

Case study:

Simple residuals management system saves \$6 million for water treatment plant

- Bishop Solids Management Solution
- Perth Water Treatment Plant
- Perth, Ontario, Canada

The challenge:

Avoiding the high cost of a complex, mechanical residuals management system

A water treatment plant (WTP) can generate a significant amount of residuals from processes such as clarification, sedimentation, softening, iron and manganese removal, filter backwash and more. Dealing with these residuals often requires additional equipment and oversight to collect, thicken and dewater them. Conventional residual management equipment can add several million dollars in capital costs to the plant and higher operating costs.

In 2010, the Town of Perth, Ontario began evaluating options to collect and dewater the sludge from the sedimentation tanks of its water treatment plant. Unfortunately, the sludge could not be sent to the town's wastewater treatment plant since it was nearly at capacity and would not be able to handle the additional loading. The town needed a way to treat the residuals onsite and produce high quality effluent that could be discharged into the Tay River.

Project managers initially considered a complex mechanical treatment system, but the estimated cost of more than \$7 million was unaffordable for the small community, which had fewer than 6,000 residents at the time. Instead, they began looking for a cost-effective alternative that could achieve the treatment requirements and preserve capacity in the town's wastewater lagoons.

The solution:

A passive dewatering system for about 1/5 of the cost of alternatives

Rather than opting for a conventional mechanical treatment process, Perth chose Bishop Water's simple, low-energy Solids Management Solution that uses only Geotube® containers, specially selected polymers and gravity to collect and dewater process residuals in a single step.

The entire Bishop Solids Management Solution was installed for \$1.25 million, saving about \$6 million in capital costs for the community.

The solution, which has been operating since December 2014, consistently meets the discharge requirement at operating costs that are significantly lower than alternatives.



A comparison of the water plant's residual waste stream and the clear filtrate that is released from the Geotube container (right).



After a period of dewatering, the Geotubes are cut open and the dry solids are removed for disposal.

Bishop Water completed the design-build project as the general contractor, project manager, and equipment supplier in partnership with Andrum Associates Inc. and Maple Reinders as the builder.

The process begins by pumping sludge from the WTP's sedimentation tanks to a 40 m³ holding tank. About every six hours, operators pump the sludge from the holding tank to a Geotube® container.

As the slurry is pumped, polymer is added to accelerate dewatering and enhance solids retention. Bishop Water's PLC-controlled Venturi Emulsion Polymer Activation System (VEPAS™) provides precise polymer dosing based on the pumping speed.

The Geotube® filtration process consistently releases filtrate with TSS in the range of 3 to 4 mg/L—far below the discharge limit of 25 mg/L.

A manifold system enables operators to easily switch the receiving container, so one Geotube® can be filled, while the other dewateres. A third Geotube® container is set up inside a greenhouse, enabling the system to be used through the winter.

The indoor Geotube is used to process about a third of the WTP's annual sludge volume.

In 2018, Perth WTP increased its use of the Bishop Solids Management Solution and began collecting and dewatering residuals from the filter backwash process also.

To achieve this, two underground 200 m³ tanks were installed to collect the filter backwash and settle out the solids. Operators decant the clarified water, release it to the river, then gradually pump the sludge to the 40 m³ tank for batch processing by the Bishop Solids Management System.

The results:

Affordable residuals management that preserves precious treatment capacity in wastewater lagoons

The Geotube® filtration process consistently releases filtrate with TSS in the range of 3 to 4 mg/L—far below the discharge limit of 25 mg/L. As a result, the plant can safely release the filtrate directly into the Tay River without any additional treatment.

Geotube filtrate results			
Parameter	Influent (mg/L)	Geotube Filtrate (mg/L)	Discharge limit (mg/L)
TSS	2,000	4	25

The Bishop Solids Management Solution also supports an initiative to extend the life of Perth's wastewater treatment lagoons by reducing influent loading. This approach helps conserve precious wastewater treatment capacity and enables the town to avoid the capital cost of expanding the treatment lagoons.

The project received the 2015 Minister's Award for Environmental Excellence from the Ontario Ministry of the Environment and Climate Change. The award recognizes companies and communities that have gone above and beyond to enhance and protect the environment.



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