the pipe barrel in order to form a suitable foundation for the pipe bedding material. Geotextile filter fabric shall be placed between the native soils and the Foundation Aggregate. Before the pipe is laid, the bedding shall be placed as specified.
- J. Special Foundation in Poor Soil - Where the bottom of the trench at subgrade is found to consist of material that is unstable to such a degree that, in the opinion of the ENGINEER, it cannot be removed and replaced with an approved material thoroughly compacted in place to support the pipe properly, the CONTRACTOR shall construct a foundation for the pipe, consisting of piling, treated timbers, concrete, or other materials, in accordance with plans prepared by the ENGINEER. Extra compensation will be allowed for the additional work at a negotiated price.
- K. Trenching by Hand or Machine - Hand methods for excavation shall be employed in locations shown on the drawings or required by the specifications. In other locations the CONTRACTOR may use trench digging machinery or employ hand methods.

2.4 SAFETY AND UTILITY PROVISIONS:

- A. Braced and Sheeted Trenches - Open cut trenches shall be sheeted and braced as required by O.S.H.A. or any governing state laws and municipal ordinances, and as may be necessary to protect life, property, the work, or as ordered by the ENGINEER.
- B. Piling of Excavated Material - All excavated material shall be piled in a manner that will not endanger the work and that will avoid obstructing sidewalks and driveways. Hydrants under pressure, valve pit covers, valve boxes, curb stop boxes, manhole covers, fire and police call boxes, or other utility controls shall be left unobstructed and accessible until the work is completed. Gutters shall be kept

clear or other satisfactory provision made for street drainage, and natural watercourses shall not be obstructed.

- C. Barricades, Guards and Safety Provisions - To protect persons from injury and to avoid property damage, adequate barricades, construction signs, torches, red lanterns, and guards as required shall be placed and maintained during the progress of the construction work and until it is safe for traffic to use the highway.

All material piles, equipment, and pipe that may be obstructions to traffic shall be enclosed by fences or barricades and shall be protected by proper lights when the visibility is poor. Safety rules and regulations of local authorities shall be observed.

- D. Structure Protection - Temporary support, adequate protection and maintenance of all underground and surface structures, drains, sewers and other obstructions encountered in the progress of the work shall be furnished by the CONTRACTOR at his expense and under the direction of the ENGINEER. Any structures that have been disturbed shall be restored upon completion of the work.
- E. Protection of Surface Structures - Trees, shrubbery, fences, poles, and all other property and surface structures shall be protected unless their removal is shown on the drawings or authorized by the ENGINEER. When it is necessary to cut roots and tree branches, such cutting shall be done under the supervision and direction of the ENGINEER.
- F. All excavated materials shall be placed a minimum of 2 feet back from the edge of the trench.

PART 3 - BASIS OF PAYMENT

- A. Trench excavation is not a pay item. It is included in the sewer line's overall unit cost. There shall be no extra payment for excavation, no matter what soil types or conditions are encountered (no extra payment for rock excavation, pumping of groundwater, etc.). If soil boring information is not included in the bid documents, the CONTRACTOR shall make his own subsurface investigations as necessary prior to submitting a bid to determine soil and groundwater conditions. This shall be coordinated with the Butler County Department of Environmental Services, Butler County Engineer's Office, ODOT, all property owners, the Ohio Utilities Protection Service, and all other appropriate agencies.
- B. The volume of Foundation Aggregate for payment shall be computed by multiplying the length of the trench as measured along the centerline of the pipe, times the actual width of the trench at the top of the pipe barrel (but not to exceed the outside diameter of the pipe barrel plus 16 inches) times the depth of the excavation necessary, as determined by the ENGINEER, below 6 inches under the pipe barrel. Payment for Foundation Aggregate will be made at the unit price bid per cubic yard for the quantities as determined from the measurements specified above. No payment will be made where Foundation Aggregate is required due to over-excavation by the CONTRACTOR not ordered by the ENGINEER. Cost of geotextile filter fabric shall be included in the bid price for Foundation Aggregate.

END OF SECTION