Attachment 1

Manufactured Treatment Device (MTD) Registration

1. **Manufactured Treatment Device Name: StormKeeper® Sediment Strip®**

2. **Company Name: Lane Enterprises**
   Mailing Address: 3905 Hartzdale Drive, Suite 514
   City: Camp Hill
   State: PA Zip: 17011

3. **Contact Name (**to whom questions should be addressed)**:** Kevin Miller
   Mailing Address: P.O Box 130482
   City: Spring
   State: Texas Zip: 77393
   Phone number: 832-773-8396
   Fax number:
   E-mail address: kmiller@lane-enterprises.com
   Web address: www.stormkeeperchambers.com

4. **Technology**

Specific size/capacity of MTD assessed (include units): Variable. In general it is a ratio of the storage capacity to be treated. The system is sized to treat the required water quality volume discharged from the site. Because the Sediment Strip is based on modular chamber system it can be configured for any size necessary. The treatment rate of the chambers is 8 gallons per minute per square foot of chamber. Therefore each SK75 can treat up to 120 gpm per chamber and each SK180 can treat up to 190 gpm per chamber. The chambers are placed in rows and the amount of water treated for water quality is the total amount of the chambers placed in the row.

Range of drainage areas served by MTD (acres): The Sediment Strip can be configured for drainage areas from les than an acre to several hundred. Because the system is constructed from modular components in the field it can be configured for any size site by expanding the area used for the sediment strip to accommodate the required water quality volume.

Include sizing chart or describe sizing criteria: The sizing is based on the first ½" to 1" of rainfall discharged from the site. The rainfall from the site is detained an filtered through a geotextile and drainage medium before being discharged from the site. In addition the water quality volume can be infiltrated into the ground if it is desirable resulting in zero discharge and a full treatment of the water quality volume.

If a flow based design is used the SK75 sediment strip can treat 120 gpm per chamber and the SK180 190 gpm per chamber.

Intended application: on-line or offline: The system is utilized on lines as part of the detention and infiltration system. A bypass weir is used to allow the flows over the water quality volume to be detained by a chamber system designed to detain the storm water quantity volume for peak reduction.

Media used (if applicable): No media is used. Infiltration and filtration is accomplished by the filtration of the water through the geotextile and natural ground filtration capacity.

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

Warranted in accordance with our Standard Manufactures warranty. Information is available on our website at www.stormkeeperchambers.com

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) Soil Onsite
☐ 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):
Removal efficiencies were lab tested in accordance with "NJDEP Laboratory Protocol to Asses Total Suspended Solids Removal by Filtration Manufactured Treatment Device". The unit was found to have a removal rate of 84.1% of Total Suspended Solids.

Removal rates claimed for the unit are 80% TSS. However in a full retention system when water is infiltrated into the ground we expect removal rates of 90% or better. In addition nutrients and other pollutants are removed as part of the filtration process.

Flow criteria is based on 0.27 cfs per chamber for the SK75 and 0.43 cfs per chamber for the SK180 until the water quality volume is reached.

Drainage area is variable and based on the modular capacity of the chambers. As many chambers as necessary can be added to accommodate the appropriate volume. The system can be as small or as big as required in order to treat the water quality volume. Because the system is built by the contractor installing the system it is possible to have the exact size required.

Specific size/Capacity of MTD assessed:

On SK75 Stormkeeper Sediment Strip chamber was used in the testing protocol. The chamber had a capacity of 0.27 cfs of treatment flow or 75 cf of treatment volume available.

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** However we are pursuing other approvals now that testing is complete.
☐ **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.

Although the Sediment Strip has not been "approved" by an established granting agency we are submitting now that testing has been completed. In addition equivalent technology has been approved.

Was an established testing protocol followed?
☐ **No**
☒ **Yes**, (1) Provide name of testing protocol followed, (2) list any protocol deviations:

1. NJDEP Laboratory Protocol ti Assess Total Suspended Solids Removal by a Filtration Manufactured Treatment Device.

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:

Total of 10 Test runs with a minimum duration of 30 minutes. Results are included in the attached report however. The following table provides the information requested here.

Run Number	Flow Rate	Run Time	Loading Rate	Removal Eff.
1	120.8 ggm	30 min	198 mg/l	85.5%
2	119.6 gpm	30 min	207mg/l	85.4%
3	119.7 gpm	30 min	189 mg/l	82.7%
4	119.7 gpm	30 min	203 mg/l	83.8%

5	119.5 gpm	30 min	204 mg/l	84.2%
6	120.2 gpm	30 min	202 mg/l	84.1%
7	119.7 gpm	30 min	204 mg/l	83.6%
8	120.1 gpm	30 min	196 mg/l	82.9%
9	119.8 gpm	30 min	204 mg/3	83.2%
10	119.9 gpm	30 min	203 mg/l	84.5%

ii. If a synthetic sediment product was used, include information about the particle size distribution of the test material: Distribution was not Sysmthetc

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

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 Sediment Strip has been on the market for 18 months. However equivalent technologies have been on the market for the last 10 years.

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: N/A

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: N/A

10. Maintenance:

What is the generic inspection and maintenance plan/procedure? (attach necessary documents): The frequency of inspection of a stabilized completed site varies by location.

It is determined by the local conditions, runoff from adjacent sites, particle size, and pollutant loading. A predefined inspection and maintenance schedule should be established based on local conditions including the percent of impervious area and climate.

The system should be inspected annually at a minimum. During the first year of operation the system should be inspected every six months. Subsequently the inspection should be adjusted based on the sediment loading that is observed at the site during previous inspections.

The Sediment Strip has inspection ports and manholes located throughout the system to facilitate access to the system and the required inspection that should occur. If sediment is discovered in the system during the inspection then a measuring device should be used to determine the depth of the system. When greater than 3 inches of sediment is found to be located throughout the sediment strip, cleaning of the system must be performed.

The Sediment Strip is designed to work in conjunction with the rest of the StormKeeper System and contain sediment to the Sediment Strip only. The Sediment Strip prevents the entire system from becoming sediment storage and allows the containment of the sediment to one row for easier maintenance and cleanout. Manholes are provided for access to the sediment strip for personnel and equipment. If it is necessary to enter manholes, adequate confined space entry procedures should be followed.

Cleanout and removal of the sediment stored in the Sediment Strip is completed utilizing the JetVac or similarly approved system. The process uses high pressure water jets to propel itself down the sediment strip while putting the sediment contained in the sediment strip into suspension. As the JetVac system returns the captured pollutants are flushed into the maintenance manhole for vacuuming and removal. The woven geotextile which is installed as the Sediment Strip is constructed protexts the underlying stone base that supports the system.

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): Yes there are maintenance of systems taking place however not logs have been collected.

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? The amount of runoff treated is variable and is determined by the number of chambers that are installed to control the water quality for the systems. The runoff will be treated to a rate of 80% TSS removal along with a filtration component from the surrounding stone and soil. The expected frequency of maintenance is once per year or less depending on pollutant loading and volume of water treated per rain event.

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

Sediment Strip is indefinite and equal or greater to the life of the developed site. There is not media in the filter that needs to be recharged.

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:
☒ Solids removal and disposal
Specify method:
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: _____

Title: _____

Date: _____

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.