

CASE STUDY:

Olympia, WA – Budd Inlet Treatment Plant LOTT Clean Water Alliance



Application:	First Anoxic, Swing, Deaeration & BNR Influent & Effluent Channel Mixing
Annual Average Flow (AAF):	16.7 MGD
Mixing Efficiency:	≈ 0.09 HP/1000 FT ³
Compressors:	Three (3) 50 HP Rotary Screw
Nozzles:	458
Design Engineer:	Parametrix
Contractor:	Prospect Construction, Inc.

BioMix Compressed Gas Mixing Provides Unique Benefits for BNR Improvement Project

Located in downtown Olympia, Washington, the Budd Inlet Treatment Plant is part of the LOTT Clean Water Alliance, a nonprofit organization that includes the cities of Lacey, Olympia, and Tumwater and Thurston County. For more than three decades, the plant has been providing advanced secondary treatment that includes biological nutrient removal (BNR) to improve the effluent discharged to Budd Inlet, which is located at the southern end of Puget Sound.

The LOTT Clean Water Alliance completed construction in 2023 on a landmark BNR process improvement project to significantly reduce the plant's nutrient discharge and meet Washington State's removal requirement of less than 3 mg/l total inorganic nitrogen (TIN). The goals of the project were to optimize the BNR process, replace aging equipment, enhance operational control and flexibility, and increase process reliability.

In lieu of 20+ mechanical mixers, **BioMix Compressed Gas Mixing was selected to mix the influent and effluent BNR channels, anoxic selectors, swing zones, and deaeration tanks — all utilizing one centralized compressed air system.** Chosen for its industry-leading energy efficiency, BioMix delivers mixing across the entire secondary treatment process while supporting stringent nutrient requirements.



The centralized compressed air system adjusts output to meet the BioMix air demand for mixing multiple applications.



ENERGY EFFICIENCY

With BioMix, the project saves the plant an **estimated \$180,000 per year**



STRAIGHTFORWARD OPERATION

Automatically adjusts mixed environment based on loading conditions
Minimal, localized maintenance



PROCESS OPTIMIZATION

Concurrently operates with diffused aeration in swing zones for simultaneous nitrification and denitrification



UNPARALLELED FLEXIBILITY

Bottom-up, uniform mixing
Ability to operate in multiple applications utilizing a common compressor system



Patented, engineered BioMix nozzles located near the tank floor integrate seamlessly with aeration diffusers for anoxic swing zone and mixing limited applications.

“We have more control over our mixers than before... there is a ton of versatility.”

— LOTT Operator

With the inclusion of BioMix, this BNR improvement project met LOTT’s unique requirements.

- This project **eliminated high internal recycle pumping costs** by integrating the first anoxic volume in the existing aeration basins reconfigured into BNR reactors.
- The **swing zones can automatically turn anoxic** during periods of low loading, e.g. the middle of the night.
- The plant can **aerate and mix at the same time** in dedicated zones to enable simultaneous nitrification and denitrification, reducing carbon addition in the second stage anoxic tanks.

All in-tank components of a BioMix Compressed Gas Mixing system are maintenance free, non-clogging, and self-cleaning. The system provides complete mixing with proven negligible oxygen transfer. BioMix provides 60% or greater reduction in power usage versus mechanical mixers. The system can accommodate multiple applications, leveraging common compressors and controls, and BioMix’s patented nozzles and headers are compatible with any tank geometry or configuration.

BioMix delivered the Budd Inlet Treatment Plant enhanced BNR capabilities, the highest energy efficiency versus all alternatives, and the lowest maintenance requirements – with only two duty pieces of equipment (compressors) versus more than 20 mechanical mixers.

Valve modules mounted on the covered tanks are controlled from plant SCADA to optimize the process conditions and mixing regime.



Contact sales@enviro-mix.com today to discuss the ways EnviroMix can optimize your mixing solutions.