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DEPARTMENT OF ENVIRONMENTAL PROTECTION
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Lt. Governor
DIVISION OF WATERSHED PROTECTION AND RESTORATION
BUREAU OF NJPDES STORMWATER PERMITTING & WATER QUALITY MANAGEMENT
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SHAWN M. LATOURETTE
Commissioner

February 6, 2024

Bo Liu, P.E. Ph.D.
Research Engineer
Advanced Drainage Systems, Inc.
4640 Trueman Boulevard
Hilliard, OH 43026

Re: MTD Lab Certification
EcoStream Biofiltration System (EcoStream)
Online Installation

TSS Removal Rate 80%

Dear Dr. Liu:

This revised certification letter supersedes the Department's prior certification dated June 20, 2023. This revision was completed as a result of the addition of new models. Additionally, amendments to the Stormwater Management rules at N.J.A.C. 7:8 were adopted on July 17, 2023. Among other changes, these amendments removed the rational method as an allowable calculation method for compliance with the Stormwater Management rules in New Jersey. As a result, this revised certification also updates the example sizing calculation to utilize NRCS methodology, rather than the rational method.

The Stormwater Management rules under N.J.A.C. 7:8-5.2(f) and 5.2(j) allow the use of manufactured treatment devices (MTDs) for compliance with the design and performance standards at N.J.A.C. 7:8-5 if the pollutant removal rates have been verified by the New Jersey Corporation for Advanced Technology (NJCAT) and have been certified by the New Jersey Department of Environmental Protection (NJDEP). Advanced Drainage Systems, Inc. has requested a Laboratory Certification for the EcoStream Biofiltration System (EcoStream).

The project falls under the "Procedure for Obtaining Verification of a Stormwater Manufactured Treatment Device from New Jersey Corporation for Advance Technology" dated August 4, 2021. The applicable protocol is the "New Jersey Department of Environmental Protection Laboratory Protocol to Assess Total Suspended Solids Removal by a Filtration Manufactured Treatment Device" dated January 14, 2022.

NJCAT verification documents submitted to the NJDEP indicate that the requirements of the aforementioned protocol have been met or exceeded. The NJCAT letter also included a recommended certification TSS removal rate and the required maintenance plan. The NJCAT Verification Report with

the Verification Appendix (dated May 2023 and last revised January 2024) for this device is published online at http://www.njcat.org/verification-process/technology-verification-database.html.

The NJDEP certifies the use of the EcoStream by Advanced Drainage Systems, Inc. at a TSS removal rate of 80% when designed, operated, and maintained in accordance with the information provided in the Verification Appendix and the following conditions:

1. The maximum treatment flow rate (MTFR) for the manufactured treatment device (MTD) is calculated using the New Jersey Water Quality Design Storm (1.25 inches in 2 hrs) in N.J.A.C. 7:8-5.5. The MTFR is calculated based on a verified loading rate of 4.125 gpm/ft^2 of effective filtration treatment area.

2. The EcoStream shall be installed using the same configuration reviewed by NJCAT and sized in accordance with the criteria specified in item 7 below.

3. This device cannot be used in series with another MTD or a media filter (such as a sand filter) to achieve an enhanced removal rate for total suspended solids (TSS) removal under N.J.A.C. 7:8-5.5.

4. Additional design criteria for MTDs can be found in Chapter 9.5 of the New Jersey Stormwater Best Management Practices (NJ Stormwater BMP) Manual, which can be found online at https://dep.nj.gov/stormwater/.

5. The maintenance plan for a site using this device shall incorporate, at a minimum, the maintenance requirements for the EcoStream. A copy of the maintenance plan is attached to this certification. However, it is recommended to review the maintenance website at https://www.adspipe.com/resources/documents/46DAA1FC-D53D-4B22-AC03FBEF7310E895 for any changes to the maintenance requirements.

6. For an MTD to be considered "green infrastructure" in accordance with the March 2, 2020 amendments to the Stormwater Management rules at N.J.A.C. 7:8, the MTD must meet the GI definition noted at amended N.J.A.C. 7:8-1.2. Specifically, the MTD shall (1) infiltrate into the subsoil; and/or (2) treat stormwater runoff through filtration by vegetation or soil. Any configuration that uses a bio-filtration media and can be configured "above ground" and incorporate a tree box, planter box, or shrubs, etc., would meet the GI definition. Any MTD with bio-filtration media that would be placed "below ground" as a vault without any vegetation can be considered GI (for NJ purposes) only if the device infiltrates the entire Water Quality Design Storm into the subsoil. Further, the below ground device (vault) would need to meet the NJDEP Stormwater BMP Manual conditions of having the soil below the MTD meet the minimum tested infiltration rate of one inch per hour, have at least two feet of separation from the seasonal high water table, and infiltrate into the subsoil.

7. Sizing Requirement:

   The example below demonstrates the sizing procedure for the EcoStream:

   Example: A 0.25-acre impervious site with a slope of 5% is to be treated to 80% TSS removal using an EcoStream. The hydraulically most distant point to the inlet of the device is 110 feet. The site is located in an area for which the projected 2-year storm rainfall depth was calculated to be 3.84 inches.

The selection of the appropriate model of an EcoStream is based upon both the maximum inflow drainage area and the MTFR. It is necessary to calculate the required model using both methods and to use the largest model determined by the two methods.

Inflow Drainage Area Evaluation:

The drainage area to the EcoStream in this example is 0.25 acres. Based upon the information in Table 1 below, the Model ES-12 would be able to treat runoff without exceeding the maximum allowable drainage area.

Maximum Treatment Flow Rate (MTFR) Evaluation:

The site runoff (Q) was based on the following:

CN = 98 (Curve Number for impervious)
Dimensionless Unit Hydrograph (DUH) = SCS Standard DUH (peak rate factor of 484)
Time of concentration = 0.8 minutes
Q = 0.77 cfs

Given the site runoff is 0.77 cfs and based on Table 1 below, the minimum size unit to be used to treat the runoff without exceeding the MTFR is the Model ES-91.

The MTFR evaluation results will be used since that method results in the highest minimum configuration determined by the two methods.

The sizing table corresponding to the available system models is noted below:

Table 1. EcoStream Biofiltration System Model MTFRs and Maximum Allowable Drainage Area.

Model	Typical Treatment Cell Dimensions W x L (ft)	Effective Filtration Treatment Area (ft^2)	MTFR (cfs)	Maximum Allowable Drainage Area (acres)
ES-6	2 x 3	6	**0.055**	**0.169**
ES-12	3 x 4	12	**0.110**	**0.339**
ES-16	4 x 4	16	**0.147**	**0.451**
ES-20	4 x 5	20	**0.184**	**0.564**
ES-24	4 x 6	24	**0.221**	**0.677**
ES-32	4 x 8	32	**0.294**	**0.903**
ES-36	6 x 6	36	**0.331**	**1.016**
ES-40	4 x 10	40	**0.368**	**1.129**
ES-48	4 x 12	48	**0.441**	**1.354**
ES-60	6 x 10	60	**0.551**	**1.693**
ES-72	6 x 12	72	**0.662**	**2.032**
ES-80	8 x 10	80	**0.735**	**2.257**
ES-91	7 x 13	91	**0.836**	**2.568**
ES-96	8 x 12	96	**0.882**	**2.709**
ES-100	10 x 10	100	**0.919**	**2.822**
ES-112	8 x 14	112	**1.029**	**3.160**
ES-120	10 x 12	120	**1.103**	**3.386**
ES-128	8 x 16	128	**1.176**	**3.612**
ES-144	12 x 12	144	**1.323**	**4.063**
ES-160	10 x 16	160	**1.470**	**4.515**
ES-168	12 x 14	168	**1.544**	**4.740**
ES-176	8 x 22	176	**1.618**	**4.966**
ES-225	15 x 15	225	**2.068**	**6.349**
ES-256	16 x 16	256	**2.353**	**7.223**
ES-289	17 x 17	289	**2.656**	**8.155**
ES-324	18 x 18	324	**2.978**	**9.142**
ES-360	18 x 20	360	**3.309**	**10.158**

Be advised a detailed maintenance plan is mandatory for any project with a Stormwater BMP subject to the Stormwater Management Rules, N.J.A.C. 7:8. The plan must include all of the items identified in the Stormwater Management Rules, N.J.A.C. 7:8-5.8. Such items include, but are not limited to, the list of inspection and maintenance equipment and tools, specific corrective and preventative maintenance tasks, indication of problems in the system, and training of maintenance personnel. Additional information can be found in Chapter 8: Maintenance and Retrofit of Stormwater Management Measures.

If you have any questions regarding the above information, please contact Changi Wu of my office at chang.i.wu@dep.nj.gov.

Sincerely,

Gabriel Mahon, Chief
Bureau of NJPDES Stormwater Permitting & Water Quality Management
Division of Watershed Protection and Restoration
New Jersey Department of Environmental Protection

Attachment: Maintenance Plan

cc: Richard Magee, NJCAT

EcoStream™ Biofiltration System Operation & Maintenance Guidance

Description

The EcoStream Biofiltration System (EcoStream) is an engineered stormwater biofiltration treatment system designed to capture and retain a variety of pollutants including sediments, phosphorus, heavy metals, and hydrocarbons from stormwater runoff. EcoStream incorporates the processes of sedimentation, filtration, infiltration, adsorption, and biological uptake to provide both water quality and quantity benefits in a small footprint. EcoStream should be activated after a site is stabilized to prevent uncontrolled stormwater runoff from the construction site from entering the system.

Configuration

The EcoStream system comes in many standard sizes and is available in several different deployment configurations. Excess flow spills over an overflow pipe and is directly discharged along with treated flow. The EcoStream system can be configured as a planter box filter with an open top that is suitable for shrubs and grasses, or as an underground filter with a subsurface inlet pipe. The optional external high flow bypass may be incorporated with any of these configurations.

Operations

Stormwater runoff enters the EcoStream via a pipe inlet or curb inlet and flows downward under gravity flow through mulch/media/gravel layers. The top layer provides pretreatment by retaining the coarse sediments, trash, and debris. The fine sediments and dissolved pollutants are further treated through the media bed in depth. Treated water enters an underdrain pipe or infiltrates into the ground (installations with open bottoms). A flow control orifice is placed downstream of the underdrain to ensure the distribution of flow in the media bed.

Inspections and Maintenance Overview

The EcoStream system requires periodic inspection and maintenance for it to operate at the design efficiency. The inspection process helps in deciding when and what level of maintenance will be needed to bring the unit up to or near peak efficiency. As with ADS' other water quality products, the maintenance cycle of the EcoStream system will be driven mostly by the actual solids and trash/debris load brought into the system.

The frequency of maintenance depends on the site-specific pollutant loading conditions. ADS recommends a visual inspection of the system quarterly for the first year of service, and after every high intensity and high-volume storm event occurring (1 in/hr and greater than 3 inches rainfall within 24 hours) during the first six months. After the first year, systems should be inspected at least bi-annually and ideally before the spring or rainy season and after the summer season, or prior to fall or winter seasons. The inspections should look for signs of but not limited to erosion, displacement, sediment, and trash accumulations in the upper portion of media bed or planting area. It is recommended that some general "good housekeeping" maintenance be performed at the beginning of the rainy or spring season every year. Depending on the site conditions, full system maintenance including removal of all media and plant life may be necessary if ponding water remains on top of media bed for 24 hours after any storm event.

For most maintenance needs, the EcoStream planting component follows the practices used for handling standard bioretention systems (i.e., general landscaping, cover management, and replacement planting of surface plants).

It may be advisable to “water” or irrigate the EcoStream plant area in geographical regions experiencing droughts or prolong periods without rainfall during the first year of service. Watering the plant life will help to ensure the plants can take hold and be established for future growth and treatment capabilities.

Inspection and General Maintenance Equipment

The following is a list of equipment recommended for inspection and general maintenance.

- Personal Protection Equipment (pants, steel-toed shoes, safety glasses, gloves, safety vest, hard hat, etc.)
- Manhole Hook or Crowbar
- Traffic Cones and Signage
- Stadia Rod and Tape Measure
- Inspection Operation and Maintenance (O&M) Log or other recording method (included at end of guide)
- Flashlight, Trash removal “Net” device, shovel, rake, broom and trash receptacle
- Vac Truck (if more extensive maintenance is required)
- Light Duty Construction Equipment (if bioretention media replacement is required

General Inspection and Maintenance Procedures

Routine inspection will ensure that the system is performing at optimal conditions and that the risk of public flooding is low. EcoStream inspection involves a visual inspection of the plant surface area, structure inlet, and the media bed. This can all be done at the surface and requires no confined space entry into the EcoStream unit. An Inspection O&M log should be used, dates and weather conditions should be noted.

If the EcoStream is located in a traffic area (i.e. roadway or automobile travel way), and inspection is not possible without entering the vehicular area, safety measures should be employed --safety cones setup, etc. --prior to performing the inspection and maintenance.

For inspection of the treatment chamber of the EcoStream system, the manhole cover should be safely removed (i.e., using a manhole hook). A visual inspection of any inlet grates should be noted. If grates are missing or inlets are damaged, contact ADS for recommendation of repair. A visual inspection of the general appearance of the EcoStream should be performed, and notes should be taken detailing the condition of the surface plant life, invasive species intrusion, vandalism, erosion in the planting area and any signs of standing water or disturbed or “shifted” surface soil bed area. This general system condition should be noted in the inspection/maintenance log.

If the plant life and surface media show signs of distress, general landscaping O&M should be performed, i.e., raking, weeding (removal of invasive plants), and general planting replacement to maximize the cover area in the planting bed/media treatment chamber. If ponding of water is present in the media treatment cell and the last rain event was greater than 24 hours prior, further inspection should be performed to ensure the effluent pipe is not blocked.

A visual inspection (with a flashlight if needed) will inspect the appearance of the inlet (pipe or curb) and media bed. Remove all trash and debris from the inlet and the top of the media bed manually or by vacuum truck as required. If there is a visible sediment load or the media bed appears to have been greatly disturbed during preceding storm events, redistribute or replace the top mulch layer as needed. If sediment load is heavy, remove the mulch layer and inspect the biofiltration media and replace the top two-inch media if it appears clogged. Additionally, a further inspection should be undertaken within 24 hours after a major storm event to see if there is standing water in the system. Water stagnation in the treatment chamber indicates that media bed replacement may be recommended. ADS Field Engineering can assist with this analysis.

ADS should be contacted for material specifications and replacement parts. Media chamber replacement will involve utilizing small construction excavation equipment.

Disposal of material from the treatment chamber should be in accordance with the local municipality’s requirements. Typically, traditional municipal landfills can be used for disposal of solids and trash obtained from servicing the EcoStream. Call ADS at 800-821-6710 for further information.

Records of Operation and Maintenance

The owner shall maintain annual records of the operation and maintenance of the EcoStream unit to document the effective maintenance of this important component of a site’s stormwater management program. The attached Inspection & Maintenance Log is suggested and should be retained for a minimum period of two years.

EcoStream BioFilter Inspection and O&M Log Sheet

Project Name: _____

Location: _____

Date	Inspection or O&M	Observation/Actions	Operator comments and general description	Inspector

adspipe.com
800-821-6710