Wastewater Treatment

Bio-Wheel™

Snow Lake, Manitoba

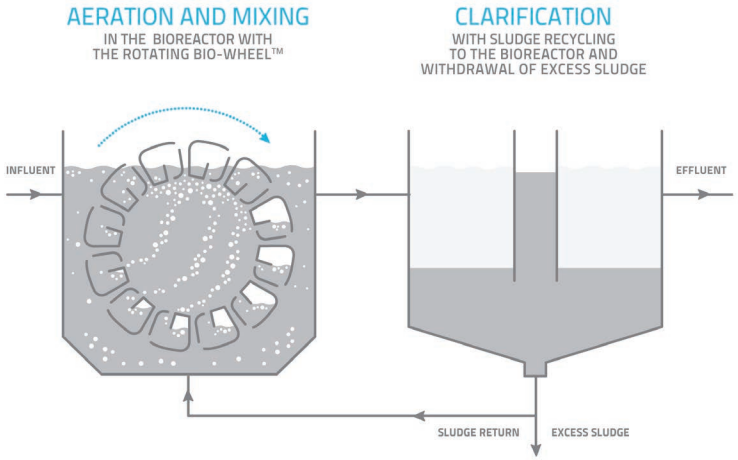
THE SITUATION

Aging infrastructure and a sudden population growth forced the City of Snow Lake to upgrade its wastewater treatment plant. A part of the City's existing system had been non-functional for many years and in 2012 it was decided that a zinc mine would be developed creating job opportunities and a population expansion in this small Manitoban city.

The appointed engineering firm with the contribution of H_2O Innovation, designed an integrated fixed film activated sludge (IFAS) process for which parts of the existing system were salvaged. As an effort to retrofit the installation in place, the engineers came up with the concept of reversing the flow of the system. The existing plant had a circular activated sludge tank and two rectangular clarifiers. The existing concrete rectangular clarifiers were retrofitted into Bio-Wheel™ tanks and the existing circular activated sludge tank was modified into a circular clarifier. By reversing the process flow direction to feed the retrofitted Bio-Wheel™ tanks and flow from there into the retrofitted circular clarifier the IFAS process flow was established.

THE SYSTEM

At the core of the system are four Bio-Wheels™. Each one is made of a steel frame and corrugated plastic plates. The plates capture air and release it in the activated sludge during its rotation. The Bio-Wheel™ surface area is used for the development of fixed-film bacteria that enhance nutrient removal and increase the average SRT of the system. The effluent flows by gravity from the Bio-Wheel™ into the clarifier where water is separated from the sludge. The settled sludge is then recirculated back to the Bio-Wheel™ process as return activated sludge. The high quality effluent produced is then sent into Snow Lake.



This integrated fixed-film activated sludge system can also withstand significant temperature variations. Located in the center of Canada, the City of Snow Lake enjoys warm summers with temperatures averaging 25°C and frigid winters during which the temperature plummets to -40°C for days. Regardless of those large temperature variations the Bio-Wheels™ treat the required flow and produce a high quality effluent.

KEY HIGHLIGHTS

- Design flow, 2 trains: 1 729 m^3/d (317.3 gpm)
- Annual flow, 1 train: 1 383 m3/d (253.71 gpm)
- Fully automated
- Maintains efficiency regardless of temperature changes
- 30% increase capacity within the existing footprint

EFFLUENT CRITERIA

BOD	140 mg/l
TSS	15.27 mg/l
Total P	0.38 mg/l
Total N	21.91 mg/l

BIO-WHEEL™ ADVANTAGES

- Minimized energy requirements
- Simple operation
- Improved nutrient removal
- Reduced plant footprint
- Resistance to shock load
- Reduced sludge production
- No offensive odours

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