# SECTION 312323 GRAVEL AND CRUSHED ROCK BASE FOR STRUCTURES

## PART 1 - GENERAL

A. Description

This includes materials, testing, and installation of gravel and crushed rock bases for structures such as manholes and vaults.

B. Related Work Specified Elsewhere

1. General Concrete Construction: 030500.

2. Trenching, Backfilling, and Compacting: 312316.

C. Submittals

Submit six copies of a report from a testing laboratory verifying that material contains less than 1% asbestos by weight or volume and conforms to the specified gradations or characteristics.

D. Testing for Compaction

1. The Owner will test for compaction or relative density as described in Section 312316 and below.

2. Determine the density of gravel and rock in place by the sand cone method, ASTM D1556.

3. Determine the relative density of gravel and rock per ASTM D4253 and D4254.

4. Sample backfill materials per ASTM D75.

5. Compaction shall be deemed to comply with the specifications when no more than one test of any six consecutive tests falls below the specified relative compaction. The one test shall be no more than three percentage points below the specified compaction. The Contractor shall pay the costs of retesting work not conforming to the specifications.

## PART 2 - MATERIALS

A. Crushed Rock and Gravel

1. Crushed rock base and gravel are defined as natural or crushed rock, free from organic matter and containing less than 1% asbestos by weight or

volume, conform to ASTM C-33 Size No. 57, and meeting the following gradation:

| Sieve Size | Percent Passing By Weight |
|---|---|
| 1 1/2 inches | 100 |
| 1 inch | 95 to 100 |
| 1/2 inch | 25 to 60 |
| No. 4 | 0 to 10 |
| No. 8 | 0 to 5 |

2. Durability Index shall be at least 40 per California Test Method No. 229.

B. Filter Fabric

See Specification Section 312316.

PART 3 - EXECUTION

A. Placement of Crushed Rock or Gravel

1. Place crushed rock or gravel base beneath structures and as shown in the drawings. Excavate a minimum of 6 inches below the required grade for the bottom of the structure and to a minimum width of 24-inches greater than the structure base or footings. Remove all loose and unsuitable material.

2. After the required excavation has been completed, the Owner's Representative will inspect the exposed subgrade to determine the need for any additional excavation. It is the intent that additional excavation be conducted in all areas within the influence of structures and pipeline where unacceptable materials exist at the exposed subgrade. Overexcavation shall include the removal of all such unacceptable material that exist directly beneath the structure and to a width 24 inches greater than the base or footing of the structure and to the depth required, with a minimum of 12 inches.

3. After excavation has been authorized by Owner's Representative, place filter fabric on the bottom of the excavation and up the sides a sufficient height to fully wrap the rock refill material and achieve a 12-inch overlap. Protect fabric during installation from clogging, tears, and other damage. Install in accordance with manufacturer's recommendations. Place fabric with the long dimension parallel to the excavation and lay smooth. Stretch and align the fabric in a wrinkle-free manner. Place the strips to provide a minimum width of 12-inches overlap at joints. Provide ballast (e.g., sand bags) to prevent uplift from wind. Do not leave fabric uncovered for more than 7 days after installation.

4. Do not cover filter fabric prior to inspection by the Owner's Representative. Protect the filter fabric from damage due to the placement of rock refill by limiting the height of drop of the material to less than 3 feet. Backfill the excavation to subgrade of structure with crushed rock or gravel. Place the foundation stabilization material over the full width of the excavation and compact in layers not exceeding 8 inches deep to the required grade. Completely wrap rock/gravel with filter fabric on all sides including top, ensuring a minimum overlap of 12-inches.

5. Rock refill used by the Contractor for his convenience will not be cause for any additional payment.

6. Compact base with four (4) full passes with a vibratory compactor per lift.

7. Place base material in maximum lifts of 8 inches.

END OF SECTION