



Mark Perry,
Executive Director

Project Cost:
\$28,200,000

Process Engineer:
Britt Bassett, PE, BCEE

Prime Engineer:
Gwin, Dobson & Foreman

Contractor:
Galway Bay Inc.

Constructed:
May 2012



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Westerly WWTP Nutrient Removal

Altoona Water Authority

Blair County

Bassett Engineering Inc.

Bassett Engineering partnered with Gwin, Dobson & Foreman to evaluate, design and upgrade the Westerly Wastewater Treatment Plant to provide Biological Nutrient Removal to meet annual loading limits equivalent to 5.0 mg/L Total Nitrogen and 0.67 mg/L Total Phosphorus. Effluent TN was 98,500 lbs. and TP was 12,700 lbs. below the 2012 Cap Loading limit.

Bassett Engineering evaluated, modeled and designed the process for this DEP-mandated Nutrient Removal Upgrade. The Hybrid Bardenpho with Step Feed Process was constructed with the flexibility to operate a variety of processes including the Modified Ludzack-Ettinger, Virginia Initiative Plant, Johannesburg, and A²O. Step Feed diverts peak flows to the last aerated zone for contact stabilization. BioWin process modeling used seven years of actual flow and loading data. Two weeks of intensive testing were conducted to supplement and collaborate this historic data. Bucknell University followed the WERF Research Manual's High F:M Test Protocol to develop site-specific kinetic parameters.

Two aeration tanks and one equalization tank were converted to four biological reactors by adding baffle walls, anaerobic and anoxic zones, submersible mixers and control instruments. Nitrate and mixed liquor internal recycle pumps were set in an existing pipe gallery in between the reactors. High-speed Turbine aeration blowers were provided. Carbon can be fed to enhance denitrification and caustic soda can be fed to raise pH but neither has been needed to date, confirming modeling results.

Modeling consistently indicated solids washouts during peak flows and loads. Three existing secondary clarifiers and one new were optimized to remove nutrients. Clarification can be chemically enhanced using polymer and alum to prevent solids washouts during peak flows. Neither has been needed to date.

The NRT Upgrade includes a fully automated computer process control system that allows either flow-paced or instrument-based process control of D.O., pH, ORP, ammonia, and Nitrate; plus Mixed Liquor, Nitrate, and RAS pumping. Project included new screening, grit removal, sludge centrifuge, scum pumping, UV disinfection. Aerobic digestion was upgraded to optimize nutrient removal.

First phase was started up on September 7, 2011, during Tropical Storm Lee. Flows were 60 MGD and the plant successfully passed the flow without solids washout.

Winner of the 2013 American Academy of Engineering and Sciences Superior Achievement Award (the highest award given). This project continues to receive awards and accolades. The project received the 2014 Award of Merit from the American Society of Civil Engineers (Pittsburgh Section), 2014 Engineering News-Record—Mid-Atlantic Region Award of Merit (Water/Wastewater), Altoona-Blair Co. Chamber of Commerce 2013 Technology Award and a 2014 Diamond Certificate (Wastewater) from the American Council of Engineering Companies/PA.

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