WASHINGTON STATE DEPARTMENT OF ECOLOGY

December 2012

GENERAL USE LEVEL DESIGNATION FOR PRETREATMENT (TSS) For Stormceptor System®

Ecology's Decision:

Based on Imbrium Systems Corporation's application submissions, Ecology hereby issues the following Use Level Designation for the Imbrium Systems Corporation Stormceptor System:

1. **General Use Level Designation (GULD) for pretreatment, as defined in Ecology's 2011 *Technical Guidance Manual for Evaluating Emerging Stormwater Treatment Technologies Technology Assessment Protocol – Ecology (TAPE)* Table 2, (a) ahead of infiltration treatment, or (b) to protect and extend the maintenance cycle of a basic or enhanced treatment device (e.g., sand or media filter). This GULD applies to Stormceptor System® units sized in accordance with Table 1 (below) at the water quality design flowrate.**

Table 1

Unit	Treatment Flowrate (gpm)
STC 450i	143
STC 900	285
STC 1200	285
STC 1800	285
STC 2400	476
STC 3600	476
STC 4800	793
STC 6000	793
STC 7200	1110
STC 11000	1585
STC 13000	1585
STC 16000	2220

2. **Ecology approves Stormceptor systems for treatment at the hydraulic loading rates shown in Table 1, and sized based on the water quality design flow rate. Calculate the water quality design flow rate using the following procedures:**

- **Western Washington: For treatment installed upstream of detention or retention, the water quality design flow rate is the peak 15-minute flow rate as calculated using the latest version of the Western Washington Hydrology Model or other Ecology-approved continuous runoff model.**

- **Eastern Washington: For treatment installed upstream of detention or retention, the water quality design flow rate is the peak 15-minute flow rate as calculated using one of the three methods described in Chapter 2.2.5 of the Stormwater Management Manual for Eastern Washington (SWMMEW) or local manual.**

- **Entire State: For treatment installed downstream of detention, the water quality design flow rate is the full 2-year release rate of the detention facility.**

3. **The GULD has no expiration date, but Ecology may amend or revoke the designation at any time.**

4. **All designations are subject to the conditions specified below.**

5. **Properly designed and operated Stormceptor Systems may also have applicability in other situations (example: low-head situations such as bridges or ferry docks), for TSS removal where, on a case-by-case basis, the permittee finds it infeasible or impracticable to use any other approved practice. Jurisdictions covered under the Phase I or II municipal stormwater permits should use variance/exception procedures and criteria as required by their NPDES permit.**

6. **Ecology finds that the Stormceptor System could also provide water quality benefits in retrofit situations.**

<u>Ecology's Conditions of Use:</u>

Stormceptor Systems shall comply with these conditions:

1. **Design, assemble, install, operate, and maintain Stormceptor Systems in accordance with Imbrium Systems Corporation's applicable manuals and documents and the Ecology decision and conditions specified herein. Ecology recommends the inspection and maintenance schedule included as Attachment 1:**

2. **Discharges from the Stormceptor System® shall not cause or contribute to water quality standards violations in receiving waters.**

Applicant: Dan Nason
Imbrium Systems Corporation

Applicant Address: 100 Grove Street
Worcester, MA, 01605

Application Documents:

- *Submission for Verification Acceptance*, State of Washington Department of Ecology (WADOE), dated May 2005. This document contains the following elements:

    - Submission for Verification Acceptance, including an abridged version of the application and a technical manual
    - Field data, Westwood, MA, 1997
    - Field data, Seatac, WA, 1999
    - Testing summary, Como Park, MN, 1998
    - Testing summary, Edmonton, AB, 1994-6
    - Wisconsin DNR/USGS report, conference paper, and monitoring summary, 1998
    - Laboratory evaluation, done for NJDEP, 2004
    - Coventry University laboratory study, 1996
    - Stormwater hydrology report, Bryant et. al.
    - Canada Environmental Technology Verification report, 2003
    - Massachusetts Strategic Envirotechnology Partnership report, 1998
    - NJCAT certification report, 2005

- *A Review of Stormceptor™ - In Contrast to Other Wet Vaults that have Received Certification under the Washington State Department of Ecology's TAPE Program for Rinker Materials*, Gary Minton, July 10, 2007

With the exception of any files identified as confidential, you may obtain a CD-ROM containing these submittal documents by contacting Imbrium Systems Corporation.

Applicant's Use Level Requests:

- General Use Level Designation (GULD) for pretreatment.

Applicant's Performance Claims:

- Imbrium Systems demonstrated the ability of the Stormceptor System to meet the State of Washington's pretreatment (TSS) criteria based on analyses of data from field and laboratory studies. Laboratory studies utilized both OK-110 sand and the NJDEP particle size distribution...
- Imbrium Systems demonstrated the ability of the Stormceptor System to remove material finer than 500 microns. Imbrium did not design the Stormceptor System to remove litter and debris.

- The Stormceptor System removes large portions of sand and silt from stormwater on a long-term basis, thereby preventing material from entering a downstream treatment facility, thus extending the maintenance cycle of the downstream facility.
- Imbrium Systems demonstrated through field performance and laboratory studies the scour prevention capability of the Stormceptor System. The system's unique design prevents loss of previously captured pollutants during periods with higher flowrates.
- The Stormceptor System is an easy-to-maintain device that is much more cost-effective to maintain/clean than many alternative methods such as filtration systems and detention ponds.
- Imbrium Systems demonstrated through field and laboratory study Stormceptor's capability to function as an effective spill capture device for petroleum hydrocarbon spills, thereby preventing potentially catastrophic environmental damage from such spills.
- The Stormceptor System is an effective treatment measure for retrofit and other space-constrained or infrastructure-constrained applications that preclude the use of other approved treatment systems.

Ecology's Recommendations: Based on the weight of the evidence and using its best professional judgment, Ecology finds that:

- The Stormceptor System®, sized according to Table 1 (above) should provide, at a minimum, equivalent performance to a presettling basin as defined in the most recent *Stormwater Management Manual for Western Washington*, Volume V, Chapter 6.
- Ecology should provide Imbrium Systems Corporation with the opportunity to demonstrate, through additional laboratory and field testing, whether the Stormceptor System® can attain Ecology's Basic (TSS) Treatment performance goal.

Findings of Fact:

- Imbrium Systems Corporation submitted laboratory data for its Stormceptor System STC-900, testing silica material prepared to satisfy New Jersey Department of Environmental Protection (NJDEP) standards (mean particle size 97 microns; range 1 to 1000 microns). Weighted TSS removal rates averaged 75% across a range of operating rates (25% to 125% of the design rate), with TSS influent concentrations (97 micron mean particle size) averaging 295 mg/L. Unweighted TSS removal rates averaged 74%, and the removal rate at 285 gpm was 73%.
- Imbrium Systems ran scour tests at 125% of the design flowrate with initial sediment loading of 50% and 100% in the lower chamber of the unit. No scouring occurred at 50% loading and minimal scouring occurred at 100% loading.
- Imbrium System submitted several substantial field data sets. However, most data do not represent flow-weighted composite samples for individual storms, which Ecology protocol requires. The Madison site used flow-weighted composites, and TSS removal rates were in the 20% to 30% range. The Madison site is a maintenance yard with dirt and salt piles and Imbrium Systems believes the results do not represent typical system performance.
- Owners can readily maintain the system using a vacuum truck.

- There are approximately 15,000 Stormceptor systems in use nationwide and 510 in the Pacific Northwest.

Technology Description:

You can download design manual and technical bulletins from company's web site.

Recommended Research and Development:

Ecology encourages Imbrium Systems Corporation to pursue continuous improvements to the Stormceptor System®. To that end, Ecology recommends the following actions are:

- No field-testing data are currently available to reliably ascertain the Stormceptor System's ability to remove the finer particles (typically represented by Sil-Co-Sil 106 in laboratory testing) comprising TSS found on local highways, parking lots, and other high-use areas. Design of future facilities should consider:

    a. Provide sizing for specific applications based on actual particle size distribution in the target runoff. Imbrium can use Ecology's TAPE Guidance (https://fortress.wa.gov/ecy/publications/summarypages/1110061.html) on the expected particle size distributions for Basic Treatment.
    b. Performing laboratory and field testing to evaluate whether the Stormceptor System® can reliably achieve Basic Treatment criteria.

Contact Information:

Applicant:

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Applicant website: www.stormceptor.com

Ecology web link: http://www.ecy.wa.gov/programs/wq/stormwater/new_tech/

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Revision History

Date	Revision
April 2006	Original Draft Pilot Use Level Designation document: for pretreatment
September 2007	Update to GULD
January 2013	Modified Design Storm Description, added Revision Table, reformatted document, revised contact information

Stormceptor System Checklist

Frequency	Drainage System Feature	Problem	Conditions to Check For	Recommended Action	Date Inspected*											
					J	F	M	A	M	J	J	A	S	O	N	D
M & S	Settling chamber	Sediment accumulation	Sediment capacity reached (varies depending on the model, see attached table)	Sediment should be removed using vactor truck												
M & S	Settling Chamber	Trash and floatable debris accumulation	Excessive trash and floatable debris accumulation.	Remove trash or other floatable debris												
M & S	Settling chamber	Excessive oil accumulation	Oil exceeds 6” in depth or evidence of a spill	Clean out Oil.												
M	Manhole Cover	Cover Damaged/ Not working	Corrosion of deformation of cover. (One maintenance person cannot remove lid after applying 80 pounds of lift.)	Repair cover to proper working specifications or replaced.												
M	Disk Insert	Disk insert inlet/ outlet obstructed	Inlet or outlet piping obstructed	Remove obstruction blocking inlet or outlet piping.												
A	Structure	Structure has cracks in wall, bottom, and damage to frame and/or top slab.	Cracks wider than ½ inch or evidence of soil particles entering the structure through the cracks, or maintenance/inspection personnel determine that the vault is not structurally sound.	Repair or replace vault to meet design specifications and is structurally sound.												
A	Structure Joints	Structure has cracks at the joint of any inlet/ outlet pipe.	Cracks wider than 0.5 inch at the joint of any inlet/outlet pipe or evidence of soil particles entering through the cracks	Repair vault so that no cracks exist wider than 0.25 inch at the joint of inlet/outlet pipe.												

*Note dates when you performed maintenance and type of maintenance performed in notes section below.

(M) Monthly from November through April.
(A) Once in late summer (preferable September)
(S) After any major storm (use 1-inch in 24 hours as a guideline).
If you are unsure whether a problem exists, please contact a Professional Engineer or the manufacturer's representative.

Refer to Stormceptor Owner's Manual for maintenance details.

Notes:

Sediment Depths Indicating Required Servicing	
Model	Sediment Depth
STC 450i	8"
STC 900	8"
STC 1200	10"
STC 1800	15"
STC 2400	12"
STC 3600	17"
STC 4800	15"
STC 6000	18"
STC 7200	15"
STC 11000	15"
STC 13000	18"
STC 16000	15"