

Minutes
May 1, 2015

The Wastewater Advisory Committee to the MWRA met at the Clinton Wastewater Treatment Plant for a tour

Attendees/Contributors:

WAC: Stephen Greene (chair), Taber Keally (vice-chair), Mary Adelstein, Craig Allen, Karen Lachmayr, Beth Miller,

Guests: Wendy Leo (MWRA), Bob Gorham (MWRA, Clinton plant superintendent), Terry Flynn, Karen Cortes, Ibrahim Dayib (MWRA), Kurt Tamposch (WSCAC), Paul Brinkman

Staff: Andreae Downs (WAC),

FUTURE MEETING DATES/TOPICS

NEXT: June 5, MAPC, WAC year-end planning, highlights

VOTE: April 15 minutes approved.

Tour: Bob Gorham welcomed the WAC to Clinton, and shared the following about the plant:

- The Clinton plant was founded as part of reimbursement to the town of Clinton for land taken for the Wachusett Reservoir. Clinton gets free water & sewer in perpetuity
- The South Branch of the Nashua River starts at the Reservoir, which is required to discharge a minimum of 4 million gallons/day.
- The plant capacity is 12m gallons/day, but it is permitted for 3.01 mgd—this, however, is a 12 month daily average.
- On average, the plant treats 2.6mgd—90% of that is from Clinton. Lancaster is the remainder. But Lancaster is expanding their sewer district.
- The plant produces about 1 dry ton/day of solids.
- The original plant dated from 1898. The original building is still there:



- The plant was modernized in 1956—the primary clarifiers, 60-foot trickling filters, anaerobic digesters date from them. The primary clarifiers are undergoing refurbishment which includes replacement of the upper four feet of concrete and a new flight and chain sludge scraper system. The digesters are being renovated also.
- The rest of the plant is mostly from 1992—and a new 2600 sf phosphorus removal system is at 100% design.

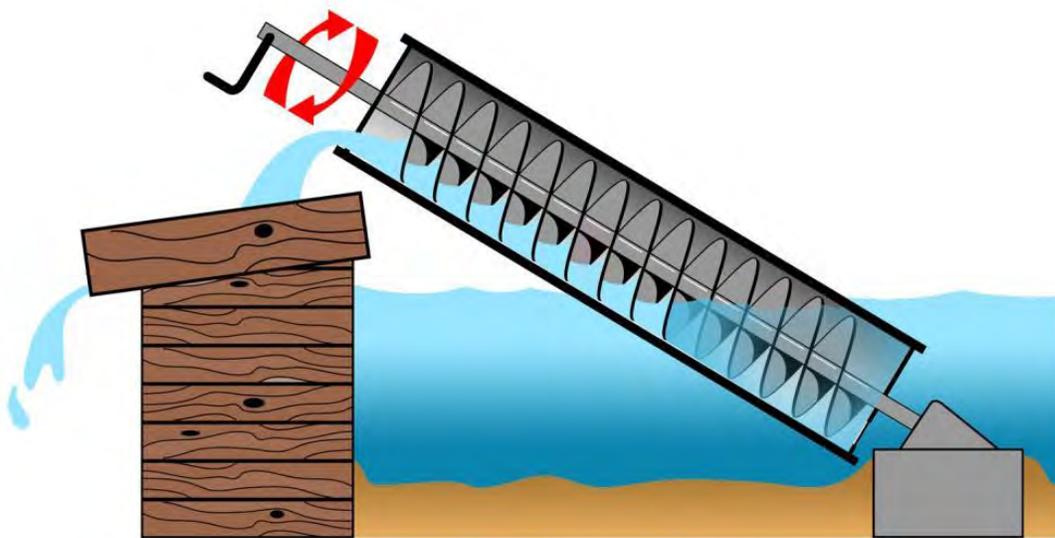
The plant receives flow via the influent flume, shown below:



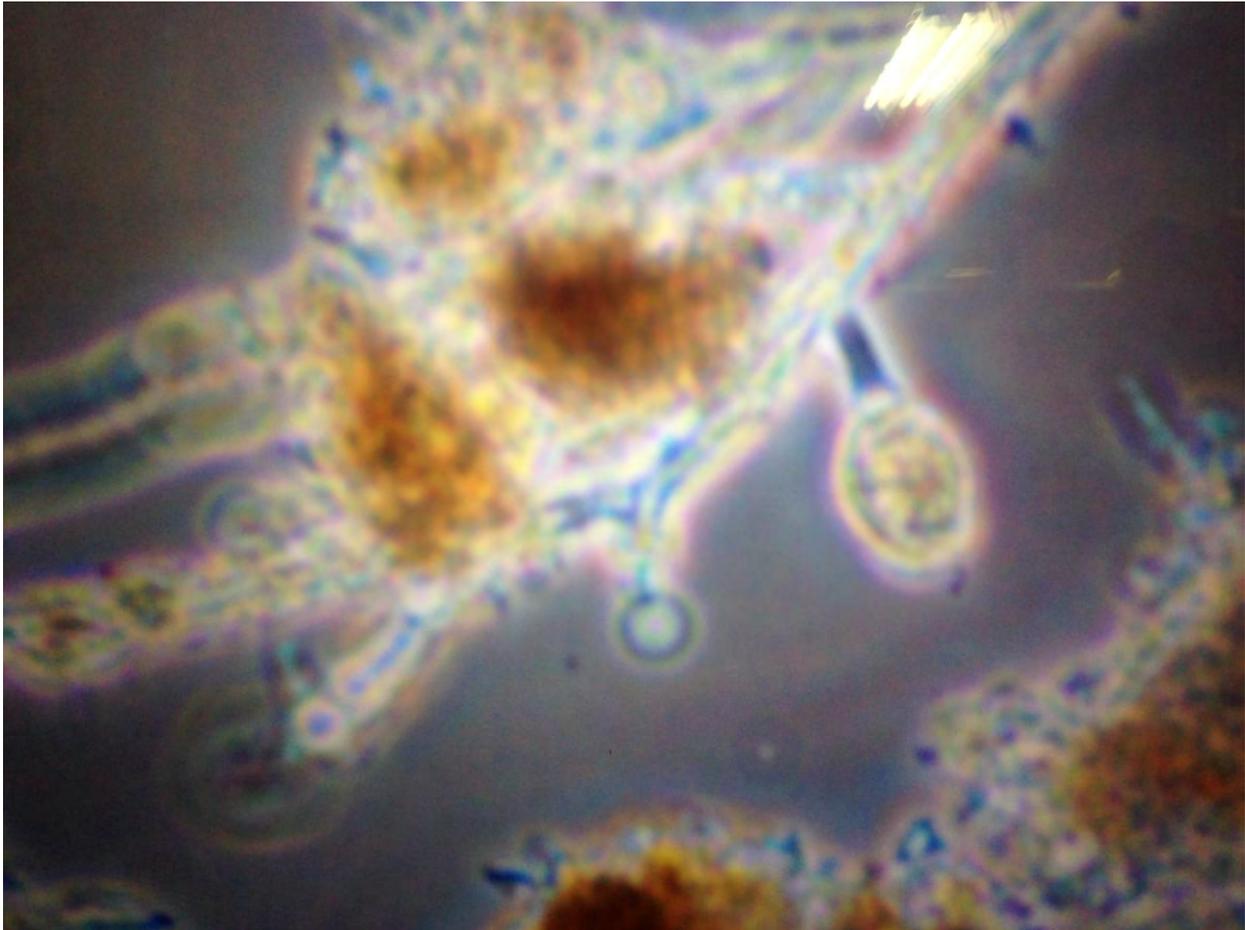
It is then lifted by the influent lift pumps to the headworks.



(Influent screw-lift pumps. These remain about a third full of water even when off)



The influent then goes to the aerated grit tanks and primary clarifiers for settling and skimming. Water then is sent to the trickling filters, which include rocks and a bacterial zoogeal film that further purifies the water. These work well in warm weather, less well in colder weather. The water then goes to aeration tanks, where *Nitrosomonas* bacteria convert ammonia to nitrite and *Nitrobacter* convert nitrite to nitrate in about 8-10 days.
(http://water.me.vccs.edu/courses/env211/lesson21_print.htm)



(The bacterial workers, stalked ciliates, shown in a microscope in the plant)

The water then enters the final clarifiers, where more sludge is settled out:



(Final Clarifiers)

Ferric chloride is added to remove phosphorus. The newer phosphorus process, which is designed but not built yet, will operate in the 7 warmest months of the year to achieve an even lower phosphorus level to meet EPA guidelines (now at 1.0, in the new system 0.15 mg/L). A final chlorination & dechlorination, and the water then flows to the South Branch of the Nashua.



(the final product—clean water)

Sludge Treatment:

Solids are recovered in several of the water treatment processes. These are pumped to two gravity thickeners, then to two 263,000 gallon anaerobic digesters, which will reduce the sludge volume and produce methane as a byproduct. This methane is about enough to heat the digesters and one other building. While there isn't enough to produce excess power, Gorham and his crew are looking at new technologies for digester gas. Co-digestion is a possible option.

The digested solids are de-watered in a belt-filter press, and then landfilled. The landfill has 13-14 years to reach capacity, but MWRA owns three (in total) in that part of the state.

Questions: How vulnerable is the plant to flooding and high water?

A: in 2010 the river flooded up to the trickling tanks, but the plant was still able to discharge 12 mg of treated effluent. Did have to pump extra onto the road. Part of the issue may have been a collapsed underdrain in Clinton that may have come to the sewer, or the Town may have opened a manhole, but all of a sudden there was a rush of water.

Q: What resilience changes will the plant need for 9-11" storms?

A: We are in the process of installing a floodgate for the influent channel, which can go to the top of the wall. This will cause excess flows to overflow onto the road instead of flooding the plant—protecting the assets. A 1992 slurry wall has so far kept the river out of the plant, but if it overflows its banks, there's not much we can do. Already the electric rooms are in a room above the high river elevations.

The plant also has 2 generators and a tank that holds 6,000 gallons of diesel. Usually keep enough on hand to run for a month without electricity.