

11 Bulk Alum Storage and Sludge Transfer - Existing belt filter press was removed to accommodate the installation of two 4,300 gallon bulk alum storage tanks, alum transfer pumps and neat polymer system. Existing sludge pumps were modified to accommodate side stream phosphorous removal.

12 Side Stream Phosphorous Removal - Existing 20' diameter contact clarifier and 39' diameter holding tank were modified to accommodate the addition of alum and polymer to bind the phosphorus laden decant and centrate (PLDC). The phosphorous rich sludge is then transferred to the aerobic digesters. Submersible pump station containing two 7.5 hp pumps, each rated for 360 gpm, transfers PLDC to the holding tank.

13 Augmented Aerobic Digestion Facility - Existing 30' diameter digested sludge holding tanks and building were converted into an aerobic digestion system.

13a Aluminum tank covers and medium bubble vertical diffuser system will maintain temperature and sludge digesting efficiency during cold weather.

13b Three 60 hp positive displacement blowers, each rated for 800 scfm, supply air to diffuser system.

13c Two 7.5 hp rotary lobe pumps, each rated for 100 gpm, feed the centrifuge with 2.5% sludge from aerobic digesters. One centrifugal 15 hp sludge transfer pump, rated for 500 gpm, facilitates movement of sludge to various tanks.

14 SCADA, Instrumentation and Controls

14a Existing control system was replaced with state of the art Programmable Logic Controllers (PLC) connected via Ethernet fiber optic local area network, providing the ability to control and monitor the WWTP process.

14b Human Machine Interface (HMI) stations are provided in the Manager's Office and in the Control Room, both located within the Administration Building. A third station is also provided in the Electrical Room of the Biosolids Building. This layout facilitates the Dryer and WWTP operations by providing control interface, status, and alarm monitoring from multiple locations.

14c Operator Interface Terminals (OIT) are located on the face of each PLC to accommodate local control and status monitoring by operators.

**Lititz Sewer Authority
Wastewater Treatment Plant
Biological Nutrient Removal Upgrade
2010**

Consulting Engineer:
Entech Engineering, Inc.

Plant Operator:
Severn Trent Environmental Services, Inc.

General Contractor:
Worth and Company, Inc.

Electrical Contractor:
Pagoda Electrical, Inc.

Plumbing & HVAC:
Garden Spot Mechanical, Inc.

Lititz Wastewater Treatment Plant Upgrade

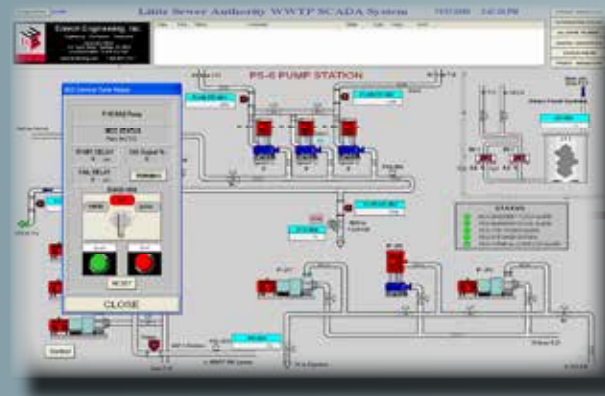


Biosolids Drying Facility



Augmented Aerobic
Digestion Facility

In accordance with the Chesapeake Bay Initiative, the Lititz Wastewater Treatment Plant, operated by Severn Trent Services, has recently undergone a biological nutrient removal upgrade.

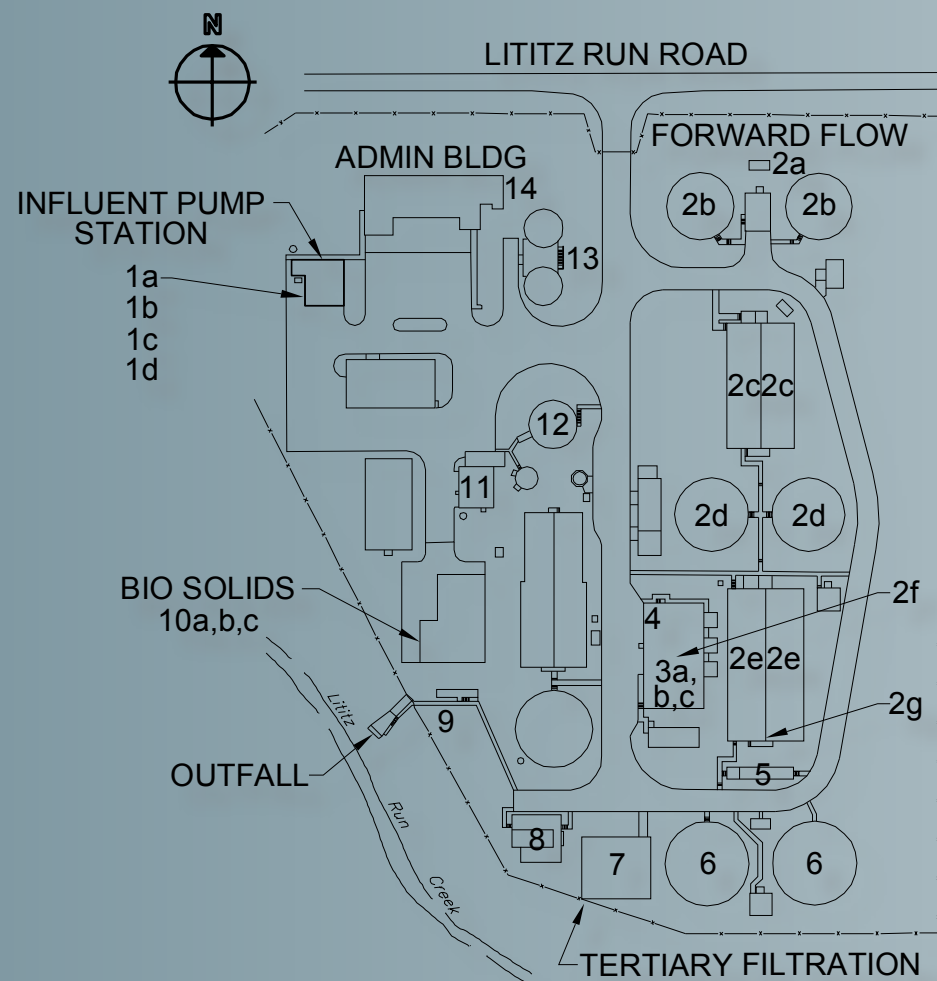


SCADA, Instrumentation and Controls



315 Clay Road
Lititz, Pennsylvania 17543-9019
717.626.6666 / Fax 717.626.6600

www.entecheng.com



LITITZ WASTEWATER TREATMENT PLANT

The Lititz Sewer Authority upgraded the Wastewater Treatment Plant that serves Lititz Borough and sewered portions of Warwick Township in Lancaster County, Pennsylvania.

The project converted the existing two-stage BOD removal and nitrification process to a Biological Nutrient Removal (BNR) process without the addition of new tankage to comply with the Chesapeake Bay Strategy.

The five stages of the BNR process are anaerobic, pre-anoxic, aeration, post-anoxic and post aeration zones with ancillary process upgrades that included influent fine screening, side stream phosphorous removal, tertiary filtration, ultraviolet disinfection, augmented aerobic digestion and biosolids drying system.

1 Influent Pump Station

- 1a WWTP Capacity - 3.85 mgd average daily flow; 4.8 mgd max monthly average flow; 7.9 mgd maximum daily flow; 9.4 mgd peak hourly flow.
- 1b Fine Screen and Compactor - Replaces existing coarse bar screen with a fine screen with 6 mm spacing, including washer/compactor and programmable logic controllers (PLC).
- 1c Wet well - Existing influent wet well(s) supply the raw sewage pumps.
- 1d Raw Sewage Pumps - Existing drywell centrifugal 50 hp pumps, rated for 3,130 gpm each, pump wastewater from the wet well(s) to the forward flow division box via an 18-inch underground force main.

2 Forward Flow

- 2a Flow Division Box - Was modified to accommodate the introduction of the 14-inch Return Activated Sludge (RAS) to the head of the forward flow train, while maintaining equal flow distribution to anaerobic tanks.
- 2b Anaerobic Tanks - Were created from the existing 55-foot diameter primary clarifiers that include one 5 hp submersible mixer each.
- 2c Pre-anoxic/Aeration Zones - Were created from the existing 320,000 gal. first stage aeration tanks by modifications to influent channel, new stop gates/weir gates, and the installation of geomembrane baffles, providing four zones, four 3 hp submersible mixers, and tube diffuser aeration.
- 2d Aeration Tanks - Were created from existing 60-foot diameter intermediate clarifiers that include tube diffuser aeration. Tanks also contain off-gas diffusion from the biosolids dryer condenser.
- 2e Aeration/Anoxic/Post-Aeration Zones - Were created from existing 648,000 gal. second stage aeration tanks by modifications to influent channel, new stop/weir gates, and installation of geomembrane baffles, providing eight zones, four 5 hp submersible mixers, tube diffuser aeration, and four 50 hp submersible Nitrate Internal Return (NIR) pumps with Variable Frequency Drives (VFD), each rated for 4,670 gpm.
- 2f Forward Flow Aeration System - Existing centrifugal blowers were rebuilt and retrofitted with additional stages and 200 hp motors with VFDs to accommodate Dissolved Oxygen (DO) control by modulating Flow Control Valves (FCV) and blower speed, based upon actual measured oxygen within various process zones. Ethernet IP and Modbus communication serve as the interface between drives, PLCs, and flow control valves.
- 2g Water Quality Instrumentation - Field instrumentation was added to the forward flow trains/zones to include Oxidation Reduction Potential (ORP), dissolved oxygen, ammonia nitrogen, nitrate, pH, Mixed Liquor Suspended Solids (MLSS) and flow rate.

3 Sludge Flow and Alum

- 3a RAS pumps were replaced with three 40 hp centrifugal non-clog pumps with VFDs, each rated for 1,360 gpm to facilitate continuous sludge withdrawal from clarifiers.
- 3b Sludge transfer pumps were replaced with two rotary lobe 7.5 hp pumps, each rated for 100 gpm.
- 3c Alum day tank, having a size of 300 gallons with hydraulic driven metering pumps, provides alum to flow upstream of flocculator or into RAS flow.

4 Utility Water System - Existing in-line strainer was replaced with a 600 micron automatic self cleaning filter system.

5 Flocculation Tank - Existing flocculator was rehabilitated with rebuilt motors, FRP new mixer paddles, and baffles to accommodate the addition of alum coagulation.

6 Final Clarifiers - Existing 70-foot diameter clarifiers were upgraded with instrumentation to measure sludge blanket depth.

7 Tertiary Filtration - This new facility contains three disc filters connected with 30-inch piping in parallel, each containing 10 micron cloth media on 14 discs. Filters backwash using plant effluent based upon individual filter differential level by PLC control.

8 UV Disinfection Facility - Was created by the removal of existing ton cylinder gas chlorine system and utilization of one side of the 42,000 gallon chlorine contact tank. The ultraviolet (UV) system consists of three modules installed in series utilizing PLC control. Level control is maintained by new stainless steel weir.

9 Flume/Outfall - Existing structure was upgraded with field instrumentation that includes flow, dissolved oxygen, nitrate, and composite sampling.

10 Biosolids Drying Facility

- 10a 50 hp centrifuge rated for 80 gpm at a 2.5% solids feed rate, providing a 20% dewatered solids to the dryer.
- 10b Indirect dryer system having a 75 hp main drive motor is rated for 20 dry tons per week or 710 dry pounds per hour. Auxiliary equipment includes 30 cy live bin hopper, two 20 hp progressive cavity wet cake feed pumps, each rated for 10 gpm, cooling and discharge conveyors, dust suppression system, and PLC controls.
- 10c Thermal oil heater utilizes natural gas to provide dryer system with an evaporation rate of 2,780 pounds per hour at 90% or greater Class A biosolids product.



Fine Screen and Compactor



Pre-anoxic/Aeration Zones



Aeration/Anoxic Post-Aeration Zones



Forward Flow Aeration System



Utility Water System



Tertiary Filtration



UV Disinfection Facility



Biosolids Drying Facility Centrifuge



Biosolids Drying Facility Indirect Dryer System