

# Technical Note

## TN 1.13 EcoStream™ Considerations

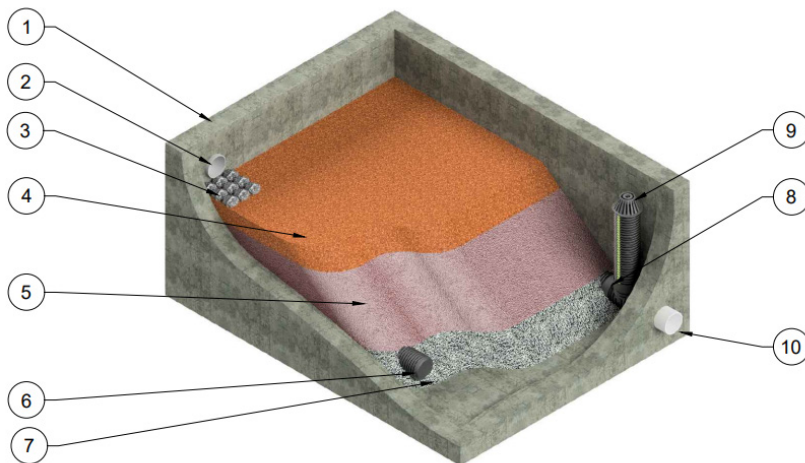
### Overview

The ADS EcoStream Biofiltration system is a manufactured water quality treatment device intended for removal of Total Suspended Solids (TSS), as well as contaminants like oil, grease, trash, heavy metals, and compounds such as nitrogen & phosphorus. This unit introduces the ability to receive both surface and subsurface runoff, allowing it to be installed in many locations and applications.

Once installed, the unit's ability to treat through filtration, adsorption and biological processes will ensure sufficient water quality treatment of the influent runoff.

### System Components

Figure 1: EcoStream System Components

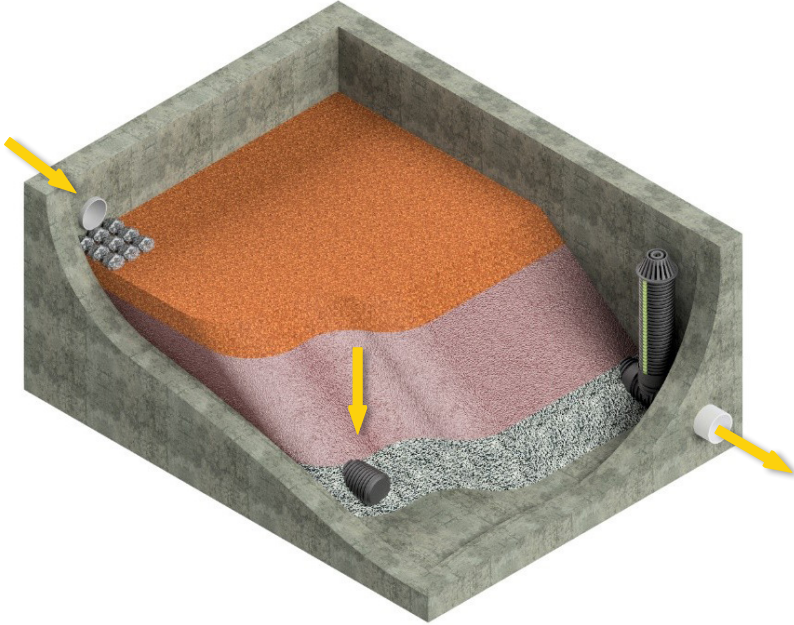


1	<b>Concrete Vault</b>	Designed for H-20 loading, meeting the specifications outlined in ASTM C857 and ASTM C858. The concrete shall have a minimum unconfined compressive strength of 4000 psi.
2	<b>Inlet Pipe or Throat Inlet</b>	Diameter and material per plans
3	<b>Energy Dissipation Stone</b>	Rip rap shall be sourced locally
4	<b>Mulch</b>	Mulch shall be double shredded, and will be sourced locally
5	<b>Biofiltration Media</b>	Engineered media targeting treatment requirements.
6	<b>Underdrain Pipe</b>	Comprised of perforated drain tile and PVC pipe fittings that shall meet ASTM D1785
7	<b>Underdrain Stone</b>	#57 Stone sourced by contractor
8	<b>Flow Control Orifice</b>	
9	<b>High Flow Bypass with Beehive Grate</b>	These components shall meet ASTM D1785 and will be provided to the contractor partially pre-cut and/or pre-assembled
10	<b>Outlet Pipe</b>	Diameter and material per plans

## Functionality

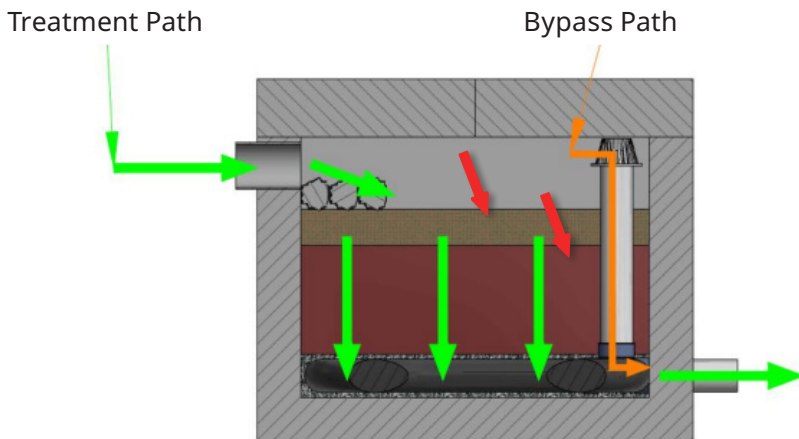
1. Stormwater runoff enters the unit through a throat inlet or subsurface influent pipe. (Item 1 in Figure 1)  
Energy dissipation stone is present to reduce the flow velocity. (Item 2 in Figure 1)

**Figure 2:** Treatment flow path shown through a unit with an inlet pipe



2. After entering the unit, runoff will flow downward via gravity through the EcoStream system. The top mulch layer will filter out coarse sediment and gross pollutants. The biofiltration layer is designed to remove fine sediments and dissolved pollutants, such as heavy metals or nutrients.
3. Treated water enters the perforated underdrain pipe (Item 6 in Figure 1) and then exits the EcoStream through the outlet pipe. (Item 10 in Figure 1) A flow control orifice is included in the underdrain piping to limit the flow rate through the system, to ensure adequate residence time within the system. (Item 8 in Figure 1)

**Figure 3:** Treatment flow pathway shown in profile view



4. During peak storm events where the treatment capacity of the system is exceeded, runoff will pond up and begin to flow through bypass standpipe. (Item 9 in Figure 1.) Figure 3 above shows the treatment flowpath through the unit in green, and also shows the bypass flow path in orange

## Design Summary Table

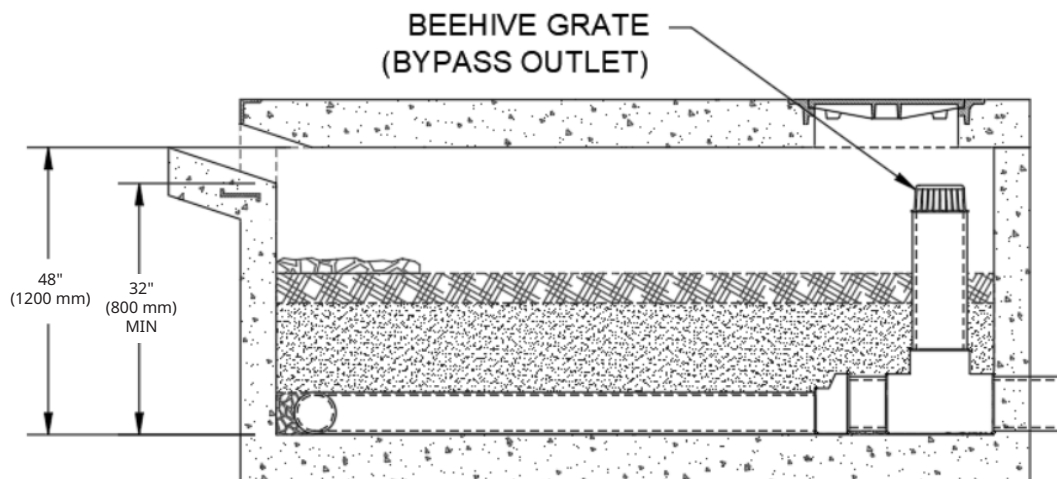
EcoStream Unit Model ft (m)	Treatment Cell Dimensions ft (m)	Treatment Rate cfs
ES 4x4 (1.2 x 1.2)	4 x 4 (1.2 x 1.2)	0.147
ES 4x6 (1.2 x 1.8)	4 x 6 (1.2 x 1.8)	0.221
ES 4x8 (1.2 x 2.4)	4 x 8 (1.2 x 2.4)	0.294
ES 4x10 (1.2 x 3.0)	4 x 10 (1.2 x 3.0)	0.368
ES 4x12 (1.2 x 3.6)	4 x 12 (1.2 x 3.6)	0.441
ES 6x8 (1.8 x 2.4)	6 x 8 (1.8 x 2.4)	0.441
ES 6x10 (1.8 x 3.0)	6 x 10 (1.8 x 3.0)	0.551
ES 6x12 (1.8 x 3.6)	6 x 12 (1.8 x 3.6)	0.662
ES 8x10 (2.4 x 3.0)	8 x 10 (2.4 x 3.0)	0.735
ES 8x12 (2.4 x 3.6)	8 x 12 (2.4 x 3.6)	0.882
ES 8x14 (2.4 x 4.2)	8 x 14 (2.4 x 4.2)	1.029
ES 8x16 (2.4 x 4.8)	8 x 16 (2.4 x 4.8)	1.176

## Design Considerations – Inverts/Elevations

In addition to ensuring that the correctly sized EcoStream unit is selected for the project based upon the above treatment parameters, there are additional factors to consider when designing a site with an EcoStream unit.

The required design head of the system is 32" (800 mm), meaning there needs to be 32" (800 mm) from the invert of the outlet pipe to the top of the bypass pipe. (The media chamber is 32" (800 mm) from the floor to the top of the bypass pipe.) See Figure 4.

**Figure 4:** EcoStream inlet/outlet



The total depth of the media is 27" (675 mm); The layer of growth media is 5" (125 mm) thick, the layer of the EcoStream media is 15" (375 mm) thick, and the stone layer is 7" (175 mm) thick. (The stone layer corresponds to the OD of the underdrain pipe.) If an inlet pipe configuration is used, it must be placed such that the inlet pipe invert is above the media layers.

## Installation

Installation of the EcoStream unit will involve subsurface excavation, placement of sub-base aggregate material, positioning/casting of the vault, and arrangement of the internal components. Proper installation of the unit is crucial to ensure performance in alignment with the parameters specified above. Please refer to the EcoStream BioFiltration Installation Guide for specifics on how the unit should be installed. Variance from the steps outlined in this document can result in an improperly functioning unit.

## Plants

Plants are not required to be utilized but if desired, choice of plant should align with local requirements and/or be chosen by a qualified landscape architect. If guidance is required, ADS can provide a generic plant list for assistance in design. Please refer to local requirements/approvals to determine if plants are required for the EcoStream BioFilter in your area.

