SECTION _____

REGULATORY STORMWATER TREE FILTER SYSTEM WITH INTERIOR SUMP

1. DESCRIPTION

1.1. The work under this section shall govern the furnishing and installation of the StormTree® tree filter system for regulatory compliance in meeting specific nutrient removal rates pursuant to the TAPE certification program, and other 3rd party certification programs. The work under this section shall govern the furnishing and installation of the StormTree® tree filter system according to the design "Plan".

2. GENERAL

2.1. The Contractor shall furnish and install a precast concrete tree filter system, complete and operable as shown and as specified herein, and in accordance with the requirements of the Plan and contract documents.

2.2. The precast structure shall be manufactured at a concrete products plant with approved facilities. A sample structure shall be made available for inspection by the Engineer. The selected structure shall meet the requirements of the following Manufacturer:

StormTree®
24 Corliss Street, Suite 9092
Providence, RI 02940
Ph.: 401-626-8999
www.storm-tree.com

Alternate systems will be considered, final approval will be determined by the Engineer.

2.3. Submittals shall be provided by the Manufacturer and shall include at a minimum the following:

- Design drawing(s)
- Construction detail with installation notes
- Performance data as requested
- Operation & Maintenance Plan
- Other project/system specific information as requested

2.4. American Society for Testing and Materials (ASTM) Reference Specifications:

2.4.1. ASTM C891: Standard Specification for Installation of Underground Precast Concrete Utility Structures

2.4.2. ASTM C478: Standard Specification for Precast Reinforced Concrete Manhole Sections

2.4.3. ASTM C858: Standard Specification of Underground Precast Concrete Utility Structures

2.4.4. ASTM C857: Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures

3. MATERIALS

3.1. Precast Concrete Structure: The precast structure shall consist of a four-sided box, two chamber, rectangular box with open sides below the elevation of the root ball with an open bottom and an attached (monolithic) catch basin with an enclosed bottom. The two chambers shall be separated by a precast weir as shown on the Plan. The sump chamber shall have weep holes cast into one or more sidewalls. The dimensions of the structure shall match those shown on the Plan. The curb portion of the structure shall conform to the requirements of and be capable of supporting HS-20-wheel loading based on local regulatory specifications, unless otherwise modified or specified by the Engineer.

3.2. Grating: The structure shall include a two-piece fiberglass grate. The grating shall be designed to withstand a minimum pedestrian loading of 500 lbs/ft2 as a uniform live loading during the life of the installation. All pieces shall be removable allowing access for the cleaning and maintenance of the system interior. The two-piece grate shall have an opening in each piece that forms a square around the planted tree. The grates shall be recessed flush into the top of the precast structure as shown on the Drawings. The grate shall be of fiberglass or other approved material fabrication and be ADA compliant having no greater than a 0.50" opening. The fiberglass grate shall be 1-1/2 inches deep and supported in the recess of the precast concrete.

3.3. An engineered media consisting of both organic and inorganic aggregates with a minimum depth of 24 inches. The media is designed to provide high flow rate infiltration and promote healthy plant growth.

3.4. A woven geotextile mesh, meeting the Manufacturer's requirements will be placed between the media and stone layers. The mesh shall be such as to allow for the passage of water and restricting sediment transport while minimizing occlusion.

3.5. A perforated PVC underdrain pipe of specific dimension within a washed crush stone layer to convey infiltrating water and provide for sediment accumulation. The underdrain pipe is connected to a vertical closed riser pipe with an open top to serve for overflow/bypass, or access for cleanout.

4. PERFORMANCE

4.1. Function: The tree filter system shall function to remove pollutants by the following treatment processes: sedimentation, physical, and biological processes.

4.2. Pollutants: The tree filter system is designed to reduce or remove debris, trash, coarse and fine particulates, particulate-bound pollutants, metals and nutrients from stormwater during runoff events.

4.3. Bypass: The tree filter system shall typically utilize an internal bypass to divert excessive flows.

4.4. Treatment Capabilities shall be verified via third-party reports following Washington State Ecology TAPE protocols and maintain General Use Level Design (GULD) status for Basic (TSS), Total Phosphorous, and Enhanced (select dissolved metals) as defined.

4.4.1. Engineered biofiltration Media flow rate shall be verified via third-party report following TAPE protocols. The minimum treatment flow rate based on target pollutant shall be as follows:

TSS: 120 in/hr
Phosphorus: 120 in/hr
Metals: 120 in/hr

The System shall be designed to ensure that high flow events shall bypass the engineered biofiltration media preventing erosion and resuspension of pollutants.

4.4.2. The System shall remove a minimum of 90% Total Suspended Solids (TSS) based on aggregated data from field studies following the TAPE protocol.

4.4.3. The System shall remove a minimum of 69% Total Phosphorus based on aggregated data from field studies following TAPE protocol.

4.4.4. The System shall remove a minimum of 38% Dissolved Copper based on aggregated data from field studies following TAPE protocol.

4.4.5. The system shall remove a minimum of 73% Dissolved Zinc based on aggregated data from field studies following TAPE protocol.

4.5. Quality Assurance and Quality Control procedures shall be followed for all batches of engineered biofiltration media produced. Engineered biofiltration media shall be certified by the Manufacturer for performance and composition.

4.5.1. Media particle size distribution and composition shall be verified as per relevant ASTM Standards.

4.5.2. Media pollutant removal performance shall be verified per relevant ASTM Standards as well as TAPE protocol.

4.5.3. Media hydraulic performance shall be verified per relevant ASTM Standards as well as TAPE protocol.

5. CONSTRUCTION METHODS

5.1. Prevent damage to materials during storage and handling. The precast concrete structure shall be delivered to the project site via a flatbed transport. The contractor shall provide equipment at the site that has adequate capacity to offload the precast components. Pick weight will be determined.

5.2. The precast structure shall be placed above a layer of crushed washed stone. The stone will be placed to the limit of the excavation shown on the Plan, but at a minimum will extend one foot beyond the outside dimensions of the precast structure provided that there are no setback restrictions.

5.3. The underdrain pipe and riser assembly will be placed within the stone layer with additional coverage.

5.4. A woven geotextile mesh meeting the Manufacturer’s requirements will be placed and overlie the finished stone layer elevation.

5.5. The engineered media will be placed to the assigned depth and extent.

5.6. The fiberglass grate will be set within the notched ledge of the structure and be flush with the top surface of the structure.

5.7. Any asphalt or concrete pavement, sidewalks, curb, gutter or other structures, including utilities, that were removed to accommodate construction shall be replaced or relocated in a condition equal to or better than that removed, all to the satisfaction of the Engineer.

6. ACTIVATION, INSPECTION AND MAINTENANCE

6.1. Following completion of system installation, demonstrate the system performance to the satisfaction of the Engineer.