



April 2016

CONDITIONAL USE LEVEL DESIGNATION FOR PRETREATMENT (TSS)

For

**Suntree Technologies, Inc.'s
Nutrient Separating Baffle Box®**

Ecology's Decision:

Based on the Suntree Technologies, Inc.® application submissions for the Nutrient Separating Baffle Box® (NSBB), Ecology hereby issues the following use level designation:

1. **Conditional Use Level Designation (CULD) for Pretreatment use (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 CULD applies to NSSB units sized at a hydraulic loading rate of no more than 25 gpm/ft². Base the size of the NSBB unit on the water quality design flow rate, as determined below. Table 1 shows design flow rates associated with various NSBB models:**

Model Number	Water Quality Design Flow Rate (cfs)
2-4-60	0.44
3-6-72	1.00
3-8-72	1.33
4-8-84	1.8
5-10-84	2.8
6-12-84	4
6-15-100	5
7-14-100	5.44
8-12-84	5.3
8-14-100	6.2
8-16-100	7.1
9-18-100	9

Model Number	Water Quality Design Flow Rate (cfs)
10-14-100	7.8
10-16-125	8.9
10-20-125	11.1
12-20-132	13.3
12-24-132	16

2. Ecology approves the NSBB at the hydraulic loading rate listed above, to achieve the maximum water quality design flow rate. The water quality design flow rates are calculated 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 use level designation expires on July 1, 2019 unless extended by Ecology, and is subject to the conditions specified below.

Ecology's Conditions of Use:

The NSBB shall comply with these conditions:

- 1. Suntree Technologies, Inc. shall design, assemble, install, operate, and maintain the NSBB installations in accordance with Suntree Technologies, Inc's applicable manuals and the Ecology Decision.**
- 2. Install the NSBB in such a manner that you bypass flows exceeding the maximum operating rate and you will not resuspend captured sediment.**
- 3. Suntree Technologies, Inc. commits to submitting a QAPP for Ecology approval by November 1, 2016 that meets the TAPE requirements for attaining a GULD for Pretreatment at a hydraulic loading rate of 25 gpm/ft².**
- 4. Suntree Technologies, Inc. shall complete all required testing and submit a TER for Ecology review by November 1, 2018.**

5. **Suntree Technologies, Inc. may request Ecology to grant deadline or expiration date extensions, upon showing cause for such extensions.**
6. **Discharges from the NSBB shall not cause or contribute to water quality standards violations in receiving waters.**

Applicant: Suntree Technologies Inc.

Applicant's Address: 798 Clearlake Road, Suite 2
Cocoa, FL 32926

Application Documents:

Application for Conditional Use Level Designation, Nutrient Separating Baffle Box – Stormwater Treatment System, Suntree Technologies, Inc., September 2015

Applicant's Use Level Request:

- Conditional Use Level Designation as a Pretreatment device in accordance with Ecology's *Stormwater Management Manual for Western Washington*

Applicant's Performance Claims:

- Based on laboratory testing, at flow rates between 25% and 125% of the 1 cfs treatment flow rate (model 3-6-72), the NSBB has an average suspended sediment concentration (SSC) removal efficiency of 67.3% for influent concentrations between 100 to 300 mg/L. The NSBB achieved these results using a 52/48 blend of Sil-co-sil 125 and Okay 90, respectively (D₅₀ of 67 µm).
- Based on a field evaluation of NSBB Model 6-12-84 in Sarasota, Florida, at peak flow rates between 8% to 685% of the 4 cfs treatment flow rate, the system has an average total suspended solids (TSS) removal efficiency of 61.2%.

Ecology's Recommendations:

Ecology finds that:

- Suntree Technologies, Inc. qualifies for the opportunity to demonstrate, through field-testing in the Pacific Northwest, whether the NSBB can attain Ecology's Pretreatment goals.

Findings of Fact:

1. Laboratory testing was conducted in November 2008 by Applied Environmental Technology testing facility in Thonotosassa, Florida. The laboratory tested a full scale NSBB, model No. NSBB-3-6-72, which has a treatment flow rate of 1 cfs. Based on the lab test results:
 - The system was evaluated using 52/48 percent blend of Sil-co-sil 125 and Okay 90, respectively, with a median (D_{50}) diameter of about 67 μm .
 - Removal efficiency was evaluated using influent SSC concentrations of 100 mg/L, 200 mg/L, and 300 mg/L at 25%, 50%, 75%, 100%, and 125% of the treatment flow rate. Results showed an average removal efficiency, across influent concentrations and flow rates, of 67.3% of SSC.
 - Two scouring and resuspension tests were conducted on the unit. For the first test the unit was charged with a volume of sediment equal to 50% of the manufacturer's recommended sediment capture capacity. For the second test the unit was charged with a volume of sediment equal to 100% of the manufacturer's recommended sediment capture capacity. The composition of the sediment added to the unit was 52% Sil-co-sil 125 and 48% Okay 90. Both tests were conducted at 1.25 cfs (or 125% of the treatment flow rate).
 - Three effluent samples were collected during the 50% resuspension test and SSC concentrations were below the 5 mg/L method detection limit for all three samples.
 - Six effluent samples were collected during the 100% resuspension test. SSC concentrations were at 5 mg/L for one sample, and below the 5 mg/L method detection limit for five of the six samples.
2. A field evaluation of the NSBB, sponsored by the Florida Department of Environmental Protection, was conducted in Sarasota, Florida between November 2006 and September 2008. The evaluation was done on NSBB Model 6-12-84, which has a treatment flow rate of 4 cfs.
 - The system was evaluated during 10 storm events. Precipitation during the sampled events ranged from 0.48" to 2.25", with peak flows ranging from 0.3 cfs to 27.4 cfs (8% to 685% of the treatment flow rate).
 - Influent TSS concentrations during the sampled events ranged from 15 to 238 mg/L.
 - The 15 mg/L data point, and its associated effluent data point, were not included in the data analysis. It was the first sampled event and there was question of the effectiveness of the procedural methods.
 - The 238 mg/L data point was artificially set to 200 mg/L prior to calculating the removal efficiency.
 - Results showed an average TSS removal efficiency of 61.2%.

Other NSBB Related Issues to be Addressed By the Company:

1. Test the system under normal operating conditions, such that pollutants partially fill the chamber. Results obtained for "clean" systems may not be representative of typical performance.
2. Conduct field-testing at sites that are indicative of the treatment goals.

3. Conduct testing to obtain information about maintenance requirements in order to come up with a maintenance cycle.
4. Conduct loading tests on the media to determine maximum treatment life of the system.

Technology Description: Download at <http://suntreetech.com>

Contact Information:

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Ecology web link: <http://www.ecy.wa.gov/programs/wq/stormwater/newtech/index.html>

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Revision History

Date	Revision
April 2016	CULD Granted