AQUA-AEROBIC SYSTEMS, INC.
A Metawater Company

AquaStorm™ Cloth Media Filter
REP SALES STRATEGY
Wet Weather Applications

Aqua-Aerobic Solution
AquaStorm™ Cloth Media Filter – SSO-CSO / Tertiary Filtration

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Introduction

AquaStorm™ Cloth Media Filter (CMF) for wet weather treatment application is a new application. The first installation sold and operational for this application is Rushville, IN by Rick Wilhelm at J. Dwight Thompson Company.

Project History

In Rushville, IN as part of its program to eliminate untreated combined sewer overflow (CSO) discharges into the Flatrock River, the City of Rushville, Indiana was undertaking the final phase of its Combined Sewer Overflow (CSO) Long Term Control Plan (LTCP) implementation program. This final phase was originally designed as a one (1) million gallon storage tank to store wet weather flow in excess of the Rushville Wastewater Treatment Plant (WWTP) peak flow capacity of 4 million gallons per day (MGD). This tank size was selected to store the excess flow for a 1-year, 1-hour rain event for full treatment at the WWTP.

Early in 2015 our representative from Aqua-Aerobics Systems, Inc. made a proposal to the City of Rushville to pilot test its nominal five (5)-micron cloth filtration media utilizing the AquaStorm™ `Cloth Media Filter (CMF) for treatment of CSO discharges at its WWTP. The City of Rushville was interested in exploring new technologies that showed the potential to reduce the cost to implement the final phase of its LTCP program to eliminate untreated CSO discharges and accepted the pilot testing proposal. An automated pilot test system was installed in the maintenance building of the Rushville WWTP in April of 2015 and a pilot test program was conducted for five (5) wet weather events during which CSO discharges occurred between May 16, 2015 and July 13, 2015. The results of this pilot testing were submitted to the Indiana Department of Environmental Management (IDEM) and acceptance was given by IDEM to the City of Rushville on March 17, 2016 to prepare a design utilizing the AquaStorm™ cloth media filters as part of a treatment system for CSO discharges.

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For the city to change from the original plan of storage to treatment, the engineer submitted to the state the impact of treatment on the receiving stream. See the detail case study for the details, but there was estimated greater than 70% reduction in TSS to the receiving stream versus storage.

The interest by the City of Rushville was driven by the large savings that they could achieve which was over a million dollars with the installation of AquaStorm™ versus the storage tank. It should be noted that facility has seen a >20 year wet weather event already versus the initial planned 1-year, 1 hour rain event. This means the AquaStorm™ was able to treat the complete wet weather event while a storage tank would have had an overflow to the river.

AquaStorm™ Initial Wet Weather Performance

Parameter	2/15-17/18	2/21/18-3/2/18	3/27-31/18	4/3-7/18
Rainfall	1.45 in	4.98 in	2.38 in	3.02 in
Rainfall Duration	--	Off/On over 10 days	Off/On over 4 days	3 days
Event Peak Flow	8.98 mgd	14+ mgd	9.25 mgd	12.1 mgd
Avg. Daily Flow	5.7 – 1.5 mgd	7.7 – 3.0 mgd	3.0 – 6.3 mgd	4.3 – 9.8 mgd
Inf / Eff $CBOD_5$	77 / 4 mg/L	31 / 3 mg/L	25 / 1 mg/L	19 / 2 mg/L
Inf / Eff TSS	116 / 6 mg/L	40 / 4 mg/L	125 / 2 mg/L	49 / 3 mg/L
Inf / Eff Ammonia	3.9 / 0.3 mg/L	2.4 / 0.33 mg/L	2.0 / 0.32 mg/L	1.6 / 0.30 mg/L
Inf / Eff Total P	2.7 / 0.26 mg/L	2.7 / 0.34 mg/L	1.7 / 0.39 mg/L	1.4 / 0.18 mg/L
Inf / Eff E. Coli	NT / NT colonies	NT / NT colonies	NT / NT colonies	-- / 1 colonies per 100 mL
Notes: NA – Not Available NT – Not Tested	• Disinfection season end Oct. 31st	• Disinfection season end Oct. 31st	• Disinfection season end Oct. 31st	

Rep Sales Recommendations

AquaStorm™ sales recommendations based on Rick's experience on the Rushville, IN project and other projects include the following key points to consider:

1) Try to understand the overall goal of the customer's wet weather (SSO/CSO) program. Every client is different, every state has different rules and treatment objectives. What may be an advantage to one customer may not fit another.
2) Understand the alternatives we are competing against. Of course there are other high rate treatment systems like WWETCO, Fuzzy Filter, Actiflo, CoMag, BioActiflo, etc. But there is also storage tanks and increasing treatment plant capacity as well. All have capital cost comparisons as well as process capability comparisons.
3) Understand how our filters work better than the competition for process reasons. AquaStorm™ CMF provides better treatment from a process standpoint. This allows for easier

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disinfection whether it be UV or chlorine. Based on Rick's experience most communities would prefer UV, but having a more consistent effluent allows for better operation of chlorine as well. Our better treatment results may also offset other necessary capital improvements in the owner's system.

4) Of course highlight our advantages – high removal rates, high capacity in small footprint, minimal head requirements, automatic operation, excellent treatment at startup of equipment when needed the most, minimal maintenance, etc.

5) Get the operators and engineers out to see installations and the factory. Understanding how the filters work goes a long way in driving interest. Bring the disk sample to presentations. It's amazing how much this helps engineers and operators understand the operation of the filter.

6) Try to pilot. If a client is willing to pilot they most likely have a high interest level. Having real world test results provides a comfort level to the engineers and gives the owners ammunition in getting the system approved with regulatory agencies.

7) When initially starting up a project typically we get a flow or volume to treat. However, the loading data seems to be scarce. Try to get the owner/engineer to provide as much information on loadings as possible even if it requires further sampling during an event. We hope at some point we will not have to pilot as long as we have accurate design data to size our systems.

8) Get involved with state and local shows to make presentations. This has helped further drive interest from other engineers/owners.

9) Support the owner and engineer as necessary in the regulatory approval process. Encourage the owner and engineer to talk with the local regulatory agency, because in many cases a regulatory agency will approval a new technology or changes to LTCP if good information is provided, the solution is a more cost effective and provides a better water quality to the receiving stream. *It is good to try to have a meeting with state regulators in advance, so they are familiar with the technology before an engineer brings it for approval.*

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