**BIOPOD™**

Tree box biofilter to remove ultra-fine and dissolved pollutants from stormwater runoff

BioPod is a tree box biofilter that uses engineered media with an integrated pre-treatment chamber to remove total suspended solids (TSS), metals and hydrocarbons from stormwater runoff. With its bioretention media and the ability to infiltrate onsite, BioPod can be an integral part of any Low-Impact Development (LID) plan.

Available in a number of sizes and shapes, the BioPod biofilter can be customized and designed to meet site-specific stormwater runoff sizing requirements. Typical systems require 3.5 feet of drop from the top of curb to the invert of the outlet pipe. Flow enters the integral pre-treatment chamber and passes through a coarse debris screen prior to entering the bioretention chamber for full treatment. The pre-treatment chamber settles out heavy sediment and associated pollutants, and the screen prevents trash and bulk debris from entering the bioretention chamber, extending the life of the media. The bioretention chamber features an 18” (minimum) layer of bioretention media, composed of an 80%/20% blend of coarse sand and organics, topped with a 4” layer of shredded mulch. This configuration yields a maximum design treatment loading rate of 1 gmp/ft². The BioPod has an internal high flow bypass incorporated in the inlet chamber to channel peak flow directly to the outlet pipe without allowing it to enter the treatment chamber where it could scour previously captured pollutants.

**System Performance**

In 2012, a field performance evaluation study of the BioPod was completed by the University of New Hampshire Stormwater Center (UNHSC) at their test facility in Durham, NH. The treatment area included one-third of an acre of impervious parking area, directly drained to the treatment unit (see Figure 1 for treatment unit details). The study evaluated performance of the BioPod system, as well as the debris removal of the integral pre-treatment chamber. The BioPod system demonstrated the following results:

**Total System Performance**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSS Efficiency Ratio</td>
<td>93%</td>
</tr>
<tr>
<td>TSS Removal Efficiency</td>
<td>85%</td>
</tr>
<tr>
<td>TPH-D (total petroleum hydrocarbons-diesel range)</td>
<td>77%</td>
</tr>
<tr>
<td>TZn (total zinc)</td>
<td>71%</td>
</tr>
</tbody>
</table>

1 Calculated based on mean influent and effluent concentrations
2 Calculated based on the median removal efficiency for all events

**Pre-Treatment Chamber Performance**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sediment Removal</td>
<td>26%</td>
</tr>
<tr>
<td>TPH-D Removal</td>
<td>9%</td>
</tr>
</tbody>
</table>

1 Particle size distribution 5mm and less

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Figure 1: Plan view and section view of BioPod unit at UNHSC field test facility
System Performance

- High flow rate bioretention media (100 in/hr) results in smaller systems and is more economical.
- Integral pre-treatment chamber removes significant portion of the bulk trash and debris and influent sediment load from typical stormwater runoff, extending the life of the bioretention media and reducing maintenance frequency.
- Pre-treatment chamber is easily accessed for maintenance.
- Inlet and outlet configuration options allow for flow to enter or exit the system on either side or the end and can be customized to the site.
- Internal high flow bypass allows flows exceeding the treatment capacity of the unit to bypass without causing street flooding, scour of previously trapped pollutants, and without the need for a second structure.
- The open-bottom BioPod can infiltrate directly into the soil below or into underground detention systems and can be customized to the site.
- Open-bottom systems are lightweight, allowing for installation with conventional jobsite equipment.
- Once sitework is completed, Oldcastle will provide a field crew for commissioning of the system which includes placement of the selected tree or shrub and can provide ongoing maintenance services.
- System uses ADA approved tree grates, ensuring an acceptable and pleasing finished surface.
- Quick and easy maintenance does not require confined space entry.