

MBR

A packaged wastewater treatment system designed for superior effluent quality and multiple membrane products

APPLICATION: Municipal Wastewater

CAPACITY: 8,000 - 26,400 GPD
(30 - 100 m³/d)

LOCATION: Calgary, AB, Canada

COMMISSIONED: March 2019

TECHNOLOGY: Packaged Plant MBR

CHALLENGE

Emcor Development Corporation had a need for wastewater treatment in one of their business parks in Calgary, AB. Their challenge was to find a system capable of treating their wastewater to stringent standards, even while flows fluctuate due to the day-use nature of the application.

SOLUTION

H₂O Innovation was selected to provide a packaged Membrane Bioreactor plant. A single tank was provided for equalization, bioreactor, membrane and sludge holding, with all associated mechanical equipment installed on skids installed adjacent to the tank. This tank is installed within a small building to protect equipment and staff from environmental conditions.

For this application, ceramic flat sheet membranes were selected to be installed within the 2 membrane trains, to treat an average annual flow of 30 m³/d and a max design flow of 100 m³/d.

Raw water is first screened through a 2 mm automated fine screen and transferred to the equalization tank to suppress the flow variation of the facility. This provides a more consistent flow and organic loading rate to prevent biological upsets which lead to poor treatment and foaming issues. From the flow equalization tank, the wastewater is pumped to the biological treatment train comprised of pre-anoxic, aerobic and post-anoxic zones. The mixed liquor from the biological train flows by gravity to two, redundant membrane trains.

Alum dosing is provided to ensure phosphorus removal, and a dosing system for a carbon source is provided at the post-anoxic tank in order to ensure total nitrogen levels are met. A compact ultraviolet (UV) reactor was installed on the final effluent to provide further disinfection.

Parameter	Influent Concentration (mg/L)	Effluent Requirements (mg/L)
BOD	350	< 10
TSS	400	< 5
TKN	60	N/A
TN	-	< 10 (winter) < 5 (summer)
Phosphorus	15	< 1
pH	6.5 - 8.5	6.5 - 8.5
Temperature	> 10 °C	N/A



EMCOR WWTP



Packaged Plant skids for EMCOR WWTP

FLEXIBLE MEMBRANE SYSTEM

The packaged MBR was designed to fit several membrane modules covering an acceptable surface area range for various flat sheet and hollow fiber products.

The supporting ancillary equipment was selected in order to facilitate various operating conditions, including: flow ranges for permeate pumps, air scour rates for membrane blowers, permeate and air header connections that are universal to the various module types and chemical dosing systems to satisfy the range of cleaning concentrations.

The Meidensha ceramic membrane modules were pre-installed prior to shipping to provide a plug and play system. The packaged plant approach contributes to a reduction in installation labor and on-site time for commissioning since the system can be fully tested at the factory. Figure 2 shows the packaged system components, including the treatment train, permeate/CIP pump skid, blower and RAS pump skid, chemical dosing skid and control and power panels.

RESULTS

The benefits of a pre-assembled, pre-tested system include significantly less site installation labor and commissioning time to provide an efficient construction timeline.