

SECTION 02220
EXCAVATION AND BACKFILL

A. Clearing and Grubbing

The Valparaiso City Utilities or its Contractor shall be responsible for all clearing and grubbing work necessary for water main construction. The site of all open cut excavations shall first be cleared of obstructions preparatory to excavation. Clearing includes the removal and disposal of vegetation, trees, stumps, roots and bushes, except those specified to be protected during excavation.

Excavated and other material shall be stored away from the edge of any excavation to prevent falling or sliding back into the excavation and to prevent collapse of the wall of the excavation. Surplus excavated material and excavated material unsuitable for backfilling or embankments shall be disposed of on the site by distributing the material over existing ground surfaces. Excess excavated materials shall be carefully graded to blend into the existing terrain as much as possible. Care shall be taken to maintain existing drainage.

B. Trenching and Open Cut

The Valparaiso City Utilities or its Contractor shall be responsible for all excavation work necessary for water main construction. Open cut excavations shall be made to the widths and depths necessary for constructing all structures, pipelines and conduits, and includes the excavation of any material which is necessary to be excavated for any purpose pertinent to the construction of the work. Banks shall be shored or sloped to the angle of repose to prevent slides or cave-ins.

Sheeting for the pipelines shall be driven or placed to a depth below the elevation of the pipe invert. In general, sheeting and bracing above the top of the pipe shall be removed as the excavation is refilled in a manner to avoid the caving in of the bank or disturbance to adjacent areas or structures. Void left by the withdrawal of the sheeting shall be carefully filled by compaction.

Before starting trench excavation, all obstructions, which are to be removed or relocated shall be cleared away. Trees, shrubs, poles, and other structures, which are to be preserved shall be properly braced and protected. Unless shown or specified otherwise, all trees and large shrubs shall be preserved with damage to the root structure held to a minimum.

The open, excavated trench preceding the pipe laying operation and the unfilled trench with pipe in place shall be kept to a minimum length causing the least disturbance. Ladders shall provide means of exit from the trench as required by the applicable safety and health regulations. Trench preparation shall proceed in advance of trench installation not more than 100 feet.

Excavated material shall be placed in a manner that will not obstruct the work nor endanger the workers, and shall be done in compliance with federal, state and/or local regulations.

Removal of pavement and road surfaces shall be a part of the trench excavation and the amount removed shall depend upon the width of trench required for the installation of the pipe and the dimensions of area required for the installation of valves, specials, manholes or other structures. The dimensions of pavement removed shall not exceed the dimensions required for the installation of pipes, valves, specials, manholes and other structures, unless otherwise required as a condition of a permit. Methods, such as sawing, drilling or chipping, may be used to assure the breaking of pavement along straight lines.

The width of the trench at the top of the pipe shall be ample to permit the pipe to be laid and joined properly and the backfill to be placed as specified. Minimum trench widths, as shown in Table 2, shall be used to protect work personnel. Trenches shall be of such extra width, when required, to permit the placement of timber supports, sheeting, bracing and appurtenances.

TABLE 2

Minimum Trench Widths at the Top of the Pipe

Normal Pipe Size (Inches)	Trench Width (Inches)
6	30
8	32
12	36
16	40
20	44
24	48
30	54
36	60

C. Removal of Water

At all times during the excavation period and until completion and acceptance of the work at final inspection, ample means and equipment shall be provided with which to remove promptly and dispose of properly all water entering any excavation or other parts of the work. The excavation shall be kept dry. No water shall be allowed to rise over or come in contact with masonry and concrete until the concrete and mortar have attained a set satisfactory to the Department Representative and, in any event, not sooner than 12 hours after placing the masonry or concrete. Water pumped or drained from the work hereunder shall be disposed of in a safe and suitable manner without damage to adjacent property or paved surfaces or to other work under construction. Water shall not be discharged onto paved surfaces without adequate protection of the surface at the point of

discharge. No water shall be discharged into sanitary sewers. No water containing settleable solids shall be discharged into storm sewers. The Valparaiso City Utilities or its Contractor shall promptly repair any and all damage caused by dewatering the work.

Discharge from any trench dewatering pumps shall be conducted to an approved reservoir, channel or sewer and in compliance with federal, state and/or local regulations.

No water shall be allowed to rise in the trench excavation until sufficient backfill base has been placed to prevent pipe flotation.

D. Boring and Casing

In some instances, trees, shrubs, utilities, sidewalks and other obstructions may be encountered, the proximity of which may be a hindrance to open cut excavation. In such cases, Valparaiso City Utilities or its Contractor shall excavate by means of short tunnels in order to protect such obstructions against damage. The short tunnel constructions shall be made by hand, auger or other approved methods and shall be approximately 6 inches larger than the diameter of the pipe bells or other conduit encasement. Such short tunnel work shall be considered incidental to the construction of pipelines or other conduits and all appurtenances.

Pipes to be placed in short tunnels shall be jointed prior to being pulled into position. Pipe shall be pulled into position in a manner, which keeps joints tight.

When casing pipe is specified for highway or railroad crossings, the project shall be completed in accordance with applicable federal, state and local regulations, and the terms of the excavation permit for the installation. In the case of railroad crossings, if the permit or license is required, the project shall comply with the regulations established by the railroad permit or license.

In order to avoid the transfer of earth and live loads to the carrier pipe, the space between the carrier and casing pipes should not be completely filled. The ends of the casing pipe shall be closed so as not to allow any drainage to flow into the casing pipe, or earth to fill the casing pipe. Casing chocks made of stainless steel and neoprene shall be installed at three (3) points on each carrier pipe and each pipe shall be restrained to the other by approved method.

E. Unstable Subgrade

If unstable material is exposed at the level of the bottom of the trench excavation, it shall be excavated. The Inspector may require material placed to stabilize the trench bottom with additional select fill material or a crushed stone or gravel mat or to insure firm support for the pipe by other suitable methods.

F. Backfill

All backfill work shall be done in accordance with INDOT specifications. Where unstable soil has been stabilized per part E of this Section (02220-3) of the Specification, all pipe shall be bedded in well graded, compacted, select fill material. Pipe bedding with select fill material shall extend a minimum of 6 inches below the bottom of the pipe and be carried up to 1 foot over the top of the pipe for the full trench width or as shown or specified. Select fill material shall consist of natural sand, crushed stone, or other granular or similar material, which can be readily and thoroughly compacted. For pipe all select fill pipe bedding shall consist of clean sand.

Select fill shall be placed by hand, in uniform layers not greater than 6 inches in loose thickness, and thoroughly compacted in place per Indiana Department of Highways Specification No. 211.

Trench backfilling work shall be done in such a way as to prevent dropping of material directly on top of any conduit or pipe. In no case shall backfilling material from a bucket be allowed to fall directly on a structure or pipe and, in all cases, the bucket shall be lowered so that the shock of falling earth will not cause damage.

All sand used for backfill shall be clean sand, not lumpy or frozen, and free from rubbish or other material.

Gravel used for backfill shall consist of clean gravel having durable particles graded from fine to coarse in a reasonably uniform combination with no boulders or stones larger than 2 inches in size. It shall be free from deleterious or objectionable materials. It shall not contain excessive amounts of loam and clay and shall not be lumpy or frozen.

Where pipelines or other conduits are placed in short tunnels, the annular space between the outside of the pipe wall and the tunnel wall shall be completely filled with select fill material or suitable job excavated material. Pipelines or conduits in short tunnels shall be suitably supported to permit placing of backfill, which shall be suitably tamped in place.

Existing underground structures, tunnels, conduits and pipes crossing the excavation shall be bedded with compacted select fill material. Bedding material shall be placed under and around each existing underground structure, tunnel, conduit or pipe and shall extend underneath and on each side to a distance equal to the depth of the trench below the structure, tunnel, conduit or pipe.

END OF SECTION