



CUY-90-14.90

PID 77332/85531

APPENDIX GE-13

**Wick Drains
(Contract Document)**

State of Ohio
Department of Transportation
Jolene M. Molitoris, Director

**Innerbelt Bridge
Construction Contract Group 1 (CCG1)**

WICK DRAINS (PREFABRICATED VERTICAL DRAINS)

1.0 MATERIAL SPECIFICATION

The prefabricated drain shall consist of a continuous plastic drainage core wrapped in a non-woven geotextile material. The prefabricated drains used shall be one of the following products and shall meet the material specifications identified herein:

- A. Ali-Drain
- B. Amerdrain (Type 407)
- C. Hitek Flodrain (Gray, Dupont Reemay Filter Jacket and Original)
- D. MEBRA-Drain (MD 7007)

The drains shall be free of defects, rips, holes, or flaws.

Each separate component (geotextile and core) and the composite wick drain shall have minimum tensile strength without distress or separation of 15 pounds per inch width by clamping over the full width and testing in accordance with ASTM D-4595 (i.e., 4-inch gauge length tested in a constant rate of extension test machine at 10 percent strain per minute).

The composite wick drain shall have the following flow characteristics. Flow capacity through the core shall be not less than 0.5 gallons per minute as measured under a normal stress of 5000 psf after a period of 24 hours using a gradient of 1. The permeability of the geotextile shall be greater than 0.01 centimeters per second as determined by ASTM D-4491. The geotextile shall have an AOS of not greater than 0.30 millimeters and not less than 0.10 millimeters.

1.1 Source Approval

Prior to delivery of the wick drain product, the DBT shall submit to the Engineer a copy of an affidavit signed by a legally authorized official from the company manufacturing the wick drain core and the geotextile wrap. The affidavit shall attest that the products meet the physical and mechanical requirements stated in the specification and shall include test results. A wick drain sample shall be submitted for evaluation at least 15 working days prior to delivery to the project. This sample shall be at least 5 lineal feet. Approval of the wick drain by the Engineer shall be required prior to site delivery.

1.2 Control Testing

Samples of the wick drain shall be periodically reviewed by the Engineer. The Engineer reserves

the right to collect samples periodically during construction for confirmation testing.

1.3 Shipment and Storage

During periods of shipment and storage, the wick drains shall be wrapped in a heavy duty protective coating. The storage area shall be such that the drains are protected from sunlight, mud, dirt, dust, debris, and detrimental substances.

2.0 EQUIPMENT

The wick drains shall be installed with equipment which will cause a minimum of disturbance of the subsoil during the installation. The prefabricated drains shall be installed using a mandrel or sleeve that will be advanced through approximately 3 feet of sand fill and into the compressible material to the required depth using vibratory, constant load, or constant rate of advancement methods. Use of falling weight impact hammers or jetting shall not be permitted for installation of the drains. The mandrel shall protect the prefabricated drain material from tears, cuts, and abrasions during installation and shall be withdrawn after the installation of the drain. The drain shall be provided with an anchor plate or rod at the bottom to anchor the bottom of the drain at the required depth at the time of mandrel removal. The projected cross-sectional area of the mandrel and anchor combination shall not be greater than that suggested by the manufacturer and approved by the Engineer.

The DBT shall examine the site to determine the equipment required for the support conditions anticipated. The DBT shall be solely responsible for selection of such equipment and, if required, shall modify such equipment or provide construction platforms such that adequate support is achieved to install the wick drains in accordance with this specification.

At least three (3) weeks prior to the installation of the wick drains, the DBT shall submit to the Engineer, for review and approval, details of the sequence and method of installation. The submittal shall, at a minimum, contain the following specification information:

- A. Size, type, weight, maximum pushing force, vibratory hammer rated energy, and configuration of the installation rig,
- B. Dimensions and length of mandrel,
- C. Details of drain anchorage,
- D. Detailed description of proposed installation procedures,
- E. Proposed method(s) for overcoming obstructions, and
- F. Proposed method(s) for splicing drains.

Approval by the Engineer will not relieve the DBT of his responsibility to install wick drains in accordance with the plans and specifications. If, at any time, the Engineer considers the method of installation to not produce a satisfactory drain, the DBT shall alter his method and/or equipment as necessary to comply with the plans and specification.

3.0 CONSTRUCTION REQUIREMENTS

Wick drains shall be installed at locations shown on the plans and as directed by the Engineer. Wick drains shall be installed once the 3 feet of sand fill has been placed. Prior to the installation of the wick drains, the DBT shall stake out the proposed locations of the drains and then take all reasonable precautions to preserve the stakes. The locations of the stakes shall not vary by more than six (6) inches from the locations indicated on the plans or as directed by the Engineer. The DBT shall prepare and submit a map, on daily basis, to the Engineer which depicts how deep each drain was installed.

The DBT shall demonstrate that his equipment, method, and materials produce a satisfactory installation in accordance with this specification. For this purpose, the DBT shall be required to install several trial drains at locations within the work area designated by the Engineer. Trial drains conforming to this specification will be paid for at the same unit price as the production drains.

The wick drains shall be installed to depths as shown on the plans or as directed by the Engineer. Drains that deviate from the plan location by more than six (6) inches, are damaged, or improperly installed, shall be rejected. Rejected drains may be removed or abandoned in place. At the DBT's option, replacement drains shall be offset approximately eighteen (18) inches from the location of the rejected drain. All rejected drains will be replaced at the DBT's expense.

The drains shall be installed vertical and to the elevations shown on the plans or as directed by the Engineer. The DBT shall provide the Engineer with a suitable means of verifying the plumbness of the mandrel and determining the depth of the drain at any time. The equipment shall be carefully checked for plumbness and shall not deviate more than .25 inch per foot from vertical.

Splices or connections in the wick drain material shall be done so as to insure continuity of the wick material and the spliced wicks shall conform to all of the material specification requirements. The prefabricated drain shall be cut such that at least a six (6) inch length protrudes above the working surface at each prefabricated drain location.

Where obstructions are encountered within the compressible material, the DBT shall abandon the hole. At the direction of the Engineer, the DBT shall install a new drain within 18 inches of the obstructed drain. A maximum of two attempts shall be made as directed by the Engineer for each obstructed drain. If the drain still cannot be installed to the design tip elevation, the drain location should be abandoned and the installation equipment should be moved to the next drain location.

Installation of the drains should consider and be coordinated with any geotechnical instrumentation. Special care should be taken to install drains in such a manner so as not to disturb the instrumentation already in place. The replacement of instrumentation damaged as result of the DBT's activities will be the responsibility of the DBT.

4.0 EMBANKMENT USING SAND

The DBT shall provide a sand blanket consisting of a clean, free draining, uniformly graded granular material conforming to the requirements of C&MS 703.02.A. Do not use sand containing any organic or other deleterious material.

5.0 PRODUCT INFORMATION

PRODUCTS:

ALI-DRAIN	Manufacturer:	Burcan Industries Limited Suite 19-111 Industrial Drive Whitby, Ontario, Canada L1N5Z9 905-668-3131
	U.S. Supplier:	Terrasystems, Inc. P.O. Box 265 Purcellville, Virginia 22123 703-882-4130
HITEK-FLODRAIN	Manufacturer:	Burcan Industries Limited (See above)
	U.S. Supplier:	Terrasystems, Inc. (See above)
MEBRA-DRAIN	Manufacturer:	Geotechnics Holland BV P.O. Box 270 6950 AF Dieren Holland
	U.S. Suppliers:	L. B. Foster Company 415 Holiday Drive Pittsburgh, Pennsylvania 15220 412-928-3475
		International Construction Equipment Inc.

Corporate Offices
301 Warehouse Drive
Matthews, North Carolina 28105
800-438-9281

AMERDRAIN

Manufacturer: American Wick Drain Company
301 Warehouse Drive
Matthews, North Carolina 28105

U. S. Supplier: International Construction Equipment, Inc.
(See above)