



AQUA-AEROBIC SYSTEMS, INC.
A Metawater Company

Process Design Report

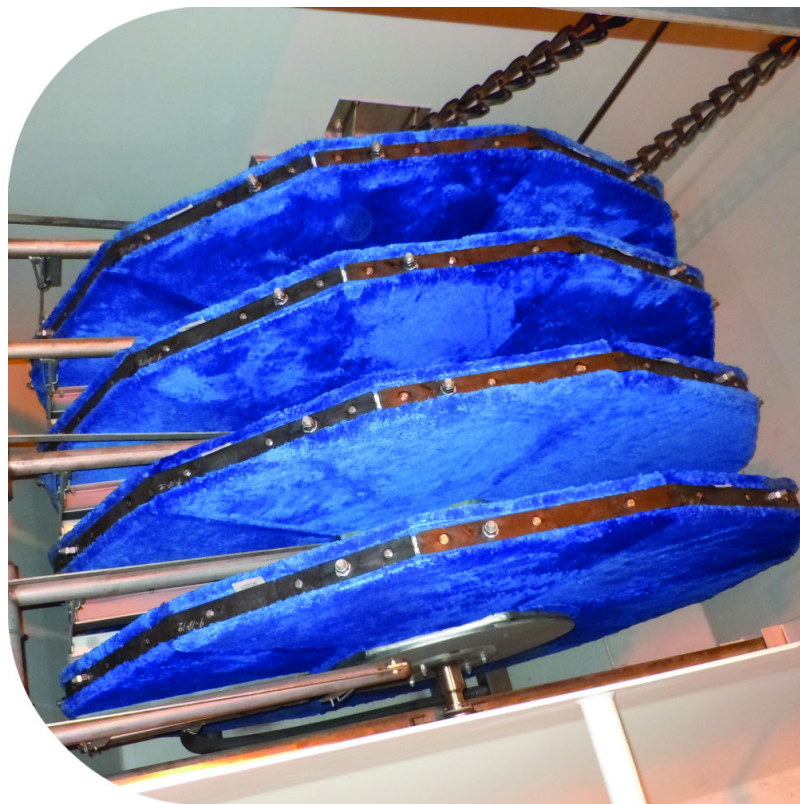
NAPANEE WWTP ON

Design# 172013

Option: Preliminary AquaDisk Design

AquaDisk®

Cloth Media Filter



July 06, 2023

Designed By: Natalie Watson

Design Notes

Design#: 172013

Project: NAPANEE WWTP ON

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Designed by Natalie Watson on Thursday, July 6, 2023



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Process/Site

- The following parameters have been assumed, as displayed on the design (engineer to verify):
Influent Total P: 0.5mg/L
- Chemical addition for coagulation/flocculation must be added upstream of the filter. In addition, rapid mixing and a flocculation tank with at least 5 minutes retention time must be provided. The chemical dosage should be flow-paced and controlled to avoid over-dosing.
- To achieve the effluent monthly average total phosphorus limit, the biological process, chemical feed systems, and Cloth Media Filters need to be designed to facilitate optimum performance.
- A minimum of twelve (12) daily composite samples per month (both influent and effluent) shall be obtained for total phosphorus analysis.
- Chemical addition (i.e. metal salts, and/or polymer) shall be furnished prior to the filter. Adequate rapid mixing must be provided as part of the chemical feed system. The chemical dosage should be flow-paced and controlled to avoid overdosing. Jar testing with various metal salts and polymers is recommended to determine the most effective metal salt and polymer as well as the optimum dosages of each, and to estimate the degree of phosphorus removal that can be achieved. In addition, a pilot study may be required to verify the actual performance capability.
- pH monitoring in the range of 6.5-8.5 of the biological reactor is required when adding metal salts.
- The cloth media filter will only remove TP that is associated with the TSS removed by the filter. Since only insoluble, particle-associated phosphorous is capable of being removed by filtration, phosphorous speciation shall be provided by the owner to substantiate the concentrations of soluble and insoluble phosphorous in the filter influent. If the proportions of soluble (unfilterable) and insoluble phosphorous are such that removal to achieve the desired effluent limit is not practical, the owner will provide for proper conditioning of the wastewater, upstream of the filter system, to allow for the required removal.
- The average and maximum design flow and loading conditions, shown within the report, are based on maximum month average and peak hour conditions, respectively.

Filtration

- The cloth media filter recommendation and anticipated effluent quality are based upon influent water quality conditions as shown under "Design Parameters" of this Process Design Report.
- The filter influent should be free of algae and other solids that are not filterable through a nominal 5 micron pore size media. Provisions to treat algae and condition the solids to be filterable are the responsibility of others.
- The cloth media filter has been designed to handle the maximum design flow while maintaining one unit out of service.

Equipment

- Scope of supply includes freight, installation supervision and start-up services.
- Equipment selection is based upon the use of Aqua-Aerobic Systems' standard materials of construction and electrical components, suitable for non-classified electrical environments.
- If the cloth media filter will be offline for extended periods of time, protection from sunlight is required.

AquaDisk® Tertiary Filtration - Design Summary

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DESIGN INFLUENT CONDITIONS

Pre-Filter Treatment: AquaNereda
Avg. Design Flow = 3.04 MGD = 2109.71 gpm = 11500.00 m³/day
Max Design Flow = 11.18 MGD = 7766.66 gpm = 42336.00 m³/day

<u>DESIGN PARAMETERS</u>	Influent	mg/l	Effluent			
			Required	<= mg/l	Anticipated	<= mg/l
Avg. Total Suspended Solids:	TSSa	10	TSSa	10	TSSa	10
Max. Total Suspended Solids:	TSSm	15	--	--	--	--
Phosphorus:	Total P	0.50	Total P	0.10	Total P	0.10

AquaDisk FILTER RECOMMENDATION

Qty Of Filter Units Recommended = 3
Number Of Disks Per Unit = 12
Total Number Of Disks Recommended = 36
Total Filter Area Provided = 1936.8 ft² = (179.93 m²)
Filter Model Recommended = AquaDisk Package: Model ADFSP-54 x 12E-PC
Filter Media Cloth Type = OptiFiber PES-14®

AquaDisk FILTER CALCULATIONS

Filter Type:

Vertically Mounted Cloth Media Disks featuring automatically operated vacuum backwash . Tank shall include a rounded bottom and solids removal system.

Average Flow Conditions:

Average Hydraulic Loading = Avg. Design Flow (gpm) / Recommended Filter Area (ft²)
= 2109.7 / 1936.8 ft²
= 1.09 gpm/ft² (2.66 m/hr) at Avg. Flow

Maximum Flow Conditions:

Maximum Hydraulic Loading = Max. Design Flow (gpm) / Recommended Filter Area (ft²)
= 7766.7 / 1936.8 ft²
= 4.01 gpm/ft² (9.80 m/hr) at Max. Flow

Solids Loading:

Solids Loading Rate = (lbs TSS/day at max flow and max TSS loading) / Recommended Filter Area (ft²)
= 1399.1 lbs/day / 1936.8 ft²
= 0.72 lbs. TSS /day/ft² (3.52 kg. TSS/day/m²)

The above recommendation is based upon the provision to maintain a satisfactory hydraulic surface loading with (1) unit out of service. The resultant hydraulic loading rate at the Maximum Design Flow is: 6 gpm / ft² = (14.7 m/hr)

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Cloth Media Filters

AquaDisk Tanks/Basins

3 AquaDisk Model # ADFSP-54x12E-PC Package Filter Painted Steel Tank(s) consisting of:

- 12 Disk painted steel tank(s).
- 3" ball valve(s).

AquaDisk Centertube Assemblies

3 Centertube(s) consisting of:

- 304 stainless steel centertube weldment(s).
- Centertube driven sprocket(s).
- Dual wheel assembly(ies).
- Rider wheel bracket assembly(ies).
- Effluent seal plate weldment.
- Centertube bearing kit(s).
- Effluent centertube lip seal(s).
- Pile cloth media and non-corrosive support frame assemblies.
- Disk segment 304 stainless steel support rods.
- Media sealing gaskets.

3 Cloth set(s) will have the following feature:

- Cloth will be OptiFiber PES-14.

AquaDisk Drive Assemblies

3 Drive System(s) consisting of:

- Gearbox with motor.
- Drive sprocket(s).
- Drive chain(s) with pins.
- Stationary drive bracket weldment(s).
- Adjustable drive bracket weldment(s).
- Chain guard weldment(s).
- Warning label(s).

AquaDisk Backwash/Sludge Assemblies

3 Backwash System(s) consisting of:

- Backwash shoe assemblies.
- Backwash shoe support weldment(s).
- 1 1/2" flexible hose.
- Stainless steel backwash shoe springs.
- Hose clamps.

3 Backwash/Solids Waste Pump(s) consisting of:

- Backwash/waste pump(s).
- Stainless steel anchors.
- 0 to 15 psi pressure gauge(s).
- 0 to 30 inches mercury vacuum gauge(s).
- Throttling gate valve(s).
- 3" ball valve(s).

AquaDisk Instrumentation

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3 Pressure Transmitter(s) consisting of:

- Level transmitter(s).

3 Float Switch(es) consisting of:

- Float switch(es).

3 Vacuum Transmitter(s) consisting of:

- Vacuum transmitter(s).

AquaDisk Valves

3 Set(s) of Backwash Valves consisting of:

- 2" full port, three piece, stainless steel body ball valve(s), grooved end connections with single phase electric actuator(s). Valve / actuator combination shall be TCI / RCI (RCI, a division of Rotork).
- 2" flexible hose.
- Victaulic coupler(s).

3 Solids Waste Valve(s) consisting of:

- 2" full port, three piece, stainless steel body ball valve(s), grooved end connections with single phase electric actuator(s). Valve / actuator combination shall be TCI / RCI (RCI, a division of Rotork).
- 2" flexible hose.
- Victaulic coupler(s).

AquaDisk Controls w/Starters

3 Conduit Installation(s) consisting of:

- PVC conduit and fittings.

3 Control Panel(s) consisting of:

- NEMA 4X fiberglass enclosure(s).
- Circuit breaker with handle.
- Transformer(s).
- Fuses and fuse blocks.
- Line filter(s).
- GFI convenience outlet(s).
- Control relay(s).
- Selector switch(es).
- Indicating pilot light(s).
- Compactlogix Processor.
- Power supply(s).
- Input card(s)
- Output card(s).
- Analog input card(s).
- Ethernet switch(es).
- Power supply(ies).
- Operator interface(s).
- Motor starter(s).
- Terminal blocks.
- UL label(s).
- Panel will be CSA labeled.