

# **Attachment A**

## **Technical Specifications**

### **1. MOBILIZATION AND DEMOBILIZATION**

#### **1.1 CONTRACTOR RESPONSIBILITY**

The work covered by this section consists of the delivery to the work sites by the Contractor of all equipment, material, and supplies; acquisition of any permits; removal from the sites of all equipment, material, and supplies after the completion of work; cleanup of the site; delivery of records; and final inspection by the Department Representative.

#### **1.2 PROCEDURE**

Mobilization by the Contractor shall consist of the delivery to the work sites of all equipment, material, and supplies to be furnished by the Contractor; the complete assembly in satisfactory working order of all such equipment on the job; and the satisfactory storage at the site of all such material and supplies.

Demobilization by the Contractor shall consist of the removal of all equipment, material, and supplies from the Project sites; the cleanup of the sites; and the restoration of any damaged areas to as good or better condition than that which existed prior to the commencement of work. This work will include regrading and/or reseeded of areas if designated by the Department Representative.

All equipment and methods to be used by the Contractor shall be subject to prior approval by the Department Representative. However, approval of the equipment shall not be construed as approval of the performance thereof. The Contractor shall furnish any additional or "special" equipment necessary for him to obtain the desired end results.

The Contractor, at his expense, shall obtain all permits, of whatever nature, necessary for the completion of the work, and the Contractor shall comply with all existing laws, ordinances, rules, and regulations relating to his operations. Easements from property owners will be obtained by the Department or its designated representative.

Every effort shall be made by the Contractor to minimize damage incidental to site access and to the drilling operations. Maximum use shall be made of existing roads and lanes for access. Where it is necessary to deviate from roads and lanes, such deviation shall be by one track, at a location causing the least damage.

The Contractor shall be liable to the property owners for any damage to vegetation, crops, and/or property, irrespective of whether the damage was caused by his negligence or was an unavoidable consequence of drilling operations. The Contractor shall be liable for any and all damage, including damages for necessary access. The Contractor shall be required to consult with the Department Representative as to when he intends to move equipment to the drilling location.

### **1.3 DELIVERY OF RECORDS**

The Contractor shall be responsible for furnishing the following records for the work site within the following time constraints:

1. One pencil copy of each boring description (log), not later than 48 hours after the completion of drilling each borehole.
2. Two typed copies of each borehole description (log), in either hard-copy (paper) or electronic format as specified by the Department Representative, not later than seven (7) days after completion of all drilling of the boreholes. Each log shall provide pertinent information such as, but not limited to (**see Item 2.4 for more details**):
  1. Borehole number.
  2. Borehole completion date.
  3. Elevation of surface.
  4. Beginning and end of each core run.
  5. Sediment/Rock types.
  6. Sediment/Rock colors.
  7. Water elevations.
3. Copies of any other records kept by the Contractor that, in the opinion of the Department Representative, will aid in the interpretation of the core borings may be requested at any time during the course of the enforcement of the Contract.

No additional payment will be made for the delivery of records, as delivery is included in Contract Item No. 1.1, "Mobilization and Demobilization, Contractor Responsibility."

### **1.4 MEASUREMENT AND PAYMENT**

Measurement, when accepted and approved, will be made on the basis of a complete unit site work item(s), but only to the extent directed by the Department Representative.

Payment will be made at the Contract Unit Price bid for the Work Sites for Contract Item, "Mobilization and Demobilization," for which price and payment shall constitute full compensation for furnishing all labor, material, equipment, supplies, and other necessary incidentals required to satisfactorily complete these items of work. Payment, including mobilization, will be paid upon completion of the holes.

## **2. DRILLING**

### **2.1 CONTRACTOR RESPONSIBILITY**

The work covered by this section consists of furnishing all labor, material, equipment, supplies, and other necessary incidentals required to drill borings through the unconsolidated sediment and into the bedrock.

### **2.2 TEST BORING LOCATIONS**

The three sites of the work to be performed shall be at the locations within the boundaries of the map area in Attachment B. The test-boring locations for the work site indicated on the map in Attachment B is approximate. The test boring will be exactly located in the field by the Department Representative, and the Department Representative will furnish the Contractor with the surface elevation of the borehole. It is the Contractor's responsibility to ascertain exact locations of utilities from the appropriate utility companies and to verify all measurements in the field in order to ensure that the boring is made at a location that will not interfere with or harm existing surface or subsurface utilities. The Contractor shall notify the Department Representative when a conflict occurs. The Contractor shall bear sole responsibility for any damage to existing utilities resulting from his operations. The number of test borings proposed for a work site will be noted in the Department's instructions to the Contractor and outlined on the drawing(s) accompanying the site-work order.

### **2.3 PROCEDURE**

The Contractor shall make one Sonic boring into the earth at each site. The boring will go through the entire profile of the unconsolidated sediment and into the first five feet of bedrock. PQ sized borings are required by the Department.

When the Contractor penetrates bedrock, drilling will continue for five additional feet. The depth of said bedrock shall be carefully documented. The Contractor shall ensure a minimum core recovery of ninety percent (90%) for each run, unless unusual subsurface conditions exist, since high recovery is considered necessary for any proper interpretation of the subsurface conditions. The Contractor may use a sonic drilling rig to bore through the entire profile. At the Department Representative's directions the drilling will be temporarily halted to allow water samples to be collected from the borehole.

### **2.4 LOGS**

The Contractor shall keep accurate logs and records of all core borings, which shall include the following information:

1. Project name and contract number, borehole number, location of borehole, ground (surface) elevation, total depth of borehole, time and date of starting, time and date of completion, driller's name, and logger's name.
2. Size and depth of surface casing and size and type of drilling tools used to advance the borehole.

3. Depth of top and bottom of each run, and core recovery of each run.
4. Color changes in drill-water returned.
5. Depths at which sudden losses or gains of drill-water return occur and estimated quantities involved.
6. Visual classification of sediment/rock, including color, and grain size.
7. Depth of top of bedrock and all other contacts between dissimilar materials.
8. Depth of water at completion of borehole and, where possible, after 24 hours.
9. Notes, remarks, and other information on pertinent incidents occurring during drilling operations.

## **2.5 CORE BOXES**

The Department representative will be responsible for providing the core boxes. PQ size boxes will be provided.

## **2.6 DELIVERY OF CORE**

The Department representative shall be responsible for transportation and delivery of the sampling containers to one of the Bureau of Geological Survey's core repositories, at 3240 Schoolhouse Road, Middletown, Pennsylvania, 17057 or 15519 Bennett's Valley Highway, Penfield , PA 15849.

## **2.7 ABANDONED BORINGS**

Except with the permission of the Department Representative, the Contractor shall not abandon or complete any boring, or remove any casing or drilling equipment, without first affording the Department Representative the opportunity to obtain the position and the depth of the boring to abandonment or completion, to secure samples of material already penetrated, and to make any other tests and measurements, or collect any other information, which the Department Representative may require.

No payment will be made for any boring which has been abandoned by the Contractor before reaching the depth, elevation, or condition specified, unless the Department Representative approves and accepts the boring as being completed. Any boring abandoned by the Contractor without the Department Representative's approval shall be sealed at the Contractor's expense. The Department Representative may, at his option, accept a boring that fails to reach the required depth due to an unusual obstruction, which, in his opinion, could not reasonably have been anticipated.

## **2.8 MEASUREMENT AND PAYMENT**

### **2.8 Drilling**

Measurement, when accepted and approved, will be made on the basis of the linear feet of borehole actually drilled into unconsolidated sediment and rock, but only to the extent directed by the Department Representative.

Payment will be made at the Contract Unit Price bid per Linear Foot for Contract Item, "Drilling," for actual quantities used, which price and payment shall constitute full compensation for furnishing all labor, material, equipment, supplies, and other necessary incidentals required to satisfactorily complete this item of work.

## **3. SEALING (CEMENTING) BOREHOLE**

### **3.1 CONTRACTOR RESPONSIBILITY**

The work covered by this section consists of furnishing all labor, material, equipment, supplies, and other necessary incidentals required to cement the borehole from bottom to top.

### **3.2 PROCEDURE**

At the direction of the Department Representative, the Contractor shall be required to seal the borehole in the following manner:

1. Upon completion of the boring and acceptance by the Department Representative, and after the Department or its representatives have completed any planned tests or measurements made in the borehole still containing the rods, the Contractor will pull the rods and fill the hole with a cement approved by the Department's representative, from the bottom of the hole to within two (2) feet of the surface, unless directed otherwise by the Department Representative.
2. The casing shall be withdrawn.
3. In the event the casing cannot be recovered, it shall be cut off one (1) foot below the ground surface, unless directed otherwise by the Department Representative, and the borehole shall be sealed as indicated in item 1 above of this list.
4. The top two (2) feet of the borehole shall be filled with topsoil or refuse material.
5. The surface shall be restored to as good as or better than original condition.

6. If so directed by the Department Representative, the borehole shall not be sealed (cemented) and the surface casing with sealing cap will be left in the hole in order for the Department or its representatives to conduct long-term tests and measurements.

### **3.3 MEASUREMENT AND PAYMENT**

Measurement, when accepted and approved, will be made on the basis of the linear feet of borehole actually sealed (cemented) before final demobilization of the Project is complete, but only to the extent directed by the Department Representative.

Payment will be made at the Contract Unit Price bid per Linear Foot for Contract Item, "Sealing (Cementing) Borehole," for actual quantities used, which price and payment shall constitute full compensation for furnishing all labor, material, equipment, supplies, and other necessary incidentals required to satisfactorily complete this item

## **4. RESTORATION OF THE SITE**

### **4.1 CONTRACTOR RESPONSIBILITY**

The work covered under this section consists of providing all labor, material, equipment, and other incidentals necessary to restore the area surrounding the borehole and the access route to the borehole to a condition equal to or better than that which existed prior to the start of work. The work included in this section is considered discretionary and must be directed, approved, and accepted by the Department Representative, since clean-up and restoration are considered incidental to and included in Contract Item, "Mobilization and Demobilization."

### **4.2 PROCEDURE**

Restoration includes, but is not limited to, repairing or replacing any sidewalks, fences, lawns (including landscaping with topsoil), and other improvements to the property which may have been damaged or removed as a result of the work, but only to the extent directed, approved, and accepted by the Department Representative. At this site damage to the lawn is likely. Any type of lawn seed may be used where grass has been damaged.

### **4.3 MEASUREMENT AND PAYMENT**

Measurement, when accepted and approved, for restoration of the site, will be made on the basis of the site restored, but only to the extent directed, approved, and accepted by the Department Representative.

Payment will be made at the Contract Unit Price bid per site for Contract Item, "Restoration of the Site," for actual quantities used, which price and payment shall

constitute full compensation for furnishing all labor, material, equipment, supplies, and other necessary incidentals required to satisfactorily complete this item of work. No payment will be made for restoration of the borehole that have not been directed, approved, and accepted by the Department Representative, since clean up and restoration is considered incidental to and included in Contract Item, "Mobilization and Demobilization".

## **5. STAND-BY TIME**

### **5.1 CONTRACTOR RESPONSIBILITY**

The work item covered by this section is intended to address any delays in drilling in which a drill rig and crew are ordered by the Department Representative to stand idle.

### **5.2 PROCEDURE**

When the Contractor is ordered by the Department Representative to delay the drilling of the boring or other activities occurring at the work site, the Contractor will be reimbursed for any such delays, provided that the delays are the sole responsibility of the Department Representative and the delays are in excess of one-half hour in duration.

Stand-by time shall not be used for payment to the Contractor of delays caused by equipment breakdown and malfunctions or for delays caused by non-availability of necessary equipment and supplies. Such delays shall be considered the sole responsibility of the Contractor and shall be incidental to other items of work, and no additional compensation will be allowed. No payment for stand-by time will be made for items of equipment other than a complete drill rig and crew in full operating condition. A crew shall consist of a driller and helper. If any delay does occur, the Department Representative will record it on a daily basis with dates and times directed to be idle.

### **5.3 MEASUREMENT AND PAYMENT**

Measurement, when accepted and approved, will be made on the basis of hours a drill rig and crew are ordered to stand idle, but only to the extent directed by the Department Representative.

Payment will be made at the Contract Unit Price bid per Hour for Contract Item, "Stand-by Time," for actual quantities used, and will be divided no finer than by one-half hour increments, which price and payment shall constitute full compensation for the delay of a drill rig and crew.

**6. INSPECTIONS**

Ample opportunity shall be furnished at all times to the Department Representative for inspecting the work. If any imperfect work is performed at any time, the defects therein shall be remedied by the Contractor, at his expense, to the full satisfaction of the Department Representative. No drilling or field testing shall be done except in the presence of the Department Inspector or Department Representative, unless specific permission has been granted to the contrary by the Department Representative. The presence of a Department Inspector, or the keeping of separate drilling records by the Department Representative, shall not relieve the Contractor of the responsibility for work specified in the Contract.

**7. DESCRIPTIONS OF CONDITIONS TO BE ENCOUNTERED**

The following description of the borehole, referenced in more detail in Attachment B, is approximate, and the Department assumes no liability for the accuracy thereof:

Hole No.	Estimated Total Depth
1. LAW073_2466	50
2. LAW073_2467	70
3. LAW073_2465	130

For the purposes of this Contract, the footage for the hole listed above shall be used in making bid calculations. Depending upon the actual distance (depth) to target horizons as determined by the Department Representative, the total depth of the hole may deviate from the estimate listed above. Therefore, the Department Representative reserves the right to decrease the total depth of the drill hole by any amount, if required, or to increase the total depth of the drill holes by up to 100 feet in the unconsolidated sediment, keeping to the same unit price for drilling used in making bid calculations. It is estimated that the total amount of drilling for this project will be 250 feet.