SECTION 334613 – FOUNDATION DRAINAGE SYSTEM

SPECIFIER: This Section is written to specify a drainage system for buildings, which normally includes a drain installed around the perimeter of a building or basement, but can include drains under the building floor tied into the perimeter drain. This drainage system is assumed to consist of a perforated corrugated pipe, installed level, surrounded by pea stone, which in turn is wrapped with a geotextile. It is assumed that this Specification is written for the drainage system only to the point at which it connects to a larger diameter pipe or manhole, which is specified under Division 33 Section "Storm Drainage."

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to this section.

1.2 SUMMARY

A. This section includes the furnishing and installation of a foundation drainage system.

B. Related sections include the following:

1. Division 31 Section "Earthwork."
2. Division 33 Section "Storm Drainage."

1.3 REFERENCES

A. Except as herein specified or as indicated on the Drawings, the work of this section shall comply with the following:

1. ASTM Standard Specifications: F405 - Corrugated Polyethylene (PE) Tubing and Fittings.

2. ASTM Standards: F449 -Subsurface Installation of Corrugated Thermoplastic Tubing for Agricultural Drainage or Water Table Control.

3. AASHTO:

a. M252 Corrugated Polyethylene Drainage Tubing.
b. M288 Geotextiles Used for Subsurface Drainage Purposes.

4. MDOT: 2012 Standard Specifications for Construction.

1.4 DEFINITIONS

A. Abbreviation for polyethylene (PE).

1.5 SYSTEM DESCRIPTION

A. Foundation Drainage System:

1. Perforated pipe.
2. Pipe Bedding and Backfill: Pea stone, wrapped with a geotextile.

B. Distribution Piping:

1. Solid wall pipe.
2. Pipe Bedding and Backfill: Granular material.

1.6 SUBMITTALS

A. Manufacturer's Literature: For pipe and geotextile:

1. Dimensions.
2. Details of construction and installation.
3. Connections and fittings.
4. Name of manufacturer.
5. Model.

1.7 QUALITY ASSURANCE

A. Fabrication and Installation Personnel Qualifications:

1. Trained and experienced in the fabrication and installation of the materials and equipment.

2. Knowledgeable of the design and the reviewed Shop Drawings.

B. Manufacturer's Services: Submit manufacturer's sworn statement that the material furnished complies with this Specification.

1.8 DELIVERY, STORAGE AND HANDLING

A. Deliver materials original, unbroken, brand marked containers or wrapping as applicable.

B. Handle and store materials in a manner which will prevent deterioration, damage, contamination with foreign matter, damage by weather or elements, and in accordance with manufacturer's directions.

C. Reject damaged, deteriorated or contaminated material and immediately remove from the site. Replace rejected materials with new materials at no additional cost to Owner.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Pipe:

1. Manufacturer: Advanced Drainage Systems, Inc.; Hancor, Inc.; or equal.
2. General:

a. Corrugated polyethylene.
b. Size as indicated on the Drawings.
c. ASTM F405.

3. Pipe:

a. Perforated:

1) Slotted perforations without filter pipe wrap.
2) For drainage piping only.
3) Pipe with holes: Not permitted.

b. Solid: For distribution piping from drainage pipe to storm water system only.

4. Joints and Fittings:

a. Furnished by same manufacturer as pipe.
b. Styles:

1) Split: In conjunction with a noncorroding strap which can be tightened around the coupling.

2) Snap-on: External style only permitted.

c. Fittings:

1) Coupler.
2) 45 degree wye.
3) 45 degree and 90 degree elbows.
4) End cap.
5) Tee.

d. [Cleanouts:

1) 4-inch diameter solid corrugated.
2) Fittings: 45 degree wye, 45 degree elbow, and cap.
3) Casting:

a) Light duty round slab style with solid lid; 8-inch inside diameter.
b) Model R-6003 by Neenah Foundry Company; or equal.]

B. Aggregates:

1. MDOT 902 Open-Graded Aggregate 34R.
2. MDOT 902 Granular Material Class II or III.

C. Geotextile:

1. Nonwoven fabric.
2. Conforming to AASHTO M288.
3. Manufacturers:

   a. Mirafi 140NS.
   b. Typar 3401.
   c. Amoco 4551.

4. Weight: 4.0 ounces per square yard minimum.
5. Burst Strength: 160 psi minimum.
6. Water Flow Rate: 100 gallons/minute/square foot.
7. Grab Tensile Strength: 145 psi minimum.

PART 3 - EXECUTION

3.1 PREPARATION

SPECIFIER: Generally a building foundation drainage system is installed level with the foundation. However, the installer needs to check it periodically to ensure it is staying within the specified tolerance. Make sure you indicate the pipe invert(s) on the Drawings.

A. Alignment and Grade:

1. If there is a grade discrepancy or an obstruction which is not indicated on the Drawings, notify Engineer and obtain instructions prior to proceeding.

2. Where Underdrain Crosses Another Utility:

   a. Expose utility prior to laying underdrain to verify existing depth.

   b. Maintain minimum clearance of [6] [18] inches unless otherwise indicated on Drawings or approved by Engineer.

   c. Space joints equidistant from crossing.

3. Control:

   a. Level and Grade Rod: Check line and grade at each structure or clean out, 25 feet, 50 feet, and 50-foot intervals thereafter.

   b. Allowable Deflection:

      1) Horizontal: 0.20 feet.

2) Vertical: 0.10 feet.

3.2 INSTALLATION

A. Install in conformance with:

1. The submittals reviewed by Engineer.
2. The manufacturer's recommendations.
3. ASTM F449.

B. General:

1. Line and grade; Provide for outlet to [storm sewer] [ ].
2. Prevent soil and debris from entering system.

C. Geotextile:

1. Placement:

a. At locations indicated on the Drawings.
b. Minimum 12-inch overlap:

1) On top of bedding.
2) Between successive sheets in direction of flow.

2. Repair: Place geotextile patch over the damaged area and extend three feet beyond the perimeter of the tear or damage.

D. Pipe Laying:

1. Bearing: Support entire length of pipe barrel evenly.
2. Direction: Commence at outlet and proceed into system.
3. Method:

a. Wipe clean the socket of pipe last laid.
b. Center end of pipe to be laid and fasten coupling.
c. Center pipe to form an underdrain with a uniform invert.

E. [Cleanouts:

1. Prefabricated wye and elbow or double elbow furnished by pipe manufacturer.
2. Located: As indicated on the Drawings.
3. [Refer to standard detail on the Drawings.]]

F. Connections:

1. To Existing Pipe: Relay pipe length as required and mortar in pipe connection.
2. To Existing Manhole: Core through wall and mortar in pipe connection solid.

3.3 CLEANING

A. Debris: Remove all dirt and debris, including cemented or wedged material from the inside of all pipes, cleanouts and manholes.

B. [Final Acceptance: Clean storm sewer [and manhole] before requesting final acceptance.]

END OF SECTION 334613