



AQUA-AEROBIC SYSTEMS, INC.
A Metawater Company

SUCCESS STORIES

PLANT NAME AND LOCATION

PORTLAND WASTEWATER TREATMENT PLANT – PORTLAND, IN

DESIGN DAILY FLOW / PEAK FLOW / MAXIMUM FLOW

2.35 MGD (371 m³/hour) / 4.7 MGD (742 m³/hour) / 9.4 MGD (1,483 m³/hour)

AQUA-AEROBIC SOLUTION

(2) AquaDisk® FILTERS (10-disk units) Utilizing OptiFiber® CLOTH FILTRATION MEDIA

TWO AquaDisk® CLOTH MEDIA FILTERS REPLACE SIX GRANULAR MEDIA UNITS, BOOSTING CAPACITY 540% AND CUTTING BACKWASH VOLUME 97%

The Portland, Indiana, Wastewater Treatment Plant (WWTP) had been using six granular-media filter units for tertiary treatment since the 1980s. The plant's treatment protocol includes fine screens for grit removal, followed by primary clarifiers, trickling filters, aeration basins, secondary clarifiers, the tertiary treatment system, and then chlorine disinfection.

The challenge was that the tertiary media filters required too much maintenance and excessive backwashing. According to Robert Brelsford, Superintendent, "Not a day went by that we didn't have to work on them, particularly on the control valves." Besides problems with the 30 control valves, the plant had trouble with broken underdrains and with losing media. And perhaps most significantly, "the system required about 10,000 gallons per backwash," says Brelsford.

In the Fall of 2011, project engineers Jones & Henry Engineers, Ltd., of Fort Wayne, Indiana, took a closer look at the six tertiary filters which, combined, had a design average flow of 2.35 MGD. Brian Houghton of Jones & Henry states, "After a six-month evaluation, we determined that the old sand filters were not repairable." Instead, the recommendation was to install two new cloth media disk filters, each with a capacity of 4.7 MGD."

During the winter and spring of 2013, Brelsford, Houghton and Portland mayor Randy Geesaman toured several municipal installations to evaluate treatment options. One location was the City of Bowling Green (Ohio) water pollution



Two AquaDisk® filter units were installed at the Portland Wastewater Treatment Plant. One unit handles the treatment volume of the six granular media filters they replaced. (Illustration courtesy of Brian Houghton, Jones & Henry Engineers, Ltd.)

control facility, which uses six AquaDisk® cloth media filters to handle peak flows of up to 36 MGD. "We went to Bowling Green a couple of times to look at the equipment," notes Breslford. "We were impressed."

One of the critical issues they investigated was the choice between an "outside-in" design versus an "inside-out" design. The outside-in configuration was chosen because it would be easier to clean, based on input from plant operators and maintenance personnel at the facilities sited. "Our secondary clarifiers have a lot of moss," says Breslford, "which would get trapped and be hard to get out in an inside-out configuration."

With the outside-in configuration of the AquaDisk filters, influent enters the filter unit and contacts the outside of the filter disk. Filtrate passes through the cloth media by gravity and is removed from the hollow area inside the filter disk through a hollow shaft that supports the individual disks. As solids accumulate on the surface of the media, the water level surrounding the disks rises. Once it reaches a predetermined level, automatic backwashing begins: The disks rotate, then backwash shoes contact the media surface and a vacuum is applied to remove the solids. Filtration is not interrupted. Heavier solids settle to the bottom of the tank and are pumped to a digester.

Meanwhile, as the team was doing its field work and preparing to request proposals from disk-filter manufacturers, the Indiana Finance Authority informed the city that it could obtain funding for these wastewater plant improvements in the current SRF (state revolving funds) project cycle. But bids for the project needed to be opened in approximately six weeks. The city asked Jones & Henry if this schedule could be met. Jones & Henry said yes and contacted Aqua-Aerobic Systems, which was able to fast-track the design and produce computer-aided design (CAD) drawings almost immediately to meet the deadline.

With a fast-track design-build process, the Portland Wastewater Treatment Plant went from design work to project completion in a little over 12 months. Meeting this very compressed timeline ensured that the plant would receive SRF funding. "Meeting that timeline was due in large part to the close coordination and communication between city personnel, the regulatory agency, the finance agency, the engineering firm (Jones & Henry) and equipment suppliers, especially Aqua-Aerobic," says Houghton.

The tertiary treatment system was completely renovated by adding two AquaDisk filters, each comprised of 10 disks and capable of handling peak flows of up to 4.7 MGD (total treatment volume for both filters is 9.4 MGD). Each disk is fitted with OptiFiber® cloth filtration media designed to maximize solids removal over a wide range of particle sizes. Its thick, pile construction allows filtered solids to be stored, unlike microscreen media, thereby extending the time between backwashes. A uniquely designed cloth-fiber-backing support structure promotes thorough cleaning of the media for optimum performance. The project also included pipe work (much of the existing piping was kept, rehabbed and reconfigured),

new controls, HVAC work, repainting, polishing the concrete floors, adding a new roof and rehabbing the anaerobic digester used to treat clarifier sludge. In operation, either one of the AquaDisk filters can handle the treatment capacity of the six previously used granular media filters, providing flexibility for routine maintenance and future growth. Backwash volume has been reduced 97%, to about 300 gallons per backwash. Additionally, energy consumption has dropped dramatically because so much less water is pumped back through the system. Adds Breslford, "The filters have worked great since we put them in. I would highly recommend the AquaDisk filter. Anyone can come and visit our plant and see the technology for themselves."

AquaDisk® FILTER ADVANTAGES

- Produces consistent, high-quality effluent
- Requires lower backwash rates
- Tolerates extreme variations in load
- Yields reuse-quality effluent
- Filters continuously during backwash
- Needs minimal operator attention
- Minimizes maintenance requirements
- Occupies a small footprint
- Eliminates sand media and underdrains



Each AquaDisk filter, using OptiFiber cloth filtration media, can handle peak flows of up to 4.7 MGD at the Portland Wastewater Treatment Plant.