



**Center for Environmental Systems
Stevens Institute of Technology
One Castle Point
Hoboken, NJ 07030-0000**

July 23, 2020

Gabriel Mahon, Chief
NJDEP
Bureau of Non-Point Pollution Control
Division of Water Quality
401 E. State Street
Mail Code 401-02B, PO Box 420
Trenton, NJ 08625-0420

Dear Mr. Mahon,

Based on my review, evaluation and assessment of the testing conducted on the Hydroworks HydroFilter at the Alden Research Laboratory, Inc. (Alden), Holden, Massachusetts, under the direct supervision of Alden's senior stormwater engineer, James Mailloux, the test protocol requirements contained in the "*New Jersey Laboratory Testing Protocol to Assess Total Suspended Solids Removal by a Filtration Manufactured Treatment Device (January 25, 2013)*" (NJDEP HDS Protocol) were met or exceeded. Specifically

Test Sediment Feed

The sediment particle size distribution (PSD) used for removal efficiency testing was comprised of 1-1000 micron silica particles. The Specific Gravity (SG) of the sediment mixes was 2.65. Commercially-available silica products were provided by AGSCO Corp., a QAS International ISO-9001 certified company, and blended by Alden as required. Test batches were prepared in individual 5-gallon buckets, which were arbitrarily selected for the removal testing. A well-mixed sample was collected from three random test batches and analyzed for PSD in accordance with ASTM D422-63 (2007), by GeoTesting Express, an ISO/IEC 17025 accredited independent laboratory. The average of the samples was used for compliance to the protocol specifications. The D₅₀ of the samples ranged from 56 to 65 microns, with an average of 60 microns, well below the < 75 micron protocol requirement.

Removal Efficiency Testing

Twenty (20) removal efficiency testing runs were completed in accordance with the NJDEP filter protocol. Ten (10) of the 20 test runs were conducted during mass loading and 10 during removal efficiency testing. The target flow rate and influent sediment concentration were 25 gpm and 200 mg/L. The HydroFilter demonstrated an average sediment removal efficiency on a cumulative mass basis of 85.1% over the course of the 10-removal efficiency test runs and 85.3% for the 20 test runs.

Sediment Mass Loading Capacity

Mass loading capacity testing was conducted as a continuation of removal efficiency testing. Mass loading test runs were conducted using identical testing procedures and targets as those used in the removal efficiency runs. The HydroFilter system demonstrated a mass loading capture capacity of 27.1 lbs (2.1 lbs/ft² of filter area).

Scour Testing

To demonstrate the ability of the HydroFilter to be used as an online treatment device, scour testing was conducted at 200% MTRF. One scour test was conducted on the HydroFilter system following the mass loading capacity (100% system mass loading) testing. A second test was conducted on the fully loaded HydroFilter from the previous 200% scour test, with the test vessel preloaded with 3-inch of sediment (50% of the sediment capture level (6-in)). The maximum unadjusted effluent concentration for the 100% system mass loading testing was 2.0 mg/L; for the preloaded sediment test it was < 1.0 mg/L.

The HydroFilter is qualified for on-line installation.

Sincerely,



Richard S. Magee, Sc.D., P.E., BCEE