DIVISION 7

Standards for Aggregates, Trenching, Backfill, & Restoration
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7-1.000 GENERAL

The Developer shall complete the installation of all furnished materials in accordance with the Construction Drawings and Standard Details, Specifications and in accordance with all State, District and other local regulatory authority requirements. The more stringent Standard shall apply unless agreed to by the District.

7-2.000 AGGREGATES

A. Foundation Gravel: Comply with Section 9-03.17 of WSDOT Standard Specifications for Class “A”.

B. Bedding Material for Rigid Pipe: For all sewer lines, pipe bedding shall be classified as pea gravel per this Division 6, for water lines, pipe bedding shall be classified as pea gravel per this Division 6, or upon prior approval by the District, shall comply with Section 9-03.12(3) of WSDOT Standard Specifications.

C. Bedding Material for Flexible Pipe (PVC): For all sewer lines, pipe bedding shall be classified as pea gravel as shown below. For water lines, pipe bedding shall be classified as pea gravel as shown below, or upon prior approval by the District, shall comply with Section 9-03.13 of WSDOT Standard Specifications.

D. Bedding Material for Copper Tubing: Shall be classified as clean, rock free sand.

E. Bank Run Gravel for Trench Backfill: Bank run gravel for trench backfill material shall conform to Section 9-03.19 of the WSDOT Standard Specifications.

F. Pea Gravel: Bedding shall consist of screened sand, gravel or other inert materials, or combinations thereof, from sources approved by the District, and shall have hard, strong, durable particles free from adherent coatings. The material shall be washed thoroughly to remove clay, loam, alkali, organic matter, or other deleterious substances and shall meet the flowing test requirements.

<table>
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7-2.010 Control Density Fill (CDF)

Control density fill shall be flowable and shall meet all the requirements of the jurisdictional authority.
7-3.000   TRENCHING AND BACKFILL

7-3.010   General

The following trenching and backfill specifications and requirements apply to all utility installations within the District. These standards represent the minimum required. Jurisdictional or other standards will apply in all cases when those standards and requirements exceed these minimums.

The location of the pipe shall be shown on the Construction Drawings and field adjusted as approved by the Engineer. During trenching, installation of pipelines and appurtenances and the placing of backfill, trenches shall be kept free of water. The Contractor shall furnish all equipment necessary to dewater the trench and shall dispose of the water in such a manner as not to cause a nuisance or menace to the public and in accordance with State and local authority requirements.

All trench excavations shall have adequate safety systems for the trench excavation that meet the requirements of the Washington Industrial Safety and Health Act, Chapter 49.17 RCW. The Contractor shall be fully responsible for providing the necessary back sloping, cribbing, trench boxes, etc., as required to meet the specific safety requirements for the trench.

The Contractor’s attention is called to the depth of the structures and pipe which may require special shoring and bracing. The Contractor shall furnish all shoring and bracing or sheeting required to perform and protect the trench and to safeguard the employees. The Contractor shall follow all Federal and State regulations for trenching and backfill.

No timber bracing, lagging, sheathing or other lumber shall be left in any excavation. From the Construction Documents it will be noted that the volume excavated will be displaced by the pipe, bedding material and backfill. Such excess material shall be loaded, hauled and disposed of in a manner selected by the Contractor and approved by Snohomish County or other agency. The Contractor shall be responsible for obtaining any City, County, State or other agency permits for such disposal sites and shall pay all fees and charges associated therewith.

Trench backfill material shall be bank run gravel or native material. Material shall require approval by the Contractor’s geotechnical consultant prior to using. Excavation and backfill compaction shall be performed in accordance with standard construction practices to achieve the required compaction. Compaction and acceptance shall be subject to approval of the jurisdictional authority and the District.

Backfill compaction shall occur in sufficiently thin lifts to achieve the density requirements specified above. Such compaction shall be performed to within 6-inches of existing road grade. In areas of existing pavement, after placing a tack coat on the existing asphalt edges, the final patch shall be constructed with 6-inches of ACP or 4-inches of ATB and 2-inches of ACP placed in the trench up to finished grade or in accordance with jurisdictional requirements and whichever is more stringent shall apply.

Where the undisturbed condition of natural soils is inadequate for support of the planned construction, excavation shall be extended 8-inches minimum below the structure or pipeline grades to permit the placing of foundation gravel.
Trench cross-sectional width shall conform to the trench details shown on the Construction Drawings and Standard Details.

Trench dams shall be installed across the entire trench section and to the full depth of all granular backfill materials in all areas of steep slopes, stream and wetlands crossings and as determined by the District and/or other local governmental authorities. See Standard Detail TBR-4 in Division 7.

Testing frequency shall comply with sub-section of this section. Areas that fail to pass testing shall require retesting at locations determined by the Engineer.

7-3.020 Evaluation of Native Soil

The Contractor’s soils geotechnical consultant shall complete a thorough evaluation of native soil. Soil evaluations, sieve analysis and proctors shall be completed prior to and during construction for varying soil conditions as determined by the soils geotechnical consultant. The geotechnical consultant shall verify that material can achieve compaction under varying weather conditions. At any time native materials are determined to be unsuitable to obtain compaction, imported materials shall be provided in accordance with the specifications. Material source shall be provided and approved by the Engineer. All acceptance tests shall be conducted from in-place samples. Compaction testing shall be accomplished using a densometer. Compaction testing results sent to the District’s Inspector shall include a copy of the material proctor results and the precise location of area tested by reference of horizontal and vertical location using Construction Drawings.

7-3.030 Installation

Prior to excavation and installation, adequate compaction equipment shall be on site. Backfill and compaction shall be completed in conjunction with the pipeline installation. Prior to use and operation of the water and/or sewer mains, adequate compaction shall be verified by compaction testing. The District highly recommends that compaction testing be completed in conjunction with the backfill and compaction. Copies of compaction testing reports and soils analysis and proctors shall be provided to the District to verify compaction requirements prior to pressure testing.

A. Utility Trenches in the Existing Right-of-Way: Trench backfill material and compaction shall conform to the jurisdictional requirements of the Entity/Owner of the existing right-of-way or follow District Standards, and whichever is deemed by the District and Entity/Owner to be more stringent shall apply.

B. Utility Trenches in Proposed or Existing Traffic Areas, including Driveways Easements: All trench backfill shall be mechanically compacted to 95 percent of maximum density in accordance with ASTM 1557 (modified proctor).

C. Utility Trenches in Non-Paved, Non-Structured Areas and Designated Wetlands: All trench backfill shall be mechanically compacted to 90 percent of maximum density in accordance with ASTM 1557 (modified proctor). Compaction testing as specified in Section 2-03.3(14)D of the WSDOT/APWA Specifications and as specified by the local jurisdiction, shall be required.
D. **Utility Trenches in Areas Near Structures:** Structures located within a 1:1 slope from invert of the excavation to the top of slope shall be deemed as lying in the “Zone of Influence” and that easement area shall be mechanically compacted to 95 percent of maximum density in accordance with ASTM 1557 (modified proctor). The geotechnical consultant must state that the compaction in the trench line adjacent to the structure has been adequately compacted to the standards and that the backfill should support the structure.

7-3.040 **Frequency of Testing**

A. Horizontally: Minimum of two locations every 200 feet of trench, or a minimum of two locations per day or a minimum of 2 locations per pipe run between manholes and/or valves whichever is more frequent shall apply.

   Additional tests may be required when variations occur due to the Contractors operations, weather conditions, site conditions, etc.

B. Vertically: For trenches 12-feet and under; complete a minimum of one test at approximately one half of the trench depth and an additional test at or near the surface.

   For trenches 12-feet to 16-feet deep; complete one test at approximately 4-feet above the pipe, one test at or near the surface and one test approximately halfway in between.

   For trenches greater than 16-feet deep; complete tests at approximately four foot intervals above the pipe to the surface (four tests required) or as directed by the District.

   Structured areas, such as an easement near a building, will require additional testing in the zone of influence from the licensed geotechnical consultant such that the compaction shall not adversely affect the nearby or surrounding structures.

   If compaction within any area of the project is questionable as determined by the District and prior to paving, additional excavation and testing as directed by the District shall be completed.

   Compaction testing costs are the responsibility of the Contractor. Copies of all testing reports shall be provided to the District for verification and project records and jurisdictional approvals.

7-3.060 **Restoration**

The Contractor shall prepare and restore all test sites with his own equipment, labor and materials. All costs incidental to the preparation and restoration of all test sites shall be at the Contractor’s cost. The Contractor shall remedy, at his expense, any defects that appear in the backfill prior to final acceptance of the work.

Upon completion of work each day, all open trenches shall be completely backfilled and leveled. In paved areas, temporarily patch with 3 inches of cold mix asphalt concrete (or as specified by the regulatory authority) except in areas designated for Control Density Fill (CDF). Where CDF is accepted it shall be placed in accordance with the jurisdictional authority (City, County, State) and at the end of excavation each day, may be covered with steel plates or other materials providing safety protection for the public. Prior to placing CDF over ductile iron pipe or fittings, the pipe bedding material around the pipe shall be placed and compacted.
7-3.070 Soil Amendments

Amendments to soil such as kiln dust will be considered by the District if:
The recommendation is made by the Contractor’s geotechnical consultant.
   a. The geotechnical consultant verifies the proposal complies with the jurisdictional authority requirements if applicable.
   b. The Contractor takes full responsibility for any impacts placed on surrounding areas.
   c. The amendment is consistent with the entire trench depth. (Bridging lower portions of trench line will not be allowed).

Use of soil amendments must be approved by the District prior to placement. The District reserves the right to deny use of soil amendments at the District’s discretion. Soil amendments used and without prior approval from the District shall be removed at the costs of the Contractor.

If amendments are approved by the District, the geotechnical consultant shall witness and document the mixture of the additive. Compaction tests that meet these standards are required at the frequency and depths specified.

7-4.000 PERMANENT PAVEMENT REPAIR

Pavement repair shall follow the governing jurisdictional authority when in the Right-of-Way. The District’s standards are to be followed in the easements. Where Standards differ, the most stringent shall apply as determined by the District.

A. Asphalt Concrete Pavement Repair. Asphalt concrete pavement repair shall be asphaltic concrete pavement HMA 1/2 and shall conform and be placed in accordance with the requirements of Section 4-06 and 5-04 WSDOT. Before pavement is placed, all edges and joints of asphaltic concrete pavement shall be tacked with:

1. Asphalt Sealer SS 1 or equal.

2. After pavement is in place, all joints shall be sealed with hot asphalt cement, AR 4000 Grade and sand placed on sealant to prevent tracking by vehicles.