TRENCHING FOR UTILITY AND DRAINAGE ENCROACHMENT PERMIT

Description: Work under this item shall consist of trenching, backfilling, removing abandoned utilities and/or drainage, satisfactory clean-up and disposal of all surplus excavated material. Also included, is paving for the proper installation, reconstruction, repair or alteration of utilities or drainage at the locations shown on the plans or as directed by the District. All work shall be compliance with Standard Specifications for Roads, Bridges, Facilities, and Incidental Construction, as referenced herein.

Materials: The materials for this work shall meet the following requirements:
No. 6 Stone as specified in M.01.01.
Pavement and sidewalk shall be as specified in M.02, M.03 and M.04.
Bedding Material/Sandy Soil and aggregate shall be as specified in M.08.03.
Processed Aggregate base shall be as specified in M.05.01
Topsoil, fertilizer, seed and mulch shall be as specified in M.13.

Construction Methods:

(1) Trench Excavation Limits:

Horizontal Limits: Trench widths for pipes and structures shall be either 9 inches or 12 inches greater on each side of the pipe or structure as shown on the drawings or directed by the District.

Vertical Limits: Trench depths shall extend vertically as follows:
(a) From the bottom of the trench to the bottom of the roadway excavation, or in areas away from roadway excavation, to the top of existing ground surface.

(b) Where pipe or structure is to be laid on a suitable base, the bedding material or sandy soil shall be placed and compacted in 6 inch lifts to a minimum elevation of 6 inches below the proposed pipe or structure to 12 inches above the top of the proposed pipe or structure.

(2) Trench Excavation: Trench excavation shall be made in conformity with the requirements of the plans, or as directed. The Contractor shall furnish and employ such shores, braces, pumps, or necessary equipment as needed for the proper protection of property, proper completion of the work, as well as safety of the public and employees of both the Contractor and the Department. All bracing and shoring shall be removed when no longer required for the construction or safety of the work. When required, the Contractor shall provide or have on the Site at all times any OSHA certification for equipment to be used, as specified in 1.07.07. For support of trenches greater than 10 feet in depth, working drawings shall be submitted, in

accordance with 1.05.02. The Contractor shall control erosion and sedimentation at trench locations and ensure that pumped water from the excavation is discharged in accordance with the requirements of 1.10. The District may require an Erosion Control Plan.

Where a firm foundation is not encountered at the grades established due to unsuitable material such as soft, spongy, or unstable soil, the unsuitable material shall be removed 12 inches below the pipe or structure and replaced with 6 inches of sandy soil over 6" of No. 6 Stone, thoroughly compacted in lifts not to exceed 6 inches, for the full trench width. The District shall be notified prior to removal of the unsuitable material in order to determine the depth of removal necessary. The Contractor shall notify the District after the trench is complete excavated. The District will approve the excavation limits prior to installation of material, pipe or structure.

(3) Rock in Trench Excavation:
(a) Rock in Trench Excavation - Ledge: When rock in definite ledge form is encountered, the Contractor shall excavate a minimum of 12 inches below the bottom of the proposed pipe or structure. The Contractor shall place 6 inches of sandy material over 6 inches of No. 6 stone below the pipe or structure, which shall be thoroughly compacted in lifts not to exceed 6 inches.

(b) Rock in Trench Excavation - Boulders: When boulders are encountered, anything over 5-inch diameter, the Contractor shall remove them from the trench and backfill the void with appropriate material, which shall be thoroughly compacted in lifts not to exceed 6 inches.

(c) Rock in Trench Excavation –Structures: When cement masonry, concrete or reinforced concrete structures are encountered, the Contractor shall remove the structures in its entirety and backfill the void with appropriate material, which shall be thoroughly compacted in lifts not to exceed 6 inches.

(4) Backfill: Suitable material excavated from the trench shall be used as backfill material prior to consideration of using any other source of backfill. Backfill material used shall be of a quality satisfactory to the District and shall be free from large or frozen lumps, wood and other extraneous material. The grading shall be completed to the lines shown on the plans, or as ordered by the District. The backfilling shall be to the required elevation with approved suitable material, placed in layers not to exceed 6 inches for bedding material and 8 inches in compacted granular fill, as shown on the Compaction Chart on the CTDOT Encroachment Permit website. (Encroachment Permit (ct.gov)) The back fill shall be thoroughly compacted by means of vibrators or by pne

umatic tampers. Material placed around pipes shall be deposited on both sides to approximately the same elevation and compacted at the same time in 6-inch lifts. Rock fill or stones larger than 5 inches shall not be placed within 1 foot of the structure or pipe. The Contractor shall install warning tape markings for underground facility located a minimum of 12 inches above the pipe as specified in 1.05.15.

Where trenching occurs in riprap or crushed stone areas, the surface material shall be replaced in kind. The backfill shall be brought to the surface of the surrounding ground and neatly graded, except that where excavation is required in existing lawn or grass areas, the backfill shall be brought to within 4 inches of the top of the trench; and the remainder shall be filled with topsoil to 3/4 inch above adjacent areas as directed by the District. Where trenching in bituminous concrete sidewalk or paved areas, the trench shall be sawcut and backfilled to within the depth from the surface required to replace the removed sidewalk or pavement structure, which shall then be replaced. Where a trench is placed through a concrete sidewalk, the entire section of sidewalk between joints shall be replaced in accordance with 9.21, unless otherwise directed by the District. The edges of all trenches in paved surfaces shall be sawcut to neat lines prior to paving. All trenches in existing paved surfaces, which parallel the curb, shall be no more than 1-1/2 feet from the curb, or when no curb is present, the apparent edge of road. The exception shall be to avoid existing appurtenances such as catch basins, water gates, manholes etc.

(5) Underdrain and Outlets: Underdrains shall consist of pipe pervious to water, laid in a trench refilled with pervious material. They shall be of the dimensions and details as indicated on the plans. They shall be classed as "Underdrains," "Foundation Underdrains," "Slope underdrains" or "Structure Underdrains." Outlets for underdrains shall consist of pipe laid in a trench and refilled with earth. The size and type of outlet pipe shall be the same as that of the underdrain to which it is connected, except that it shall not be pervious to water.

The trench for the underdrain shall be excavated in accordance with the requirements of 2.86.03. The dimensions of the trench shall be as indicated on the plans or as ordered. Where the bottom of the trench is unstable or in rock, the trench shall be excavated 6 inches deeper and an additional 6 inches layer of granular fill or aggregate similar to that used to fill the trench shall be placed and compacted in the trench.

Where the perforations are to be at the bottom of the pipe, the aggregate for filling the trench shall then be placed to a depth of 3 inches and tamped true to grade. The pipe shall be placed and firmly bedded on the aggregate. This aggregate shall be placed whether the pipe is encased with geotextile or not.

When the pipe used has a bell, the pipe shall be installed with the bell end upgrade with the spigot end entered fully into the adjacent bell.

When clay or concrete pipe is used, the joints will not have to be filled with a joint sealant or fitted with a gasket.

When metal, bituminized fiber, plastic, polyethylene, or asbestos cement pipe is used, the pipe shall be carefully butted together and held by bands or other approved means so as to prevent any displacement of the joint.

After the pipe has been installed as described above, the aggregate shall be placed carefully around and over the pipe to a height of 12 inches above the top of the pipe. The remainder of the trench shall be filled with aggregate and tamped in layers as shown on the plans. When the underdrain pipe is used with the holes in an upward position, and in all cases where sand is used instead of the aggregate described hereinbefore, a protective 3-inch minimum layer of 3/8-inch aggregate shall be placed over the pipe and around all of the holes. Geotextile may be substituted for the 3-inch layer of aggregate. When geotextile is used, the entire length of each drainpipe shall be wrapped with the fabric and the seams lapped and welded or bonded. Where the seams of the geotextile are not welded or bonded, they shall be lapped to a minimum width equal to the diameter of the pipe for 6-inch pipe and larger and a minimum of 6 inches for smaller pipe.

In all cases where subbase material or gravel is to be placed over the underdrains, a layer of at least 6 inches of subbase material or gravel shall be placed over the underdrain immediately after its completion. For outlets, the trench shall be excavated, and the pipe installed in accordance with the requirements of 2.86.03.

Where shown on the plans or directed by the District, the Contractor shall connect underdrains or outlets to existing or proposed drainage systems or structures. This work shall be performed to the satisfaction of the District by installation of tees or wyes branches or by providing a hole in the main line underdrain. Where the upgrade end of the underdrain does not enter a structure, it shall be capped or plugged as directed.

6. Drainage: The placement of the drainage pipe or structure shall start at the downstream end and progress upstream as shown on the plans, or as directed by the District. All drainage pipes shall be carefully laid in the center of the drainage trench, true to the lines and grades given. Bell ends shall face upgrade and all joints shall be tight.

Joints in concrete pipe shall be sealed with cold-applied bituminous sealer, preformed plastic gaskets or flexible, watertight, rubber-type gaskets. Portland cement mortar shall not be used for sealing pipe joints except with permission of the District.

When a cold-applied bituminous sealer is used, the bell and spigot ends shall be wiped clean and dry before applying the bituminous sealer to the pipe ends. Before the drainage pipes are placed in contact with each other, the spigot or tongue end shall be completely covered with bituminous sealer; then the pipe shall be laid to line and grade so the inside surface of all abutting pipes are flush. Additional bituminous sealer shall be applied to the joint after the connection has been made to ensure a watertight connection.

Where the end of an existing drainage pipe is not compatible with the end of a proposed concrete pipe, the Contractor shall align the inner diameters of the pipes being connected, butt the pipe ends together, and construct a cast-in-place concrete pipe connection, as shown in the plans. Incompatible bell/spigot or tongue/groove ends shall be cut off as required to ensure the interior drainage pipe walls are aligned to provide a smooth transition between the pipes.

Newly installed drainage pipe which is not in true alignment, or which shows any settlement or distortion, shall be reinstalled in accordance with 1.05.03.

When drainage pipe outside of proposed drainage trench limits is to be removed, it shall be removed to the limits shown on the plans. All remaining pipes shall be plugged with cement masonry.

All inlet and outlet pipes shall be set flush with the inside face of the wall as shown on the plans. The pipes shall extend through the exterior walls for a sufficient distance beyond the exterior surface to allow for satisfactory connections. The concrete or masonry shall be constructed around the inlet and pipe neatly to prevent leakage along their exterior surfaces.

Drainage Pipe End Installation: Reinforced concrete drainage pipe ends shall be placed on a prepared bed of the sandy soil and accurately aligned as shown on the plans. The joints shall be sealed as specified in 6.86.03-3 and backfill shall be placed around both sides of the unit simultaneously to the elevation shown on the plans.

When a pipe or structure is to be abandoned, the pipe or structure shall be removed to a depth 2 feet below the subgrade or as directed by the District.

Drainage Structures shall be constructed in accordance with the plans. The provisions of 6.02.03 pertaining to bar reinforcement shall apply. Welding shall be performed in accordance with the applicable sections of the AWS Structural Welding Code, D1.1.

Work for drainage shall also include the encasement of pipe or structure in sand, grading and placement of topsoil, fertilizing, seeding, and mulching, and the removal and reconstruction of bituminous, concrete and granite curbing, riprap, crushed stone, processed aggregate base, granular base, suitable backfill material, pavement or bituminous concrete sidewalk structure of all disturbed areas within the maximum trenching limits shown on the plans.