



JANET T. MILLS
GOVERNOR

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION



MELANIE LOYZIM
COMMISSIONER

May 13, 2021

Bio Clean, a Forterra Company
ATTN: Chris French, National Regulatory Manager
10364 Design Road
Ashland, VA 23005

Dear Mr. French:

This letter is to inform you that The Kraken® Filter has been reviewed and accepted as an approved alternative to the General Standards (Section 4.C.(2)) of the Stormwater Management Rules, Chapter 500). Bio Clean has provided the Department with (1) extensive information demonstrating how Kraken Filter may be sized to provide full treatment of 90% of an average annual runoff volume without bypass (“Flow Through” treatment) and (2) testing data showing that the system provides pollutant removal equivalent to the Chapter 500 General Standard Best Management Practices “Volume” based treatment. This approval does not address the additional requirements for control of peak flow events outlined in the Flooding Standards Section 4.F. of Chapter 500. Therefore, the Department will review and approve, on a case-by-case basis, the use of the Kraken Filter to meet the pollutant removal requirements when the system is sized, installed and maintained in accordance with the provisions that follow:

1. The Kraken filter may be designed as “Flow Through” treatment using Table 1, “Kraken Flow Based Sizing.” This table is for water quality treatment with high flow rates. The Department has determined that “Flow Through” systems must provide full treatment of 90% of the annual runoff and that this goal can be accomplished by treating all of the runoff from the contributing catchment from a 0.95” Type III storm without bypass. Bio Clean has provided calculations to show this. Table 1. shows the appropriate sizing of Kraken Model # Unit for the corresponding impervious drainage area. Alternatively, the runoff from the entire contributing drainage area, including all pervious areas, may be modelled to provide treatment of the 0.95” Type III storm and the runoff flow rate used to determine the appropriate Kraken Filter Unit.

This sizing addresses the pollutant removal or treatment requirements of Section 4.C.(2) but does not mitigate for the increased frequency and duration of channel erosive flows due to runoff from smaller storms (known as the Channel Protection volume (CPv)) and potential temperature impacts. Unless attenuation of the channel protection volume is **not** required (i.e., direct discharge to a lake, tidal waters, or a major river, the treated flow as well as the bypassed flow must be directed to a detention system/structure that will store the channel protection volume (CPv) consisting of the first 1.0 inch of runoff from impervious surfaces and 0.4 inch of runoff from lawns and landscaped areas. An external outlet control structure must control the flow out of the system such that the drawdown time of the CPv must be no less than 24 hours and no greater than 48 hours.

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Table 1. Kraken Flow Based Sizing

Kraken Model #	Structure Size (ft x ft)	Cartridge Capacity	30" Tall Filters (cfs)	Drainage Area (Acres)
KF-4-4	4 x 4	up to 16	0.264	0.343
KF-4-6	4 x 6	17 to 24	0.396	0.534
KF-4-8	4 x 8	25 to 32	0.528	0.700
KF-8-8	8 x 8	33 to 48	0.791	1.082
KF-8-10	8 x 10	49 to 66	1.088	1.492
KF-8-12	8 x 12	67 to 78	1.286	1.766
KF-8-14	8 x 14	79 to 96	1.583	2.165
KF-8-16	8 x 16	97 to 114	1.880	2.574
KF-10-16	10 x 16	115 to 152	2.506	3.416

- The Kraken filter may be designed as "Volume" based treatment using Table 2, "Kraken Volume-Based Sizing." The Kraken Filter must be part of a stormwater management system that provides for storage and release through the filter of a Water Quality volume (WQv) consisting of 1.0 inch of runoff from impervious areas draining to the system, and 0.4 inch of runoff from lawn and landscaped areas draining to the system. The system must be designed so that the WQv is detained before discharge to the Kraken Filter Unit for a minimum of 24 hours and a maximum of 48 hours. A bypass structure that protects the WQv from being displaced by flows that exceed the WQv must be provided ahead of WQv storage.

Table 2. Kraken Volume Based Sizing.

Model #	Structure Size (ft x ft)	Cartridge Capacity	30" Tall Filters (cfs)	30" Tall Filters (lbs TSS)	Maximum Acreage
KF-4-4	4 x 4	9 to 16	0.264	434	0.723
KF-4-6	4 x 6	17 to 24	0.396	651	1.085
KF-4-8	4 x 8	25 to 32	0.528	868	1.447
KF-8-8	8 x 8	33 to 48	0.791	1,302	2.170
KF-8-10	8 x 10	49 to 66	1.088	1,790	2.984
KF-8-12	8 x 12	67 to 78	1.286	2,116	3.526
KF-8-14	8 x 14	79 to 96	1.583	2,604	4.340
KF-8-16	8 x 16	97 to 114	1.880	3,092	5.154
KF-10-16	10 x 16	115 to 152	2.506	4,123	6.872

*Filters rated for 7.4 gpm per Washington GULD phosphorus removal approval.
 *1 inch of runoff per impervious acre, and 0.4 inches of runoff per landscaped acre.
 *600 lbs per acre of sediment runoff, annually (NJDEP).

Letter to Chris French

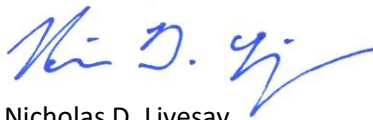
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3. Review and approval by Bio Clean for the proposed use and sizing of the Kraken Filter Unit at each specific project is required to ensure conformance with the manufacturer's design specifications.
4. All Kraken Filter units must include an unobstructed maintenance access for the removal of the canisters and accumulated sediment or debris.
5. Kraken Filter units along with other components of the stormwater treatment system (i.e. detention, bypass, and pretreatment) are expected to have an operational longevity of at least one year.
6. The overall stormwater management design must meet all Department criteria and sizing specifications and will be reviewed and approved by the Department prior to use.
7. Each system must be inspected and the filters maintained per the manufacturer's guidelines and consistent with this approval letter to maintain the established efficiency for pollutant removal. A five-year binding inspection and maintenance contract must be provided prior to project approval (issue of a permit) by the Department and must be renewed before contract expiration.
8. This approval is conditional to on-the-ground experience confirming that the Kraken Filter cartridges' pollutant removal efficiency and sizing are appropriate. The "permit shield" provision (Section 14) of the Chapter 500 rules will apply, and the Department will not require the replacement of the system if, with proper maintenance, pollutant removals do not satisfy the General Standard Best Management Practices.

We look forward to working with you as these stormwater management structures are installed on new projects. Questions concerning this decision should be directed to Jeff Dennis at (207) 215-6376.

Sincerely,



Nicholas D. Livesay

Director, Bureau of Land Resources

cc: Don Witherill, DEP