STATE OF CONNECTICUT

DEPARTMENT OF TRANSPORTATION

Standard Specifications
for
Roads, Bridges, Facilities
and
Incidental Construction

FORM 817
merged with
JULY 2017 SUPPLEMENTS

INCIDENTAL CONSTRUCTION

SECTION 7.01
DRILLED SHAFTS

7.01.01—Description: This work shall consist of all labor, materials, equipment and services necessary to complete the Drilled Shaft installation in accordance with the Contract. Drilled shafts shall be made primarily of reinforced or unreinforced concrete.

7.01.02—Materials: Drilled Shafts shall be made of the following materials:

1. Portland Cement Concrete: Concrete used in the construction of the shaft shall be as shown on the plans, in M.03, and shall meet the following requirements:

(a) The concrete shall have a minimum initial slump of 8 inches.

(b) The concrete mix shall maintain a slump of no less than 4 inches for a minimum of 3 hours beyond the expected time for placement of concrete and removal of temporary casing (if used), as indicated by trial mixes and physical tests of slump loss. The trial mix and physical tests (slump loss tests) shall be conducted using concrete mix and ambient air temperatures anticipated during concrete placement.

(c) All admixtures, if approved for use, shall be adjusted for the conditions encountered on the job so as to meet the slump loss requirements within this specification and must not adversely affect the timing of, taking of or interpretation of any Nondestructive Testing that may be called for in the Contract.

(d) Coarse aggregate shall meet the gradation requirements specified in Table M.01.02-2 for No. 8 coarse aggregate.

2. Reinforcing Steel: Reinforcing steel used in construction of the shaft shall be as specified in M.06.01.

3. Access Tubes: Access tubes for cross-hole acoustic logging shall be made of Schedule 40 steel pipe meeting the requirements of ASTM A53, Grade A or B, Type E, F, or S. The tubes' inside diameter shall be at least 1.5 inches.

All access tubes, including all pipe joints, shall have a round, regular inside surface free of defects and obstructions in order to permit the free, unobstructed passage of probes to the bottoms of the tubes. The access tubes shall be watertight, free from corrosion and free of deleterious material on the outside that could prevent bonding with the concrete. All access tubes shall be fitted with watertight caps on the bottom and top.

4. Grout: Grout used for filling Access Tubes shall meet the requirements of M.03.05. The grout shall have strength properties equivalent to or better than those of the drilled shaft concrete.

5. Permanent Casing: Steel casing shall meet the requirements of ASTM A36 or ASTM A252 Grade 2 unless otherwise specified on the plans. Casings shall be smooth, clean, watertight, and of ample strength to withstand handling, installation, and the pressure from surrounding concrete and earth materials. The outside diameter of any

horizontal plane at the plan elevation for the top of the shaft.

(b) The vertical alignment of a vertical shaft excavation shall not vary from the plan alignment by more than 1/4 inch/foot of depth.

(c) After the concrete is placed, the top of the reinforcing steel cage shall be no more than 6 inches above and no more than 3 inches below plan position.

(d) All casing diameters shown on the plans refer to outside diameter ("OD") dimensions. The dimensions of casings are subject to American Petroleum Institute tolerances applicable to regular steel pipe. The Contractor may elect to provide a casing larger in diameter than shown in the plans, if the Engineer approves to do so.

(e) The top elevation of the shaft shall have a tolerance of plus 1 inch or minus 3 inches from the plan top-of-shaft elevation.

(f) Excavation equipment and methods shall be designed so that the completed shaft excavation will have a planar bottom. The cutting edges of excavation equipment shall be normal to the vertical axis of the equipment within a tolerance of +/- 3/8 inch/foot of diameter.

Drilled shaft excavations and completed shafts not constructed within the required tolerances are unacceptable. The Contractor shall be responsible for correcting all unacceptable shaft excavations and completed shafts to the satisfaction of the Engineer. Materials and work necessary, including engineering analysis and redesign, in order to complete corrections for out-of-tolerance drilled shaft excavations, shall be furnished without cost to the State or extension of Contract time.

21. Reinforcing Steel Cage Construction and Placement: The reinforcing steel cage, consisting of longitudinal bars, ties, cage stiffener bars, spacers, centralizers, and other necessary appurtenances, shall be completely assembled and placed as a unit immediately after the shaft excavation is inspected and accepted, and prior to concrete placement. Internal stiffeners shall be removed as the cage is placed in the borehole, so as not to interfere with the placement of concrete.

The reinforcing steel in the shaft shall be tied and supported so that the reinforcing steel will remain within allowable tolerances. Concrete spacers or other approved noncorrosive spacing devices shall be used at sufficient intervals near the bottom and at intervals not exceeding 10 feet up the shaft, in order to ensure concentric spacing for the entire cage length. Spacers shall be constructed of approved material, equal in quality and durability to the concrete specified for the shaft. The spacers shall be of adequate dimension to ensure a minimum 3 inch annular space between the outside of the reinforcing cage and the side of the excavated hole. Approved cylindrical concrete feet (bottom supports) shall be provided to ensure that the bottom of the cage is maintained the proper distance above the base.

The elevation of the top of the steel cage shall be checked before and after the concrete is placed. If the upward displacement of the rebar cage exceeds 2 inches or if the downward displacement exceeds 6 inches per 20 feet of shaft length, the drilled shaft will be considered defective. In such a case, corrections shall be made by the Contractor to the satisfaction of the Engineer. No additional shafts shall be constructed until the Contractor has modified the rebar cage support in a manner satisfactory to the Engineer.

22. Concrete Placement: Concrete placement shall be performed in accordance with the applicable portions of 6.01 and the requirements herein dealing with concrete materials.