

RBC to MBBR Retrofit Wabaseemoong WWTP

CASE STUDY



The following case study is from a successful project in Canada, delivered by our sister company Nexom (an Axis Water company). It shows how a failed RBC system was retrofitted into a high-performance MBBR, reusing the existing tanks, cutting costs by around 30% versus a like-for-like replacement, and performing reliably even in sub-zero Ontario winters. ATAC now offers these same RBC-to-MBBR retrofit solutions here in the UK.

Overview

When the wastewater treatment plant (WWTP) serving the Wabaseemoong Independent Nations (WIN) community in northwestern Ontario suffered a catastrophic failure, a rapid, cost-effective and cold-climate-resilient solution was needed. Nexom, an Axis Water company, transformed a failed rotating biological contactor (RBC) system into a high-performance moving bed biofilm reactor (MBBR) without major structural works.

The challenge

The WIN community (population ~1,200) relied on two parallel RBC units installed in 2001. In late 2021, shaft and bearing failures rendered the plant non-compliant and inoperable, posing a serious environmental and public health risk.

Replacing like-for-like was not viable. The building had been constructed around the original reactors, so a new RBC installation would have required partial demolition, making it prohibitively expensive. The replacement solution had to:

- ↪ Utilise the existing tank structures
- ↪ Operate reliably at a minimum temperature of 5°C
- ↪ Meet stringent effluent quality standards
- ↪ Be delivered under urgent timescales

Our solution

Nexom installed the BioPorts™ MBBR system using free-floating media placed directly into the existing RBC tanks, eliminating the need for structural modifications.

↪ Customised tank geometry

The existing tanks had sloped sidewalls and a shallow 1.2 m water depth, far below the 3.05–3.66 m typically required for standard MBBR designs. Nexom customised the BioPorts system to suit the unique geometry.



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🔧 Energy-efficient aeration

24 EDI CoarsAir™ MaxAir stainless steel diffusers (12 per tank) provide efficient aeration without the need for membrane replacement.

Implementation

The project was delivered on a tight programme. The contract was awarded in early 2023 and the new MBBR treatment equipment was commissioned in November of the same year, a remarkable turnaround for an installation of this complexity.

Project milestones

Milestone	Date
Contract awarded	Early 2023
MBBR system commissioned	November 2023



Results

- 🔧 NH₃ and BOD compliance achieved at temperatures as low as 5°C
- 🔧 Approximately 30% cheaper than a like-for-like RBC replacement
- 🔧 Minimal footprint, with full integration into existing structures
- 🔧 Low civil and land acquisition costs
- 🔧 Simple to operate, with minimal maintenance

Design parameters

Parameter	Value
Biological flow (5°C)	876 m ³ /d
Summer / high-temp flow	1,442 m ³ /d
Required TSS	< 25 mg/L
Required BOD	< 25 mg/L
Required NH ₃ -N (summer)	< 1 mg/L
Required NH ₃ -N (winter)	< 5 mg/L

The Wabaseemoong WWTP upgrade shows how Nexom's BioPorts™ MBBR technology can overcome significant infrastructure, logistical and environmental constraints to deliver a modern, reliable and cost-effective treatment solution, even in the most challenging conditions. It is a blueprint for RBC-to-MBBR retrofits worldwide, particularly for remote communities, cold climates and sites where structural limits make traditional replacement impractical.

Technology and data supplied by Tanner Devlin (Nexom, an Axis Water company) and Rhianna Holter-Ferguson (JR Cousin Consultants Ltd).
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~30%

lower cost than a
like-for-like RBC replacement

< 1 yr

from contract award
to commissioning

5°C

reliable NH₃ & BOD
compliance

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