

Attachment 1

Manufactured Treatment Device (MTD) Registration

1. **Manufactured Treatment Device Name:** Dual Vortex Separator (DVS) by Oldcastle Stormwater Solutions

2. **Company Name:** Oldcastle Stormwater Solutions
Mailing Address: 7921 Southpark Plaza, Suite 200
City: Littleton
State: CO
Zip: 80120

3. **Contact Name (to whom questions should be addressed):** Joanna Ogintz, PE
Mailing Address: 7921 Southpark Plaza, Suite 200
City: Littleton
State: CO
Zip: 80120
Phone number: 707-387-5633 or 800-579-8819
Fax number: 707-524-8188
E-mail address: joanna.ogintz@oldcastle.com
Web address: <http://www.oldcastlestormwater.com>

4. Technology

Specific size/capacity of MTD assessed (include units): The Dual Vortex Separator is typically designed in a manhole configuration, available in a range of sizes from 36" diameter to 144" diameter. The size of the unit is matched to the water quality flow rate from the site. The DVS is provided with an internal bypass weir and can be designed as an on-line or off-line system. A summary of model sizes and treatment flow capacities is included in Table 1.

Range of drainage areas served by MTD (acres): Units are sized to serve any size of drainage area.

Include sizing chart or describe sizing criteria: A summary of model sizes and treatment flow capacities is included in Table 1. This recommended sizing is based on the New Jersey Department of Environmental Protection (NJDEP) certification of the DVS at a TSS removal rate of 50% and reflects a hydraulic loading rate of 35.7 gpm/sf.

Intended application: on-line or offline: Online. The DVS has been certified by the NJDEP for online use.

Media used (if applicable): N/A

Table 1. Summary of DVS Model Sizes, Flow Rates and Critical Dimensions.

DVS Summary Table					
DVS Model	Structure Diameter (ft)	Maximum Treatment Flow Rate (cfs)	Minimum Rim to Invert Depth (ft)	Standard Sump Depth Below Invert (ft)	Minimum Total Depth of Structure (ft)
DVS-36	3	0.56	2.5	4.5	7.0
DVS-48	4	1.00	3.0	5.0	8.0
DVS-60	5	1.56	3.5	6.0	9.5
DVS-72	6	2.25	4.5	7.0	11.5
DVS-84	7	3.06	5.0	8.0	13.0
DVS-96	8	4.00	5.5	9.0	14.5
DVS-120	10	6.25	7.0	10.5	17.5
DVS-144	12	9.00	8.0	12.0	20.0

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

Oldcastle Stormwater Solutions warrants its products to be free from defects in material and workmanship for a period of one year from the date of original purchase.

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 New Jersey Department of Environmental Protection (NJDEP) certifies the use of the DVS at a TSS removal rate of 50% when designed with a hydraulic loading rate of 35.7 gpm/sf and operated and maintained appropriately.

Specific size/capacity of MTD assessed: A DVS-48 (48" diameter manhole) with a maximum treatment flow rate of 1.0 cfs was evaluated in the laboratory according to the NJDEP Protocol for Hydrodynamic Sedimentation MTDs (see below).

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.

The DVS has been certified by NJDEP for use as a 50% TSS removal stormwater manufactured treatment device in the State of New Jersey (<http://www.nj.gov/dep/stormwater/treatment.html>). The DVS was tested at the St. Anthony Falls Laboratory (SAFL) at the University of Minnesota and the test set-up, execution, and results were verified by the New Jersey Corporation for Advanced Technology (NJCAT) program and summarized in a verification report posted on the NJCAT website (<http://www.njcat.org/verification-process/technology-verification-database.html>). The testing was performed under the protocol "New Jersey Department of Environmental Protection Laboratory Protocol to Assess Total Suspended Solids Removal by a Hydrodynamic Sedimentation Manufactured Treatment Device" published January 25, 2013. The certification was issued by NJDEP on August 12, 2015 (attached).

Was an established testing protocol followed?

No

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

The testing was performed under the protocol "New Jersey Department of Environmental Protection Laboratory Protocol to Assess Total Suspended Solids Removal by a Hydrodynamic Sedimentation Manufactured Treatment Device" published January 25, 2013, with no 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:**

In accordance with the NJDEP HDS protocol, removal efficiency testing was performed on a full-scale DVS-48 to determine the ability of the DVS to remove the specified test

sediment at 25%, 50%, 75%, 100% and 125% of the targeted Maximum Treatment Flow Rate (MTFR). Additional testing information can be found in the attached NJCAT Technology Verification report.

ii. **If a synthetic sediment product was used, include information about the particle size distribution of the test material:**

The sediment mix used for testing was a mixture of commercially available sediments that met the particle size distribution requirements of the NJDEP protocol. The removal efficiency test sediment ($d_{50} = 43 \mu\text{m}$) was shown to be significantly finer than the sediment blend required ($d_{50} = 75 \mu\text{m}$) and thus treatment results may be considered conservative.

iii. **If less than full-scale setup was tested, describe the ratio of that tested to the full-scale MTD:**

N/A

For field tests:

- i. Provide the address, average annual rainfall and characterized rainfall pattern, and the average annual number of storms for the field-test location:
- 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):
- iii. Describe pretreatment, bypass conditions, or other special circumstances at the test site:
- iv. Provide the number of storms monitored and describe the monitored storm events (amount of precipitation, duration, etc.):
- v. Describe whether or not monitoring examined seasonal variation in MTD performance:
- vi. If particle size distribution was determined for monitored runoff and/or sediment collected by the MTD, provide this information:

9. MTD History:

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

The DVS has been available on the market since 2006. Since then, incremental improvements have been made in the product, but the basic configuration has remained unchanged.

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:

Project Name: Ivy Market
Project Location: Roanoke, VA
Size of System(s): DVS-48 and (2) DVS-60

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:

Project Name: Fry's Fuel Center #113
Project Location: Peoria, AZ
Size of System(s): DVS-48

Project Name: AutoZone
Project Location: Albany, OR
Size of System(s): DVS-36

Project Name: Honolulu International Airport
Project Location: Honolulu, HI
Size of System(s): DVS-120 and DVS-72

10. Maintenance:

What is the generic inspection and maintenance plan/procedure? (attach necessary documents):

Oldcastle Stormwater Solutions recommends that inspection of the DVS typically be conducted every six months. Depending on the conditions observed, maintenance may be recommended. If the internal components are missing or broken, if the inlet or outlet piping is obstructed, or if accumulation of floating trash and debris or sediment (twelve inches or greater) exceeds recommended guidelines, maintenance should be scheduled. Maintenance typically involves using a vacuum truck to remove floating trash, debris and oils from the water surface, as well as dewatering the structure to remove all accumulated sediment from the sump. Since pollutant transport and deposition vary from site to site, a site-specific maintenance frequency should be established during the first two to three years of operation. Please refer to the attached document "DVS Inspection and Maintenance Guide" attached to the NJDEP certification for more detailed information.

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):

Ongoing maintenance of the DVS is the responsibility of the property owner. In some cases, the owner may choose to contract with Oldcastle Stormwater Solutions for full-service maintenance. In other cases, they may choose to provide maintenance through independent contractors. Oldcastle Stormwater Solutions can provide the DVS Inspection and Maintenance Guide to offer guidance on the inspection and maintenance process and how to track maintenance that was performed

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?

Oldcastle Stormwater Solutions recommends inspection of the DVS every six months. Recommended maintenance frequency is typically dictated by the conditions of the site. Refer to the DVS Inspection and Maintenance Guide for more information.

Total life expectancy of MTD when properly operated in Virginia and, if relevant, life expectancy of media:

The expected design life of the concrete components of the DVS is 50 years. The expected design life of the stainless steel internal components and hardware is 25 years.

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 recommended
- Solids removal and disposal
Specify method: Vacuum truck recommended
- Other noteworthy maintenance parameter (describe):


11. Comments

Include any additional explanations or comments: None

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: Joanna Ogintz

Title: Regulatory Services Manager

Date: September 1, 2015

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.