Note: This is not a common document on a multi-contract project. Include only in the construction work contract.

SECTION 017123 - FIELD ENGINEERING

Use this section for projects which include major site improvement work, establishment of property lines, and others which have critical grading requirements. Delete overlapping requirements in section 011000, "Laying Out" Article, Paragraph B.

1. GENERAL
   * + 1. RELATED WORK SPECIFIED ELSEWHERE
          1. Contract Closeout: Section 017716.
       2. QUALITY ASSURANCE
          1. Employ an independent Land Surveyor, licensed to practice in the State of New York, for the duration of the Work, to certify the accuracy of the survey work.

The word "independent" as used above means a person not in the regular employment of the Contractor or having any vested interest in the Contractor's business.

* + - 1. SUBMITTALS
         1. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
         2. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
         3. Submit the name, address, telephone number, and registration number of the Land Surveyor before starting the survey work.
         4. On request, submit documentation verifying accuracy of survey work.
         5. Upon completion of the Work, submit a certificate signed and sealed by the Land Surveyor, stating that the elevations and locations of the Work are in conformance with the Contract Documents.
      2. PROJECT RECORD DOCUMENTS
         1. Maintain a complete and accurate log of control and survey work as it progresses.
         2. Record location data for control points in sketch form and turn over 6 copies of sketches and computations to the Director's Representative.
         3. Submit Record Documents under provisions of Section 017716.
      3. TOOLS, EQUIPMENT, AND MATERIALS
         1. Furnish all tools, equipment, and materials required to perform the work of this Section.
         2. Permanent Survey Markers: Berntsen Aluminum Top Security Rod Monument with benchmark aluminum access cover and flat top cap to imprint information. Stamp on cap “NEW YORK OFFICE OF GENRENAL SERVICES, STA. NO., NORTHING, EASTING, AND ELEVATION.
      4. EXAMINATION
         1. Verify locations of control points prior to starting work.
         2. Promptly notify Director's Representative of any discrepancies discovered.
      5. CONTROL POINTS
         1. Control datum for survey is indicated on the Drawings.
         2. Protect control points prior to starting site work; preserve control points during construction.
         3. Promptly report to Director's Representative the loss or destruction of any control point or relocation required because of changes in grades or other reasons.
         4. Replace dislocated control points based on original survey control. Make no changes without prior written notice to the Director's Representative.
      6. ESTABLISHING CONTROL POINTS
         1. Prior to clearing or earthwork operations, install permanent survey markers at the coordinate locations shown on the drawings. Establish and record the exact coordinates of these markers to within one one-hundredth of a foot horizontally.
         2. Reference coordinates and elevations to the horizontal and vertical datum provided for this contract.
         3. Locate each permanent survey marker from at least 3 points of permanent reference.
      7. SURVEY REQUIREMENTS
         1. Utilize recognized engineering survey practices.
         2. Establish a minimum of two permanent survey markers to be used as bench marks for vertical control on the Site where indicated on the Drawings and referenced to established control points. Record locations, with horizontal and vertical data to within one one-hundredth of a foot, on Project Record Documents.
         3. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:

Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.

Grid or axis for structures.

Building foundation, column locations, ground floor elevations.

* + - * 1. Verify disturbed layouts by same means.
      1. FIELD ENGINEERING FOR GENERAL EARTHWORK
         1. Provide not less than one stake for each 2,500 square feet where rough and finished grades are flatter than one foot of rise per 10 feet of run.
         2. Provide not less than one stake for each 2,000 square feet where rough and finished grades are greater than one foot of rise per 10 feet of run but less than one foot of rise per 4 feet of run.
         3. Provide not less than one stake for each 1,000 square feet where rough and finished grades are greater than one foot of rise per 4 feet of run.
         4. Provide stakes spaced not more than 50 feet apart along centerline of ditches and swales. Provide additional stakes at right angles to centerline, and opposite each centerline stake, to mark bottom and top of slopes.
         5. Mark each stake with the correct finished grade elevation and the appropriate cut or fill at that stake.
      2. FIELD ENGINEERING FOR DRAINAGE STRUCTURES, PIPES, CULVERTS, AND TUNNELS
         1. Drainage Structures: Provide stakes marked with inverts. Also mark structure number if indicated on Drawings.
         2. Pipes, Culverts, and Tunnels: Provide stakes at each end marked with inverts.
      3. FIELD ENGINEERING FOR CHANNELS AND ROADWAY STRUCTURES
         1. Channels: Provide stakes at centerline of channel at each side of roadway structure.
         2. Roadway Structures: Stake centerline of structural bearing points, footings, anchor bolts, and other features.
      4. FIELD ENGINEERING FOR ROADWAYS AND PAVING WORK
         1. Place two offset stakes at each centerline station (50 foot intervals) and at tangent points, radius points, abrupt changes in grade, super-elevation, and other locations necessary to maintain layout and grade control.
         2. Mark each stake with the correct centerline station number, description, offset and cut or fill.
         3. Restore faded or illegible markings.
         4. Provide pins and hubs directly adjacent to the Work at a spacing of 25 feet. Mark pins and affix string lines to provide adequate horizontal and vertical control for paving work.
         5. Immediately following placement of the final paving course and prior to project closeout, re-establish and mark the location of all centerline stations with masonry nails at least 2 inches long. Drive nail heads flush with the pavement surface.
         6. For points of curve and tangent points provide identifying markings at the outside edge of each lane.

1. PRODUCTS (Not Used)
2. EXECUTION (Not Used)

END OF SECTION 017123