LA CLEAN WATER AUTHORITY

Our Mission is to protect public health and the environment by treating the residential, commercial, and industrial wastewaters of our communities and returning clean water to the Androscoggin River.

Who we are

LACWA was created by an act of the Maine Legislature in 1967 to provide wastewater treatment services to the Cities of Lewiston and Auburn. The Clean Water Act of 1972 was championed by Maine's own Senator Edmund Muskie, at a time when the Androscoggin River was one of the top 10 polluted rivers in the country. Rather than build two separate treatment plants, one was built to service both cities. The cost was $7.4 million and was funded 85% by state and federal grants. The City of Lewiston and the Auburn Water and Sewerage District are the Authority's two customers, each handling their own collection systems and billing. The plant started operation in 1974 and was one of the first secondary wastewater treatment facilities in the State of Maine. The plant is the second largest in the state and is designed to handle an average daily sewage flow of 14.2 million gallons per day (MGD), but during wet weather, can handle up to 38 MGD. In addition to treating waste generated by the homes, businesses, schools, etc. that are connected to the sewer system, LACWA also provides septic and holding tank waste treatment services for 26 area communities. The Authority is managed by a seven-member board of directors.

Today, the Androscoggin River is a recreational destination.

Paddle After Hours with Androscoggin Land Trust

Our Process

1. **Headworks** – 3/8" bar screens remove large debris (e.g. rocks, sticks, trash, hygiene products).

2. **Grit Removal** - Dirt, small rocks, sand, and other coarse material such as egg shells are removed here.

3. **Primary Treatment** – Floatable and heavy solids are removed. The remaining liquid is the organic waste which we call "food" for the microorganisms in the secondary treatment tank.

4. **Secondary Treatment** – Naturally occurring microorganisms, under high levels of aeration, utilize waste as a food source. The more "food", the more the microorganisms reproduce, creating a biomass called "activated sludge".

5. **Secondary Clarifiers** – provide a still environment where the activated sludge will floc together and settle to the bottom, and the clean water will flow out over weirs and continue on to final treatment.

6. **Final Basin** – During chlorination season, the water is disinfected with sodium hypochlorite (and dechlorinated with sodium bisulfite) in order to kill any remaining microorganisms before being discharged to the Androscoggin River.

7. **Process Building**
   Influent pumps - take the flow that has made it to the treatment plant from gravity pipes and lifts it to a high point so that it can flow by gravity through the rest of the facility.

   Gravity Belt Thickeners (GBTs) - waste solids are thickened before being sent to the anaerobic digesters.

   Screw Presses- anaerobically digested solids are thickened and currently sent to landfill. We produce ~ 8,500 yards annually.

   Pipe Tunnel-The facility requires a lot of pumping of material, both liquids and solids, and a lot of it happens below ground to allow for better access and maintenance during cold weather.

8. **Block House / Aeration blowers** - The blowers provide the necessary oxygen for the aerobic microorganisms in secondary treatment.

9. **Anaerobic Digestion Campus**
   Digesters - as the water is treated, solids are collected (at both primary and secondary treatment), thickened, and sent to the anaerobic digesters where bacteria further utilize the organic material available. These include methane forming bacteria, called methanogens. They function without oxygen (anaerobic), and at a mesophilic temperature (body temp.), to break down the solids into water, carbon dioxide, biogas, and into 50% less biosolids. The methane they create during solids digestion is collected and used to generate electricity. These are mesophilic digesters (maintained at body temp. = ~ 98 deg. F).

Digested sludge and gas storage tank - The broken-down solids and gas produced are stored collectively in this tank.

Digester boiler room - The equipment in this room is circulating the heat from the cogens to keep them cool and the sludge in the digesters warm. The heat exchangers are tubes within tubes with hot water passed on the outside of inside tubes circulating the sludge within the digesters. The boilers serve as a back-up heat supply at times the cogens are not operating.

Digester equipment room - The digesters themselves have no equipment in them, just pipes, microorganisms, and suspended solids therefore all of the material handling is done via pumps in this room.

Cogens - utilize biogas to produce electricity & heat. Each unit is capable of 230 kW, which offsets nearly half of the power needed at the facility. At times, enough power is made to meet all facility demands and power is sent back to the grid.

Gas conditioning - removes foam, solids, hydrogen sulfide, siloxane, and moisture from biogas before boosting the pressure to a point that the cogens and/or the boilers can utilize it.

Flare - If we have more gas in the system than we can utilize, and storage of the membrane is full, we must get rid of the extra gas by burning to the environment.

10. **Septic & feedstock receiving** - We receive septage from 26 communities that are not connected to sewer systems. Feedstock is high strength organic wastes we accept to feed the digesters to generate additional biogas.

11. **Lab** - We perform tests daily which help us meet regulations. We use the data that are developed to determine what adjustments we need to make with our equipment and process.

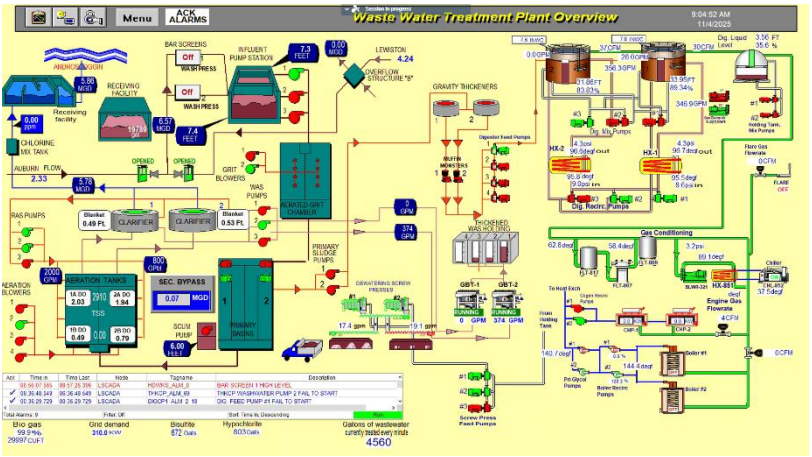
How Does it All Work?

- Redundancy – We have to be operational at all times, with a maximum shut down time of 20 minutes, which is why we have two treatment trains and multiple pumps and equipment for each step in the process.

- Automation – we rely on PLCs, networks, instrumentation, and automation. SCADA allows for continuous and remote monitoring. There is always a Plant Operator on-call to respond to any alarm situation.

- Preventative maintenance – Asset Management program, Capital Improvement Plan (CIP), and a Reserve for Replacement account all help us best position the plant for needed repairs, replacements, and upgrades.

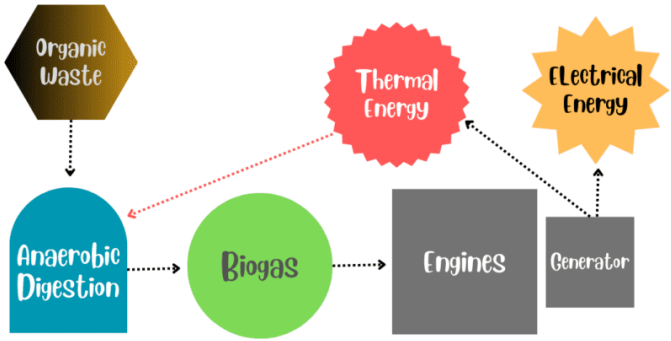
- Continuity of Operations – Ensure that multiple staff members are trained to carry out critical plant operations.



Supervisory Control and Data Acquisition (SCADA) main screen

Energy

- Wastewater treatment is very energy intense. LACWA utilizes over 3 million kwh annually.
- Member of Power Options, participate in demand response programs, have installed demand reduction controls to shut off all non-essential equipment during peak power periods in an attempt to minimize capacity tags.
- Numerous energy projects such as:
  - Entire facility converted to CFL and now LED.
  - Updated all major HVAC Between 2010 and 2020 with newer efficient units and controls.
  - Numerous insulated panels, windows and doors installed.
  - Modified numerous operational processes for energy efficiency purposes.
  - Utilize final effluent in many processes throughout the facility instead of city water.



We utilize the biogas from our anaerobic digestion process in our co-generation units to produce an annual average of 1.75 million kW's. This is enough to power the equivalent of approximately 267 Maine households, and enough waste heat (we capture & utilize) to provide heating to the equivalent of 78 Maine households.

Did You Know?

The water entering the plant is 99% water and just 1% waste. The process removes over 90% of the organic pollutants in that 1% of waste, making the water discharged much cleaner than the water flowing down the river past us. We take great pride in the service we provide to the environment, human health, and the citizens of Lewiston and Auburn.

Traditional treatment plants are only designed to remove organic wastes. We regulate local industries to ensure they are not discharging unauthorized, and potentially toxic, material into the sewers that could pass through to the river.

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