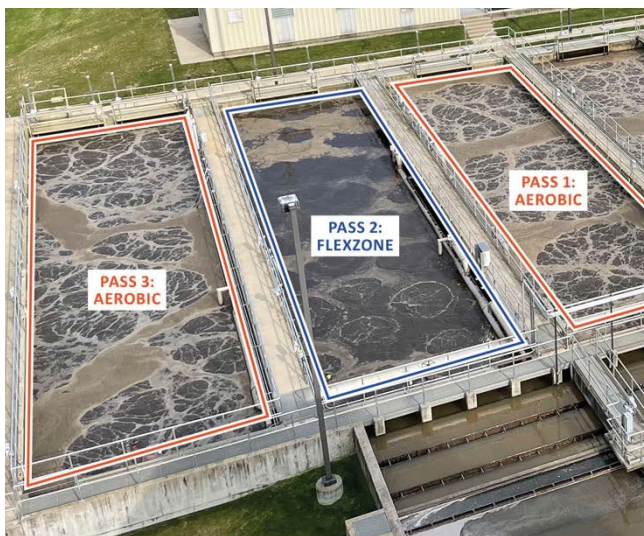


CASE STUDY: Grandville, Michigan Clean Water Plant

Application:	Secondary Treatment Bioreactor
Design Flow (ADF):	Design = 10 MGD, Actual = 6.4 MGD
Mixing Efficiency:	≈ 0.16 HP/1000 FT ³
Compressors:	(2) 25 HP Atlas Copco model GA18
Blowers:	Existing (Single Stage Centrifugal)
Design Engineer:	Moore & Bruggink, Inc.



Secondary treatment aerial view

FlexZone Delivers Energy Savings, Reclaims Alkalinity, and Lowers Effluent Nitrate

In 2024, the city of Grandville completed a FlexZone Adaptive Process Volume System upgrade to optimize the bioreactor environment and improve aeration control of dissolved oxygen (DO). Released by EnviroMix in 2022, the FlexZone is a patented, versatile secondary treatment solution that integrates BioMix Compressed Gas Mixing, diffused aeration, instrumentation, and proprietary control algorithms to ensure precise aeration control and meet treatment objectives.

The FlexZone system was easily incorporated into the existing bioreactor, utilizing existing aeration grids and instrumentation while adding new air flow control equipment, BioMix Compressed Gas Mixing, and upgraded controls. The upgrade has delivered Grandville the following benefits:

- 20% reduction in aeration energy consumption for an **estimated annual energy cost savings of \$60,000**.
- Immediate process improvements due to the **adaptable transition between aerobic and anoxic environments** within the same reactor.
- Promotion of denitrification to **reduce effluent nitrate and reclaim alkalinity**.



ENERGY EFFICIENCY

20% reduction in aeration energy
Estimated annual energy cost savings of \$60,000



STRAIGHTFORWARD OPERATION

Proprietary control algorithms adjust aeration and mixing parameters
Minimal, localized maintenance



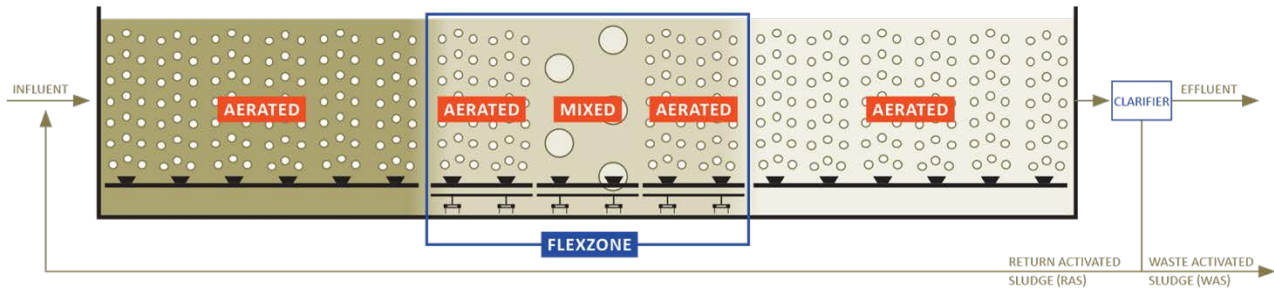
PROCESS OPTIMIZATION

Delivers precise aeration control, **reclaims alkalinity, and lowers effluent nitrate (NO₃-N)**



UNPARALLELED FLEXIBILITY

Easily incorporated into the existing aeration tanks
Complementary mixing and aeration operation



Ground level view of aeration train

“Installing the FlexZone has made perfect sense from every aspect considered, including but not limited to electrical savings and alkalinity recovery.”

Scott Yonkers, Assistant Superintendent

The FlexZone dynamically adapts anoxic and aerobic environments to changes in loading and temperature. **In addition to managing bioreactor volume utilization, Grandville’s FlexZone was designed to control DO with two primary benefits in mind: prevent over-aeration and incorporate denitrification to recover alkalinity.**

Grandville’s FlexZone was strategically placed in the second pass of a three-pass aeration train (see image above). The first pass and the last pass remained aeration only. The design minimized modifications to the existing equipment, ensuring minimal downtime and cost-effective installation. The FlexZone is divided into three subzones, each of which can be independently controlled with its own mixing and aeration grid.

As the system’s oxygen demand increases, the subzones individually transition from mix-only to aerated environments. Likewise, as oxygen demand declines, the subzones transition to mix-only, anoxic environments.

The FlexZone’s complementary mixing and aeration equipment offer concurrent operation, allowing Grandville to **adapt process environments to meet current conditions without sacrificing treatment capacity to meet future design loading conditions.**



BioMix Compressed Gas Mixing in operation



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