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CITY OF ELK GROVE

Standards Update Transmittal

Reference Number: 2024v-01
Standards: Standard Construction Specifications 19-02.03

Update:

1. Modification to Specification Section:
   a. 19-02.03 Trench Excavation, Bedding and Backfill – Intermediate backfill, revised to add Manhole runs of 100' or less to Construction Quality Assurance testing frequency.
   b. Modify sentence as follows: "Testing frequency, at minimum shall include at least one test per 100 linear feet of trench length or manhole run which ever is less, and…."

Effect of Update:

1. This modification will ensure that backfill of manhole runs of 100' or less is tested as it is typically completed separately from the longer adjacent runs.
2. Current project testing plots indicate that these short runs are not being tested at all.

Request for Update Initiated By: John Pumphrey 5/14/2024
Date

Update Reviewed for Conformity and Consistency to Standards: Shoaib Ahrary 6/19/2024 | 5:43 PM PDT
Shoaib Ahrary, PE, ESD Manager Date

Update to Standards Approved: Kristin Parsons 6/19/2024 | 6:12 PM PDT
Kristin Parsons, PE, City Engineer Date

19-2.03 Intermediate Backfill

Intermediate backfill materials shall consist of material placed between the initial backfill and bottom of subgrade in paved areas or to the top of the trench in unpaved areas, unless otherwise shown on the Plans or specified in the Contract.

Intermediate backfill materials shall meet the requirements of the Standard Construction Specifications, Standard Drawings, and the approved project plans.

The intermediate backfill material may be native material excavated at the work site if the intermediate backfill depth between the top of the initial backfill and subgrade is greater than or equal to eighteen inches (18”). Native material must be free of organic or other unsuitable materials as determined by the City that may cause voids or depressions to develop during or after placement of the intermediate backfill. Rocks, stones, and solid earth chunks exceeding three inches (3”) in greatest dimension shall be removed from the intermediate backfill material. The intermediate backfill material for intermediate backfill depths less than eighteen inches (18”) measured from the top of the initial backfill to the bottom of subgrade shall be Type “A” ¾” Class II Aggregate Base (AB) or Type “D” Controlled Density Fill (CDF) material conforming to the requirements in Section 50 of these Specifications and Standard Drawings SD - 6.0, SD-6.1 and SD – 6.2. Aggregate base shall be placed in eight inch (8”) maximum loose lifts. Compaction requirements for aggregate base shall be the same as required for compaction of job excavated native material. An alternative use of Type “D” CDF material as defined in Section 50-15 of these specifications must be approved in writing by the Engineer. Type “D” material will not be allowed over other agency water pipes or sewer pipes.

Unless otherwise shown or specified in the Contract, compaction of all intermediate backfill material shall be by mechanical pneumatic or vibratory compaction equipment. Hydraulic ponding and hydraulic jetting methods are not permitted.

1. Compaction

   The first lift of the intermediate backfill material shall be no more than eight inches (8”) in loose thickness and shall be compacted to achieve a minimum of ninety (90%) percent of the ASTM D1557 maximum dry density at a moisture content between zero (0) and three percent (3%) above the optimum moisture content. This lift shall be tested for relative compaction prior to continuation of backfill procedures. All subsequent backfill shall be placed in lifts no greater than eight-inches (8”) in loose thickness (or less depending on ability of compaction equipment) and compacted to achieve a minimum of ninety three percent (93%) of the ASTM D1557 maximum dry density at a moisture content between zero (0) and three percent (3%) above the optimum moisture content. The intermediate backfill material within a two foot (2’) wide zone surrounding vertical structures shall be mechanically compacted by smaller hand operated or walk behind compactors in addition to the larger trench compaction equipment. Hydraulic jetting will not be permitted by the City of Elk Grove.

For new and existing street areas where over-compaction of expansive soils is a concern, if native material, used in the upper three feet (3') of trenches, has an Expansion Index (EI) greater than seventy (70) (based on 1997 UBC Test Method 29-2), then the contractor/developer shall submit for approval, alternative methods to either reduce the expansion potential of the native material or replace with suitable non-expansive material. An alternative to conventional intermediate backfill materials would be CDF.

2. Moisture Content

   The moisture content of the intermediate backfill during compaction shall be between zero (0) and three percent (3%) above the optimum moisture content as established by ASTM D1557 unless otherwise specified by the geotechnical report for the specific project and approved by the Engineer. The intermediate backfill material shall be uniformly moisture conditioned as needed prior to placement and compaction.

Construction Quality Assurance

1. Field Density Tests

   Nuclear moisture content and density testing shall conform to ASTM D2922 and ASTM D3017. Test frequency, at minimum, shall include at least one test per 100 linear feet of trench length or per manhole run, whichever is less, and every two feet (2') vertically starting two feet (2') above the pipe. Density tests shall be performed at a frequency of at least one test for every two feet (2') of backfill vertically for vertical structures (i.e. manholes, valve risers, etc.). Backfill above lateral services shall be tested at least every two feet (2') vertically. Calibration shall be performed for each nuclear gauge on a weekly basis to confirm the accuracy of nuclear density gauge moisture readings. The frequency and location of testing may be revised as determined by the Engineer.

2. Modified Proctor Compaction Curve

   Modified Proctor compaction curves (ASTM D1557) shall be performed as needed depending on changes in material types or a minimum once for every 2,000 cubic yards of material placed whichever comes first.

3. Profile Plots of Test Locations

   All compaction tests performed on trench backfill placed in utility trench mainlines, services, and around manholes shall be plotted and individually numbered on a set of record drawings for submittal to the Engineer immediately upon completion of the testing. Test reports and technician Daily Field Reports shall be submitted electronically to the Engineer within five (5) working days of testing. All trench backfill test reports shall be submitted to the Engineer at a minimum of ten (10) working days in advance of subgrade preparation. Unless otherwise specified in the Special Provisions, the Contractor has the option to use imported granular

material for trench backfill in place of native material excavated at the work site. The imported granular material shall be uniformly graded Class 2 aggregate base conforming to the requirements in Section 50-7, “Aggregate Bases”, of these Specifications. The imported granular material shall be placed in lifts not to exceed six inches (6”) after compaction. Compaction requirements for imported granular material shall be the same as required for compaction of job excavated native material. Unless otherwise specified in the Special Provisions, the optional use of imported granular material for trench backfill will be at the Contractor’s expense.