

Attachment 1

Manufactured Treatment Device (MTD) Registration

1. Manufactured Treatment Device Name: Nutrient Separating Baffle Box®

2. Company Name: Suntree Technologies

Mailing Address: 798 Clearlake Rd. Suite 2

City: Cocoa

State: FL Zip: 32922

3. Contact Name (to whom questions should be addressed): Evan Selbiger

Mailing Address: 798 Clearlake Rd. Suite 2

City: Cocoa

State: FL Zip: 32922

Phone number: 321-637-7552

Fax number: 321-637-7554

E-mail address: info@SuntreeTech.com

Web address: <http://www.suntreetech.com/>

4. Technology

Specific size/capacity of MTD assessed (include units): See page 9 of Virginia Storm Water BMP Clearinghouse Submittal

Range of drainage areas served by MTD (acres): ¼ acre – 500 acres

Include sizing chart or describe sizing criteria: See page 10 of Virginia Storm Water BMP Clearinghouse Submittal

Intended application: on-line or offline: On-Line

Media used (if applicable): Optional

5. Warranty Information (describe, or provide web address):

Suntree Technologies, Inc.® products are engineered and manufactured with the intent of being a permanent part of the infrastructure. Suntree Technologies warrants its products to be free from manufacturing defects for a period of five (5) years from the date of purchase. Suntree Technologies warrants that the materials used to manufacture its products will be able to withstand and remain durable to environmental conditions for a period of five (5) years from the date of purchase. If a warranty claim is made and determined to be valid, Suntree Technologies will replace or repair the product, at the discretion of Suntree Technologies. Warranty claims must be submitted, evaluated, and approved by Suntree Technologies for the claim to be determined to be valid. All warranty work and/or corrective actions must be authorized by Suntree Technologies prior to work beginning not covered by this warranty. There are no warranties either expressed or implied other than what is specifically specified herein. Abusive treatment, neglect, or improper use of the Nutrient Separating Baffle Box® manufactured by Suntree Technologies will not be covered by this warranty.

6. Treatment Type

☒ Hydrodynamic Structure

☐ Filtering Structure

☐ Manufactured Bioretention System

Provide Infiltration Rate (in/hr):

☐ Other (describe):

7. Water Quality Treatment Mechanisms (check all that apply)

- ☒ Sedimentation/settling
- ☐ Infiltration
- ☐ Filtration (specify filter media)
- ☐ Adsorption/cation exchange
- ☐ Chelating/precipitation
- ☐ Chemical treatment
- ☐ Biological uptake

X Other (describe): The NSBB features a centrally located basket system that is designed to keep the captured nutrient load in a dry state between rain events, thus allowing the nutrients to dissipate into the air instead of leaching into the water column as most hydrodynamic separators do.

8. Performance Testing and Certification (check all that apply):

Performance Claim (include removal efficiencies for treated pollutants, flow criteria, drainage area):

NSBB-HVT Model No.	Inside Length (L), ft	Inside Width (W), ft	Depth Below Invert (DBI) ¹ , ft	Maximum Treatment Flow Rate (MTFR) ² , cfs	Partition Height (PH) ³ , ft	Partition Thickness (PT), in	Floor Area (FA) ⁴ , ft ²	50% Maximum Sediment Storage Volume ⁵ , cu yd	Sediment Removal Interval (SRI), days
2-4	4.00	2.00	2.70	0.62	2.70	0.75	7.75	3.88	44.5
3-6	6.00	3.00	3.00	1.40	3.00	1.50	17.25	8.63	44.0
3-8	8.00	3.00	3.00	1.87	3.00	1.50	23.25	11.6	44.5
4-8	8.00	4.00	3.00	2.49	3.00	3.00	30.00	15.0	43.0
5-10	10.00	5.00	4.10	3.89	4.10	3.00	47.50	23.8	43.6
6-12	12.00	6.00	4.80	5.60	4.80	3.50	68.50	34.3	43.7
6-13.75	13.75	6.00	5.40	6.42	5.40	3.50	79.00	39.5	44.0
7-14	14.00	7.00	5.50	7.62	5.50	4.00	93.33	46.7	43.7
7-15	15.00	7.00	5.90	8.17	5.90	4.00	100.33	50.2	43.9
8-14	14.00	8.00	6.20	8.71	6.20	4.00	106.67	53.3	43.7
8-16	16.00	8.00	6.20	9.96	6.20	4.00	122.67	61.3	44.0
9-18	18.00	9.00	6.90	12.60	6.90	6.00	153.00	76.5	43.4
10-17	17.00	10.00	7.60	13.22	7.60	6.00	160.00	80.0	43.2
10-20	20.00	10.00	7.60	15.56	7.60	6.00	190.00	95.0	43.6
12-21	21.00	12.00	9.00	19.60	9.00	6.00	240.00	120	43.7
12-24	24.00	12.00	9.00	22.40	9.00	6.00	276.00	138	44.0

¹DBI = depth from invert of inlet pipe to bottom of unit

²MTFR scaling based on $1.40/18 = 0.07778$ cfs/ft²

³PH=DBI

⁴FA = W x (L-2xPT)

⁵SRI calculated from NJDEP HDS Protocol 2013 Appendix A (50% TSS Removal Efficiency)

Specific size/Capacity of MTD assessed: 80% SSC Removal Efficiency at 1.40cfs
MTFR of the NSBB-3-6-72

Has the MTD been "approved" by an established granting agency, e.g. New Jersey Department of Environmental Protection (NJDEP), Washington State Department of Ecology, etc.

☐ **No**

☒ **Yes;** For each approval, indicate (1) the granting agency, (2) use level if awarded (3) the protocol version under which performance testing occurred (if applicable), and (4) the date of award, and attach award letter. See page 94 of Virginia Storm Water BMP Clearinghouse Submittal.

Was an established testing protocol followed?

☐ **No**

☒ **Yes,** (1) Provide name of testing protocol followed, (2) list any protocol deviations: The protocols followed were the removal efficiency and resuspension protocols published by the New Jersey Department of Environmental Protection (NJDEP) and endorsed by the Stormwater Equipment Manufacturer's Association (SWEMA).

Provide the information below and provide a performance report (attach report):

For lab tests: See pages 11-93 of Virginia Storm Water BMP Clearinghouse Submittal.

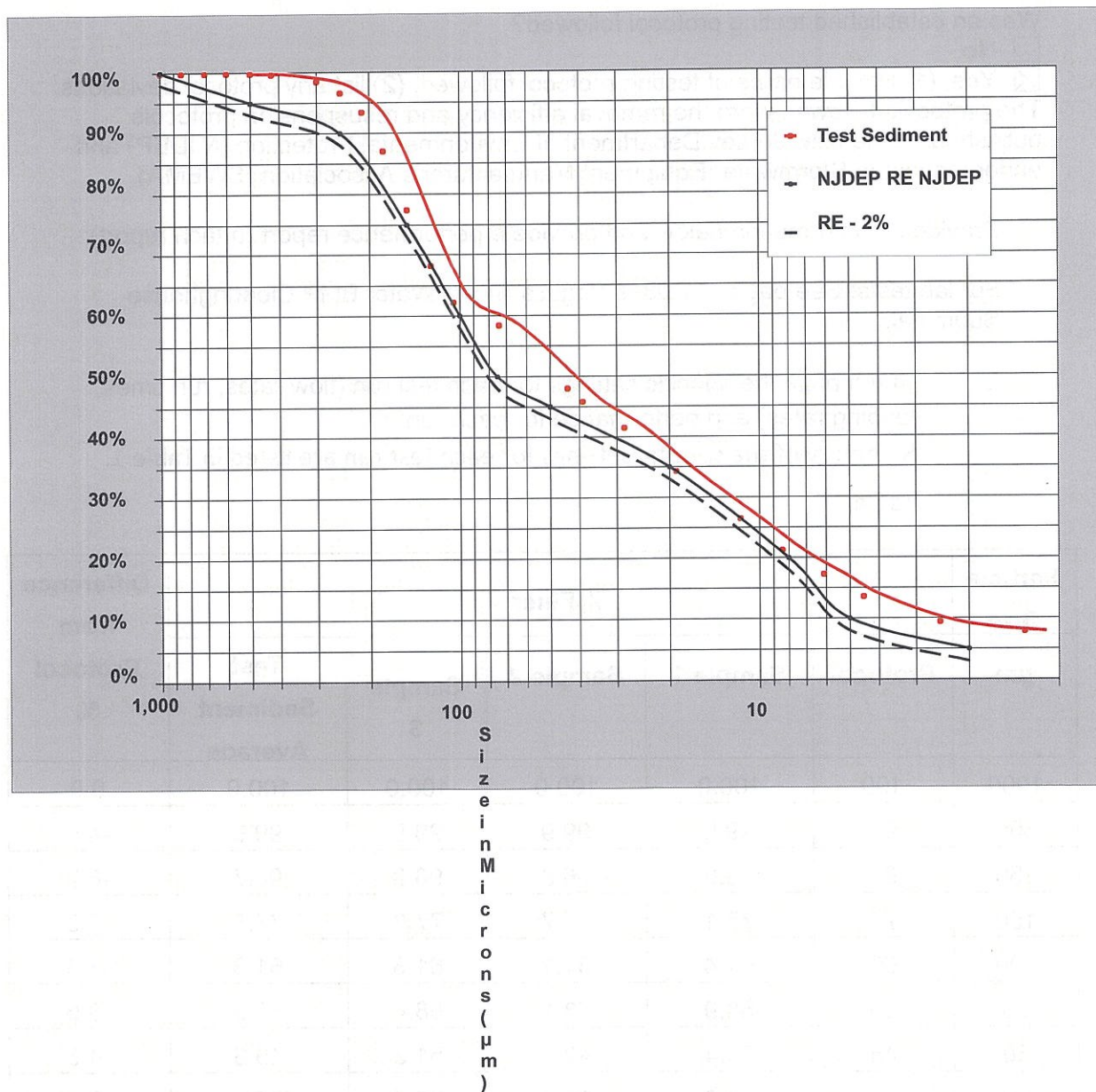
- i. Summarize the specific settings for each test run (flow rates, run times, loading rates) and performance for each run:
Summary of the specific settings for each test run are listed in Table 1.

Table 1

Particle Size	% Finer					Difference from Protocol %
	µm	Protocol	Sample 1	Sample 2	Sample 3	Test Sediment Average
1000	100	100.0	100.0	100.0	100.0	0.0
500	95	99.9	99.9	99.9	99.9	-4.9
250	90	96.6	96.8	96.8	96.7	-6.7
150	75	77.1	77.7	77.6	77.5	-2.5
100	60	61.4	61.1	61.3	61.3	-1.3
75	50	58.9	58.1	58.4	58.5	-8.5
50	45	50.4	49.8	51.3	49.3	-4.3
20	35	34.9	35.4	35.4	35.2	-0.2
8	20	20.9	20.3	20.8	20.7	-0.7
5	10	14.4	15.1	15.0	14.8	-4.8
2	5	9.0	8.5	9.0	8.8	-3.8

- ii. If a synthetic sediment product was used, include information about the particle size distribution of the test material:
The Particle Size Distribution of the test sediment is shown in Figure 1 and summarized in Table 2.

Figure 1



- iii. Describe pretreatment, bypass conditions, or other special circumstances at the test site: No pretreatment or special circumstances
- iv. Provide the number of storms monitored and describe the monitored storm events (amount of precipitation, duration, etc.): 2 storms monitored
- v. Describe whether or not monitoring examined seasonal variation in MTD performance: no
- vi. If particle size distribution was determined for monitored runoff and/or sediment collected by the MTD, provide this information:
 9/15/2005: d_{50} = 325 μ m (See Page 153 of Virginia Storm Water BMP Clearinghouse Submittal)
 9/23/2005: d_{50} = 197 μ m (See Page 155 of Virginia Storm Water BMP Clearinghouse Submittal)

9. MTD History:

How long has this specific model/design been on the market? Since 1993

List no more than three locations where the assessed model size(s) has/have been installed in Virginia. If applicable, provide permitting authority. If known, provide latitude & longitude:

1. Jack Massie Williamsburg Project, Williamsburg, VA (NSBB-10-14-116)
2. 165 Peppers Ferry Road, Wytheville VA 24382 (NSBB-2-5-70)
3. 100 Beauregard St. Fredericksburg, VA 22408 (NSBB-4-6-62)

List no more than three locations where the assessed model size(s) has/have been installed outside of Virginia. If applicable, provide permitting authority. If known, provide latitude & longitude:

1. 50 Irving Street NW, Washington, D.C. 38°55'44.43"N, 77° 0'36.19"W (NSBB-6-12-133)
2. 2205 Lakeside Drive, Harvey's Lake, PA 41°21'50.66"N, 76° 3'27.35"W (NSBB-4-8-67)
3. 6312 Lake Emma Rd, Groveland, FL 28°37'5.82"N, 81°51'1.68"W (NSBB-5-10.5-114)

10. Maintenance:

What is the generic inspection and maintenance plan/procedure? (attach necessary documents): See pages 183-199 of Virginia Storm Water BMP Clearinghouse Submittal

Is there a maintenance track record/history that can be documented?

☒ No, no track record.

☐ Yes, track record exists; (provide maintenance track record, location, and sizing of three to five MTDs installed in Virginia [preferred] or elsewhere):

Recognizing that maintenance is an integral function of the MTD, provide the following: amount of runoff treated, the water quality of the runoff, and what is the expected maintenance frequency for this MTD in Virginia, per year? Site specific specification. Please see O&M Manual for gathering site specific data for maintenance frequency.

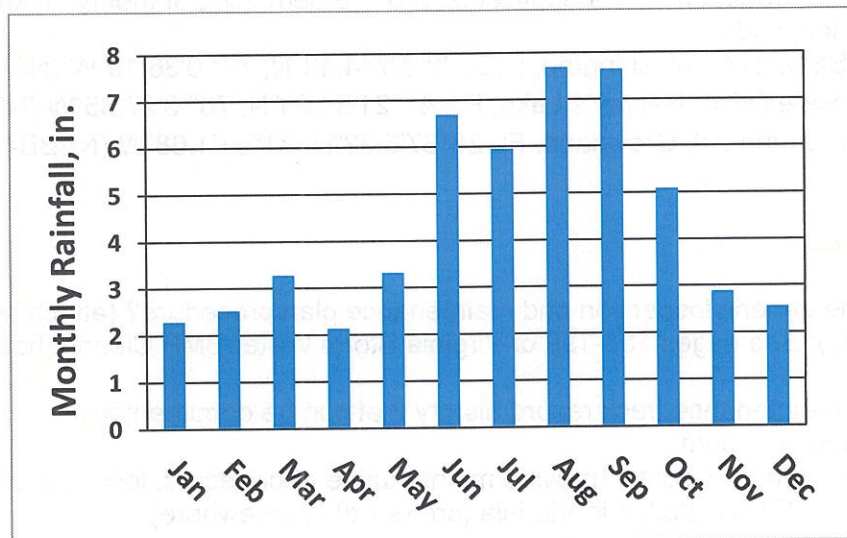
Table 2

% MTFR	Mean Flow Rate tested (cfs)	Actual % MTFR	Measured Removal Efficiency	Weighted Removal Efficiency
25	0.35	25.2	67.90%	16.98%
50	0.7	49.7	65.80%	19.74%
75	1.05	75.1	63.10%	12.62%
100	1.4	100.2	56.40%	8.46%
125	1.75	125.1	50.60%	5.06%
Weighted Annualized TSS Removal Efficiency				62.86%

- iii. If less than full-scale setup was tested, describe the ratio of that tested to the full-scale MTD: A full-scale Nutrient Separating Baffle Box (NSBB 3-6) was tested.

For field tests: See pages 147-166 of Virginia Storm Water BMP Clearinghouse Submittal.

- i. Provide the address, **Crane Road, Melbourne Village, Florida** average annual rainfall (**51.97 inch**) and characterized rainfall pattern (**see figure**), and the average annual number of storms for the field-test location (**~51 storms/year > 0.2 inch**):



- ii. Provide the total contributing drainage area for the test site, percent of impervious area in the drainage area, and percentages of land uses within the drainage area (acres): Primarily Single Family Home

Total life expectancy of MTD when properly operated in Virginia and, if relevant, life expectancy of media: The NSBB is designed to become a permanent part of the infrastructure. If the NSBB includes media, the life of the media (Bold & Gold) is 5 years in this application.

For media or amendments functioning based on cation exchange or adsorption, how long will the media last before breakthrough (indicator capacity is nearly reached) occurs? Total Nitrogen will have an infinite time frame before breakthrough. Total Phosphorus can be calculated through site specific data.

For media or amendments functioning based on cation exchange or adsorption, how has the longevity of the media or amendments been quantified prior to breakthrough (attach necessary performance data or documents)? Field testing on the media in the NSBB has been performed. Please see pages 167-182 of Virginia Storm Water BMP Clearinghouse Submittal.

Is the maintenance procedure and/or are materials/components proprietary?

- ☐ Yes, proprietary
☒ No, not proprietary

Maintenance complexity (check all that apply):

- ☐ Confined space training required for maintenance
☐ Liquid pumping and transportation

Specify method:

- ☒ Solids removal and disposal

Specify method: Standard Vacuum Truck

Other noteworthy maintenance parameter (describe):

11. Comments

Include any additional explanations or comments:

12. Certification

Signed by the company president or responsible officer of the organization:

"I certify that all information submitted is to the best of my knowledge and belief true, accurate, and complete."

Signature: Tom Appel

Name: Tom Appel

Title: President

Date: 10/29/2018

NOTE: All information submitted to the department will be made publically accessible to all interested parties. This MTD registration form will be posted on the Virginia Stormwater BMP Clearinghouse website.

