ADDENDUM NO. 1

SPECIAL PROVISION

REVISED SPECIAL PROVISION
The following Special Provision is hereby deleted in its entirety and replaced with the attached like-named Special Provision:

- ITEM #1202247A – OVERHEAD CANTILEVER SIGN SUPPORT FOUNDATION (TYPE VMS 1)

PLANS

REVISED PLANS
The following Plan Sheets are hereby deleted and replaced with the like-numbered Plan Sheets:

- 02.01.A1
- 04.02.A1
- 04.03.A1
- 04.04.A1
- 04.05.A1

The Bid Proposal Form and Detailed Estimate Sheets are not affected by this Addendum.

There will be no change in the number of calendar days due to this Addendum.

The foregoing is hereby made a part of the contract.
ITEM #1202247A – OVERHEAD CANTILEVER SIGN SUPPORT FOUNDATION (TYPE VMS 1)

Description: Work under this item shall consist of the construction of foundation(s) for the “Overhead Cantilever Sign Support” structures and all work incidental to this construction as shown on the plans and in conformance with these specifications. The Contractor shall construct the footing foundation as shown on the plans. All work shall conform to the requirements of this Special Provision and Section 7.01 of the Standard Specifications.

Contractor Qualifications:

The Contractor or Subcontractor(s) performing the work to install drilled shaft foundations shall submit documentation to the Engineer for approval that demonstrates experience of key staff with the proposed work as it relates to the requirements of this contract. At a minimum, this documentation shall include the following:

- List of key staff that will be involved in the construction of the traffic structure foundations, to include the supervisor for the foundation installations and proposed equipment operator(s).
- Resumes for each key staff member that will be involved in the construction of the traffic structure foundations. Resumes shall identify the following for each individual:
  - A minimum of two (2) previously completed construction projects where the key staff member has performed their proposed job function in the construction of traffic structure foundations. Each cited project shall have included a minimum of four (4) new drilled shaft foundations for overhead sign structures. A minimum of one (1) project shall have included the installation of a foundation requiring either a rock socket or Rock-In-Foundation Excavation.
  - A minimum of 5 years’ experience in the performance of the proposed work for all field supervisory personnel.
  - The individual’s role/job function and overall responsibilities for each identified project.
  - The number & type of traffic structure foundations that were installed for each project.
  - Client reference for each project.

In addition, the Contractor shall submit to the Engineer for approval a list of proposed equipment that will be used for the installation of the traffic structure foundations proposed in the project.
Materials:

Materials for Drilled Shaft Foundations shall conform to the requirements of Section 7.01 of the Standard Specifications and the following:

Class PCC03340 Concrete shall conform to the requirements of Section 6.01, 7.01 and Article M.03.

Concrete for drilled shafts shall attain a 28-day compressive strength of 4,400 PSI and have a maximum aggregate size of No. 8 stone.

Reinforcing steel shall conform to the requirements of Section 6.02 and Article M.06.01. Anchor plate shall conform to the requirements of ASTM A709, Grade 50, galvanized. Anchor rods shall conform to ASTM F1554, Grade 105 and shall be galvanized as shown on the plans in accordance with ASTM B695, Class 55. The internal threads of nuts shall be retapped after galvanizing to accommodate the increased diameter of the bolts.

Leveling and lock nuts shall conform to ASTM A563, Grade DH and shall be galvanized in accordance with ASTM B695, Class 55. Lock nuts shall also be self-locking of the prevailing torque reusable type and shall conform to the requirements of Article M.18.02.

Washers shall conform to ASTM F436, Type 1 and shall be quenched, tempered and galvanized in accordance with ASTM B695, Class 55.

Rigid metal conduit, ground rod sleeves and related hardware and end caps shall be galvanized steel conduit and shall conform to Section M.15.09.

Bare copper wire shall conform to M.15.13.

Zinc-rich field primer for touch up shall conform to the requirements of Federal Specification TT-P-641-Type 1 and ASTM A780. The use of aerosol spray cans shall not be permitted.

Ground rods shall be 5/8” in diameter by 12’ long copper clad steel. The copper cladding shall be a minimum thickness of 0.12”. The ground clamp shall be a square-head bolt type approved for direct burial.

Any admixtures proposed for use in the bentonite slurry shall be approved by the Engineer. Bentonite slurry properties may be adjusted to suit field conditions with the approval of the Engineer. Polymer or other slurry materials may be submitted to the Engineer for review.

Construction Methods:

Working Drawings

Prior to submission of shop drawings, the Contractor shall obtain a field survey and prepare and submit for review, a roadway plan and cross section, drawn to scale, at the location of each sign support foundation in accordance with Article 1.05.02. The plan and cross section shall include, at
a minimum, the following information:

- foundation type
- orientation of the structure, foundation and VMS with respect to the roadway
- elevation view of the structure, foundation and VMS, oriented perpendicular to the sign face
- roadway cross section, including lane and shoulder locations, widths and elevations within the limits of the truss arm
- ground elevations at the top/bottom of slope, center of the posts and pertinent points on the slope beyond the foundation to establish grade and accurately determine depth of cover to critical points of foundation
- existing/proposed roadside barrier type and location
- for overhead cantilever structures, minimum vertical clearance to the bottom of the support beams and distance to the truss centerline from the top of roadway high point within the limits of the truss arm
- for side mounted structures, minimum lateral offset from curb/edge of pavement to VMS
- post height (measured from top of foundation to center of truss for overhead cantilever), top of foundation/pedestal elevation
- pedestal and pile cap heights (for overhead cantilever drilled shaft alternate)
- excavation limits and temporary sheet piling limits (if required)
- work areas

The Contractor is responsible for the location and proper orientation of the sign support foundation.

The Contractor shall submit a foundation constructability plan which includes the following:

- Access to the area including the following, when applicable:
  - Temporary road
  - Removal of guide rails or concrete barriers
  - Utility locations and drainage installations that could obstruct construction
  - Clearing and grubbing (this shall be accomplished in accordance with Section 2.01)

- Traffic Protection including the following applicable considerations:
  - Temporary guide rails and/or concrete barriers
  - Maintenance and Protection of Traffic Control Plans for work that cannot be accomplished using the Typical Traffic Control Plans (All work to install the foundation shall be accomplished in accordance with Article 1.08.04 – Prosecution & Progress and item 0971001A- Maintenance & Protection of Traffic unless otherwise approved in writing by the Engineer).

Shop Drawings
Once the Engineer has reviewed and accepted the Contractor’s roadway plan and cross section, shop drawings for the foundation reinforcement and anchorage shall be submitted to the Engineer in accordance with Article 1.05.02. As part of the submittals for the overhead cantilever foundation reinforcement and drilled shaft, the Contractor shall include details and/or work procedure for support of the reinforcement cage.
Drilled Shaft Foundation

A drilled shaft foundation unit consists of two drilled shafts, one pile cap and one pedestal. Drilled shafts shall be constructed in accordance with Section 7.01 – Drilled Shafts and Section 12.02 – Overhead Sign Support Foundation of the CTDOT Standard Specifications for Roads, Bridges, and Incidental Construction.

This work may require rock excavation, drilling rock or using slurry filled shafts through whatever materials are encountered to reach the depths indicated on the plans and specifications. The Contractor shall submit a sequence plan outlining drilling, casing, slurry, reinforcement and concrete placement procedures for the Engineer to review.

All excavations shall conform to the current OSHA and other applicable local, state and federal regulations. It is the Contractor’s responsibility to ensure the stability of the excavations.

Prior to drilled shaft construction, the grade in the vicinity of the shafts shall be constructed to the finished grade.

The hole shall be drilled to the minimum depth specified and shall be examined for straightness. A suitable temporary casing or slurry shall be furnished and placed when required to prevent caving/sloughing of the granular soils before concrete is placed. The Contractor is responsible for maintaining the stability of the shaft excavation. While the casing is being withdrawn, a sufficient head of concrete should be maintained above the bottom of the casing, to prevent "necking" of the shaft due to sloughing soils. Concrete placed near the surface should be in full contact with the undisturbed soil to provide lateral stability for the full length of the shaft. An uncased hole shall only be allowed if the Contractor can ensure a stable dry excavation. All loose material existing at the bottom of the hole after drilling operations have been completed shall be removed before placing concrete in the hole. The hole shall be covered when left unattended.

Perform shaft drilling by combinations of auguring, rotary drilling, down-the-hole hammer, reverse circulation drilling, clamping, scraping or other means approved by the Engineer. Use such means as will minimize over excavation and loosening and caving of material outside the designed shaft foundation dimensions.

If bedrock is encountered, the Engineer shall be notified to inspect and determine the elevation of the top of competent rock. The top of rock will be considered as the point where rock, defined as bedded deposits and conglomerate deposits exhibiting the physical characteristics and difficulty of rock removal as determined by the Engineer, is encountered which cannot be drilled with earth augers and/or underreaming tools configured to be effective in the soils indicated in the contract documents, and requires the use of special rock augers, core barrels, air tools, blasting, or other methods of hand excavation. Bedrock is anticipated to be encountered within the depths of the drilled shafts at the following structures:

- VMS-95N-51
- VMS-95N-53
- VMS-95N-54
- VMS-7S-97
Minimum required lengths of rock socket shall be determined from the table provided in the contract plans (refer to VMS Cantilever Sign Support Foundation Details) based on the depth to the top of rock from the foundation grade level. The Contractor shall construct the appropriate sign support foundation depending on the field conditions as shown on the plans and as approved by the Engineer.

It is the Contractor’s responsibility to utilize proper equipment and methodology to drill through the boulders. It should be noted that boulders may also be encountered at other structure locations.

Provisions shall be made to minimize surface water infiltration into the shaft excavations. Dry construction should be allowed if less than one foot of water accumulates in the bottom of a hole without pumping over a one hour period, the excavation remains stable and any loose material and water can be removed prior to placement of concrete. Dry construction would allow for free-fall concrete provided the Contractor can place the concrete without hitting the reinforcing steel. Wet construction would be used for all other applications.

Groundwater may be encountered during drilled shaft construction, so concrete shall be placed using a concrete pump or tremie pipe in accordance with the specifications.

When slurry is used in the drilling process, it shall be a mineral slurry. The slurry shall have both a mineral grain size that will remain in suspension and sufficient viscosity and gel characteristics to transport excavated material to a suitable screening system. The percentage and specific gravity of the material used to make the suspension shall be sufficient to maintain the stability of the excavation and to allow proper concrete placement. The level of the slurry shall be maintained at a height sufficient to prevent caving of the hole.

The mineral slurry shall be premixed thoroughly with clean fresh water at a temperature above 41°F and adequate time allotted for hydration prior to introduction into the shaft excavation. Maintain shaft foundation excavations full of slurry to within 2 feet of the top of the casing and at least 4 feet above the existing water level during drilling until the concrete placement is essentially complete. Circulate or agitate the slurry during drilling operations and immediately prior to concrete placement. Maintain the slurry requirements at all times, including non-working periods and stoppages. Provide continuous circulation or agitation, if necessary, to meet these requirements.

Control tests using suitable apparatus shall be carried out by the Contractor on the mineral slurry to determine density, viscosity, and pH. An acceptable range of values for those physical properties is shown in the following table:
Range of Values (at 68° F)

<table>
<thead>
<tr>
<th>Property (Units)</th>
<th>Time of Slurry Introduction</th>
<th>Time of Concreting (in Hole)</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density (lb/ft³)</td>
<td>64 to 69</td>
<td>64 to 69</td>
<td>Density Balance</td>
</tr>
<tr>
<td>Viscosity (seconds per quart)</td>
<td>28 to 45</td>
<td>28 to 45</td>
<td>Marsh Cone</td>
</tr>
<tr>
<td>pH</td>
<td>8 to 11</td>
<td>8 to 11</td>
<td>pH paper or meter</td>
</tr>
</tbody>
</table>

Before placing reinforcing steel in a slurry filled shaft, all loose debris from the bottom shall be removed by a large capacity air-lift system or submersible pump. Contractor shall submit calculations to demonstrate that the chosen air-lift system or submersible pump is capable of the debris removal at the required depths. Concreting shall not start until the alignment, dimension, and cleanliness of the shaft excavation has been verified by the Engineer.

Carefully lower reinforcing steel in drilled shaft immediately after cleaning the bottom as herein specified. Dropping or forcing cages into the shaft will not be allowed. If the reinforcing steel does not properly and smoothly enter the shaft, it shall be retrieved and the shaft adjusted and properly cleaned as specified until the reinforcing fits smoothly. Repair or replace any damaged reinforcing cage to the satisfaction of the Engineer.

The steel reinforcing cage shall be placed and firmly held with approved centering devices at least 4 inches wide to insure the alignment of the reinforcing within the hole. Thin concrete or plastic rollers will not be allowed.

The depth of drilling shall be checked immediately prior to concrete placement in the presence of the Engineer.

Immediately prior to placing concrete, the Engineer will inspect and verify the cleanliness of the shaft. If the inspection indicates that sediment has accumulated at the bottom of excavation, the Contractor shall remove all steel and reclean the shaft.

Start placement of concrete in the shaft as soon as possible, but no more than four hours after completion of slurry and bottom cleaning, and no more than two hours after reinforcing steel cage placement. Proceed continuously until completion of concreting. If the time limitations specified above are exceeded, remove the cage and reclean the bottom as specified.

Place concrete in the slurry filled shaft by the tremie method in such a manner that the concrete displaces the slurry from bottom and rises like a liquid, and mixing of concrete with the slurry will not occur. The concrete shall be placed through a top metal hopper and into a rigid leak-proof elephant trunk tremie pipe sufficiently large enough to permit free flow of concrete. The tremie
The anchor bolt locations shall be in accordance with shop drawings for the sign support 173-496
Anchor bolt assemblies shall conform to the requirements shown on the plans and shall be embedded in the concrete, which shall be placed to within the minimum distance of the finished surface of the stem as shown on the plans. A template to hold the required anchor bolt assemblies, ground rod sleeve and conduit in their correct position shall be used. Each bolt of the anchor bolt assembly shall be fitted with two leveling nuts. As-built anchor bolt locations shall be provided to the steel sign support fabricator to ensure proper fit of the support base plates on the foundation anchor bolts.

The leveling template shall be clamped in position by two leveling nuts at each anchor bolt. These leveling nuts shall be adjusted to assure a truly level finished foundation surface at the proper elevations.

After the sign support has been erected and the nuts fully tightened, the bolts, nuts and washers shall be coated with Zinc Rich Field Primer as directed by the Engineer.

The space between the leveling template and pedestal concrete shall be hollow.

All conduit ends terminating below grade shall be capped with a malleable iron cap. All above grade conduit ends shall be terminated with an insulated bonding bushing with tinned insert. The number of conduits in the foundation shall be as shown on the plans. Additional conduits are to be installed as required.

Ground rod and ground wire shall be installed as shown on the plans.

The disturbed ground along the access path to the shaft locations shall be restored and protected from erosion within 5 calendar days of the completion of the foundation construction.

**Method of Measurement:** This work will be measured for payment by the number of foundation units of the type specified, completely installed and accepted. Foundations for overhead cantilever sign supports (Type VMS 1) will be measured for payment as one foundation unit.

**Basis of Payment:** The work will be paid for at the contract unit price each for “Overhead Cantilever Sign Support Foundation (Type VMS 1)” complete in place, which price shall include field survey, layout, materials, construction access path, drilling, rock socket, temporary casing, slurry, excavation, cutting and removing existing pavement, granular fill, backfill, concrete, reinforcing, anchor bolts, rigid metal conduits, PVC weep holes, ground rod, ground wire, clamps and surface treatments to be restored, as directed by the Engineer, and all equipment, labor, tools and work incidental thereto.

When rock is encountered within the limits of excavation, its removal will be paid for at the Contract unit price per vertical foot for “Rock-in-Foundation Excavation,” which price includes any additional excavation to remove the rock and any additional concrete required to fill the excavation beyond the designed foundation hole dimensions. Rock-in-foundation excavation is defined as rock in definite ledge formation, boulders, or portions of boulders, cement masonry structures, concrete...
structures or Portland cement concrete pavement with a cross-sectional area that exceeds 50% of the cross-sectional area of the designed foundation hole.

No additional payment will be made for the Contractor to test the slurry when it is used to construct a drilled shaft foundation.

Temporary sheeting, if required, will not be paid for separately, but will be included as part of the work.

Borrow, if required, will not be paid for separately, but will be included as part of the work.

Temporary traffic control items, eradication of existing pavement markings and permanent pavement markings will not be paid for separately, but will be included as part of the work.

The removal of existing roadside barrier systems, installation and removal of temporary roadside barrier systems and resetting existing roadside barrier systems will not be paid for separately, but will be included as part of the work.

The temporary support, protection and restoration of utilities (if necessary), including existing underground wiring, conduits, drainage structures, pipes and underdrain systems within the excavation limits will not be paid for separately, but will be included as part of the work.

The restoration of existing surface treatments (pavement, slope protection, topsoil & seed, etc.) in all areas disturbed by the work, including temporary access paths, will not be paid for separately, but will be included as part of the work. The Engineer will determine the type, thickness and horizontal limits of the surface treatments to be restored.

The installation of new or upgraded permanent roadside barrier systems, if required, will not be paid for as part of this work, but will be paid for under separate items.