

Attachment 1

Manufactured Treatment Device (MTD) Registration

1. Manufactured Treatment Device Name: HydroStorm

2. Company Name: Hydroworks, LLC

Mailing Address: 136 Central Ave, FL2

City: Clark

State: NJ Zip: 07066

3. Contact Name (to whom questions should be addressed): Graham Bryant

Mailing Address: 136 Central Ave, FL2

City: Clark

State: NJ Zip: 07066

Phone number: 848-235-5950

Fax number: 888-290-7900

E-mail address: gbryant@hydroworks.com

Web address: www.hydroworks.com

4. Technology

Specific size/capacity of MTD assessed (include units):

HS4 (4 ft diameter) to -HS 12 (12 ft diameter)

Range of drainage areas served by MTD (acres):

The range of area served depends on the design TSS particle size, local hydrology, and percentage of annual TSS removal required. In states that size using a water quality flow it also depends on the size of water quality storm and methodology to convert rainfall to runoff. Typical ranges of areas served include 0.1 to 15 impervious acres.

Include sizing chart or describe sizing criteria: Our sizing methodology is based on continuous simulation using local hydrology and SWMM to derive flow rates and TSS buildup and washoff. TSS removal in the sizing model is based on independent laboratory TSS removal testing results (Alden, 2018). The Alden laboratory TSS removal results have been used to calculate critical Peclet numbers for each particle size tested (1-1000 um) in the NJDEP TSS distribution that was tested. The critical Peclet numbers can be used in the sizing model with any user input TSS distribution to determine long term removal of that TSS distribution based on the Alden testing results. We have included our sizing program on the enclosed link (www.hydroworks.com/vabmp.html). In states that regulate hydrodynamic separators by a water quality flow rate we have attached a flyer that indicates what our systems' water quality flow rates are for various TSS distributions and annual TSS removal rates.

Include sizing chart or describe sizing criteria: attached

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

Media used (if applicable): N/A (Hydrodynamic separator)

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

1 year manufacturers defect warranty (longer warranties available at a cost)

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
- Other (describe):

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

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

The HS 4 (4 ft internal diameter separator, 375 gallon) has been independently reviewed (NJCAT, 2018) and is certified by NJDEP to provide 50% annual TSS removal for the NJDEP TSS distribution (d50 = 67 um), based on the NJDEP annual weighting system, a 100% treatment flow rate of 0.88 cfs, and independent laboratory testing at Alden Research Labs (2018). Hydroworks routinely sizes for various levels of annual TSS removal both higher than 50% TSS (i.e. 60%,70%, 80%) removal based on the NJDEP and other TSS distributions as required (OK110, 100 um (ConnDOT), NJDEP, etc.).

Specific size/Capacity of MTD assessed:

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.

1. NJDEP – Approval for 50% annual TSS removal based on the 2013 NJDEP Laboratory Protocol and NJDEP TSS (d50=67 um). Letter of approval dated March 27, 2018
2. ETV Canada – Verification based on the 2014 Procedure for Laboratory Testing of Oil-Grit Separators (Toronto Region Conservation Authority, 2014). Approval dated May 15, 2018.

Was an established testing protocol followed?

No

Yes, (1) Provide name of testing protocol followed, (2) list any protocol deviations:

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

For lab tests:

- i. Summarize the specific settings for each test run (flow rates, run times, loading rates) and performance for each run: All TSS removal tests were conducted with a loading rate of 200 mg/l. Test run times varied with flow rate from a run time of 37 min up to 135 min (NJDEP) and 37 min up to 1280 min (ETV Canada). Flow rates tested varied from 0.03 cfs up to 1 cfs (ETV Canada) and 0.25 cfs up to 1 cfs (NJDEP). Scour testing was performed at 2 cfs (NJDEP) and 1.8 cfs (ETV Canada). TSS removal performance varied from 69% to 36% depending on flow rate and laboratory test methodology (sampling versus mass balance). Sampling was performed for NJDEP approval whereas mass balance testing was performed for ETV Canada Verification.
- ii. If a synthetic sediment product was used, include information about the particle size distribution of the test material: NJDEP TSS (1 -1 000 um with a d50 = 67 um) was used for both the ETV Canada and NJDEP testing programs.
- iii. If less than full-scale setup was tested, describe the ratio of that tested to the full-scale MTD: N/A A full scale HS 4 was tested in the lab.

9. MTD History:

How long has this specific model/design been on the market? HydroStorm has been on the market since March, 2018.

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: There are no HydroStorm separators currently installed in Virginia since it is not listed in the Virginia BMP Clearinghouse. To-date there are approximately 40 HydroStorm units installed in either Canada or the United States. Ten are installed in

Connecticut, one is installed in Iowa, 3 are installed in Massachusetts, 5 are installed in New York, and 20 are installed in Ontario, Canada.

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:

Yale University – Operations Center, New Haven, CT – HS 4
Church of the Resurrection – Rye, NY – HS 6
Citgo Gas Station – Meriden, CT – HS 4

10. Maintenance:

What is the generic inspection and maintenance plan/procedure? (attach necessary documents): Inspection and maintenance procedures are the same as other hydrodynamic separators (coring tube for inspection and vacuum truck for cleaning). An operations and maintenance manual is attached.

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?

Separators are sized to treat 90% of the annual runoff and treat the peak flow from a 1” storm prior to bypass.

Maintenance frequency depends on site conditions (stabilized, unstabilized), site activities (average daily traffic) and surrounding land activities (construction, etc). The maintenance frequency is designed to be a maximum of once per year and separators serving stabilized post development areas typically have a maintenance frequency of once every two years.

Total life expectancy of MTD when properly operated in Virginia and, if relevant, life expectancy of media: HydroStorm is made from precast concrete components with copolymer polypropylene inserts. The life expectancy of precast concrete is a minimum of 100 years with normal use. Copolymer polypropylene has only been in use/available for 65 years. The projected service life of polypropylene is 100 years (TEPPFA, 2014).

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?
N/A

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)? N/A

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: Vacuum Truck

- Solids removal and disposal

Specify method: 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: 

Name: Graham Bryant

Title: President

Date: 11/12/2018

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.