ITEM 203.13970017 - PIEZOMETER (VIBRATING WIRE) & READOUT DEVICE

DESCRIPTION

This work shall consist of furnishing a readout device and furnishing, installing and maintaining a piezometer and appurtenances at the location and elevation designated in the contract documents or as directed by the Engineer.

MATERIALS

The piezometer shall be obtained from one of the following companies, or an approved equal:

<table>
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<tr>
<th>Company</th>
<th>Address</th>
<th>Phone</th>
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<tr>
<td>Geokon</td>
<td>48 Spencer Street, Lebanon, NH 03766</td>
<td>(603) 448-1562</td>
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<tr>
<td>Slope Indicator Company</td>
<td>3450 Monte Villa Parkway, Bothell, WA 98041-3015</td>
<td>(800) 331-0703</td>
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<tr>
<td>Roctest, Inc.</td>
<td>94 Industrial Blvd., Plattsburg, NY 12901-2016</td>
<td>(800) 477-2506</td>
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<tr>
<td>Geonor, USA</td>
<td>PO Box 903, Milford, PA 18337</td>
<td>(717)296-4884</td>
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The following shall be required:

1. A piezometer cell and readout device suitable for the intended depth and capable of responding with a minimum accuracy of 2% of full range of the readout unit.

2. A cloth bag to encase the piezometer.

3. Terminal pipe and weatherproof junction box of sufficient size to accommodate the leads and connections. The box shall be capable of being locked.

4. Drilling equipment capable of providing a minimum 2½” diameter cased hole to the specified depth and capable of obtaining split barrel samples.

5. Jars and plastic bags with ties for soil samples.

6. Sand used for the piezometer installation shall be Ottawa Sand or another thoroughly washed sand passing the #20 sieve and retained on the #40 mesh sieve.

7. A grout pump capable of delivering the grout to the lowest piezometer elevation.

8. Grout mixed to the satisfaction of the Engineer consisting of and conforming to the following ratio:
Portland Cement Type 2............................................................26 Lbs
Water...............................................................................................50 Gal
Bentonite........................................................................................26 Lbs
(ground to pass a #200 sieve)

9. Sand used to fill the trench for the leads shall conform to Subsection 703-07 Concrete Sand.

CONSTRUCTION DETAILS

The Contractor shall utilize personnel experienced with the installation of piezometers. Prior to commencing the piezometer installation, the Contractor shall provide a description of the previous applicable experience of such personnel, at the request of the Engineer. The experience resume will be evaluated by the Director of the Geotechnical Engineering Bureau with a written recommendation provided to the Engineer within ten (10) work days of receipt.

Notification of at least ten (10) work days before the start of installation shall be provided to the Engineer.

The work shall be performed in conformance with the following procedure:

1. The casing shall be advanced at the location and to the elevation shown on plans by any means except for the final 5 Feet.

2. For the last 5 Feet, the casing shall be progressed by driving and kept full of water. The casing shall be installed to the piezometer elevation. Continuous split barrel samples shall be obtained for the final 5 Feet above the piezometer elevation and to a depth of 12 inches below. The samples shall be appropriately labeled and delivered in sealed plastic bags in jars to the Engineer. Washing below the casing will not be allowed.

3. Ottawa sand or an approved equal shall be poured into the casing to fill the 12 inch void caused by sampling below the piezometer elevation.

4. The piezometer shall be placed in the cloth bag and the bag filled with sand.

5. As the piezometer cell assembly is lowered into the drill hole, readings shall be obtained to confirm the equipment accuracy. Any noted malfunctions shall be remedied at this time at no cost to the State.

6. When the piezometer is located at the desired elevation, sand shall be placed around and to 12 inches above the cloth bag containing the piezometer. The casing shall then be withdrawn to the top of the sand. The Contractor shall then grout the rest of the hole from the bottom up.

7. As the casing is removed from the drill hole, the grout shall be kept within 5 Feet of the ground surface at all times. No vertical movement of the piezometer will be allowed as
the casing is withdrawn. Care is necessary to prevent the withdrawn casing from pulling upon the equipment leads.

8. A 24 inches by 24 inches trench shall be provided for the leads from the piezometer location to the readout box. Concrete sand shall be used to backfill the trench. A 6 inch layer of concrete sand shall be placed prior to installing the tubes in the trench. The remainder of the trench shall then be filled with concrete sand.

Embarkment construction shall not be performed within 100 Feet of the proposed piezometer location until the piezometer has been installed, connections completed, and a three day waiting period observed. The waiting period will be used to obtain baseline data.

A representative of the Geotechnical Engineering Bureau will recommend acceptance or rejection of the piezometer to the Engineer after the three day waiting period.

Piezometers shall be maintained by the Contractor until the Director of the Geotechnical Engineering Bureau determines that the installation may be abandoned. When a piezometer becomes damaged or inoperable, all embarkment construction operations within 100 feet of the installation shall cease unless otherwise directed by the Engineer. The Director of the Geotechnical Engineering Bureau will determine if replacement is required or if sufficient information has been obtained or the installation may be abandoned. Abandoned piezometers shall be left in place and the terminal pipes removed as directed by the Engineer. Upon completion of the contract, the readout device will become the property of the State.

**METHOD OF MEASUREMENT**

The quantity shall be per each piezometer satisfactorily installed and maintained in accordance with this specification.

**BASIS OF PAYMENT**

The unit price bid for this item shall include all labor, materials and equipment necessary to satisfactorily complete the work. The furnishing of equipment needed to progress the drill hole will be paid under separate applicable items. Also to be included, is the cost of all necessary excavation and backfill of the trench to install the leads.

Piezometers that become damaged or inoperable through no fault of the Contractor shall, if directed by the Director of the Geotechnical Engineering Bureau, be replaced and paid for at the unit price bid for this item. Any piezometer that becomes damaged or inoperable as a result of the Contractor's operations shall be repaired or replaced by him at no cost to the State. Seventy-five percent of the unit price shall be paid upon acceptable installation of the piezometer and the remainder upon completion of monitoring.