WHERE DOES THE WATER GO?

Collection: People probably don't think too much about what happens to the wastewater that goes down the drains in their homes, work places, or schools, after they wash, flush, or rinse something off. That water (and whatever else may be carried with it) is in for quite an interesting journey.

When a dishwasher is running somewhere in Wauconda, the water and food remnants go down the drain and are on their way to Wauconda's Water Reclamation Facility. In most cases, the water leaving the dishwasher will pass through the plumbing of the owner's house and into a service line that takes it from the property into one of Wauconda's many sewer mains. The Village utilizes sixty miles of sewer line to deliver the wastewater that is generated by residents and businesses in town to the Water Reclamation Facility. On its way, it will flow by gravity through slightly pitched sewer lines and may be pumped by any number of the Village's eighteen lift stations. These lift stations pump up to 124,000 gallons of water each day to push wastewater from a low-lying region to a higher elevation where it can flow by gravity the rest of the way to the Reclamation Facility. Of course, once at the facility, the water will be treated and re-released into the environment.

Preliminary Treatment: Upon entering the Water Reclamation Facility, the water flows into two different systems, one being the older portion of the Reclamation Facility that was built in 1984, and the other being the recent expansion that was completed in 2008. Each system utilizes a different method of treatment to remove waste from the water. However, in both systems, the initial steps are pretty much the same. The first stage of treatment is grit removal. 'Grit' is primarily made up of eggshells, coffee grounds, and inorganic debris such as sand and gravel. Articles of this nature can cause abrasive wear on our Facility's pumps and other critical equipment and will not break down in the treatment process, so they are removed as early as possible in the treatment process. Once collected, grit is deposited in a dumpster and hauled away much like household garbage. The next stage in the early treatment process is screening. Screening is the removal of rags, paper, foodstuffs, and other material in the waste stream. During this process, wastewater is forced to flow though a screener that collects all of these items and sends them away with the collected grit. Both systems at the Reclamation Facility utilize these two methods which are collectively known as 'preliminary treatment'. The next stage in the process is called 'primary treatment'.

Primary Treatment: Primary treatment is completed in our primary clarifiers where the flow of the wastewaters into the facility is purposely slowed. As the wastewater gently flows through these large rectangular tanks, clearer water flows over the top edge of the tank and on to secondary treatment, while solids settle out to the bottom where they are collected and sent to the digestion portion of the treatment process. Digestion is the treatment of solids in wastewater. These solids are pumped to a large tank called a digester where air is forced to the bottom of the tank and naturally rises to the surface. The air serves two purposes, the first is to mix the contents of the tank and provide circulation, and the second is to provide oxygen to the bacteria that breakdown the solids. Once these solids have been broken down to meet Illinois EPA and USEPA standards, they are pumped to an underground storage tank. When the tank is full, the Village contracts with an outside company to remove these solids and they are transported to farm fields to be used as fertilizer for crops.

Secondary Treatment: Once the waste water has passed through preliminary and primary treatment at Wauconda's Water Reclamation Facility, the wastewater is headed to the heart of the operation, 'secondary treatment'. In Wauconda, we utilize two different processes for secondary treatment. The first uses trickling filters (the two large, round towers that can be seen at the Public Works facility on Slocum Lake Road). The second process is called 'activated sludge'. The use of activated sludge was

made available to us with the recent plant expansion. Each of these processes can effectively treat wastewater to a high degree, but each goes about it in slightly different ways.

The trickling filter towers are filled with a plastic media that resembles large blocks of plastic honeycomb stacked on top of each other-reaching all the way to the top of the tower. Wastewater enters the trickle towers through a device on the ceiling that resembles a giant sprinkler-head. This sprinkler distributes the water very evenly over the media, where the real water-cleaning action takes place. The honeycomb design of the media provides enormous surface area for the development of a slime growth of hungry microorganisms. As the wastewater trickles down over this slime, the microorganisms snatch all the nutrients (waste) out of the water as it passes by, cleaning the water in the process.

The activated sludge removes nutrients as well, but there is no media involved. The activated sludge takes place in large tanks similar to the digesters that were previously discussed. Air is forced to the bottom of the tank, and as it rises to the surface, it mixes the tank, and more importantly, provides oxygen to the microorganisms living in the water. The microorganisms in activated sludge live in tiny colonies on particles of solids floating in the wastewater. After these microorganisms have broken down the nutrients in the wastewater, they are separated from the cleaned water and are then recycled through the facility and are used to begin breaking down more nutrients.

Final Treatment: Our water is now on its way to 'secondary clarification', 'filtration', and 'disinfection'. These are the last stages of the treatment process at our facility.

Secondary clarification is a relatively simple process. After the water has passed through either the activated sludge or trickling filter process, it is still carrying a fair amount of solids. Secondary clarification is where most of these solids are removed. The water is pumped into a large circular tank that has a long detention time. This slow-down of the water flow allows the solids being carried in the water to settle out and be collected. At this point, the water, having left most of the solids behind, is on its way to the filtration process.

Filtration takes place in a large rectangular tank called a sand filter. As the water flows into this tank, it must pass through a bed of sand on the bottom of the tank before it can exit through specialized pipes below the tank. The sand catches any fine particulate solids that may still remain in the water before it leaves the facility. The water is not quite ready to leave the facility yet. It still has one last step to go.

At our facility, the final step in the process is to disinfect the water with UV (ultraviolet) light. UV light has the ability to penetrate individual pathogenic (disease causing) microorganisms' cells and scramble their DNA. Once the DNA has been destroyed, the cell is dead and it can no longer reproduce or continue to function. The disinfection process takes place in a narrow trough where the water passes over rows of UV lamps submerged in the water before exiting the facility. Under normal conditions, this disinfection process takes approximately 10-15 seconds.

Finally, after having gone through the numerous stages of treatment at the facility, it is time to return the water to the environment. About 24 hours after initially arriving at the reclamation facility, the treated water is discharged into Fiddle Creek, where it will eventually wind its way to the Fox River.

A small percentage of that newly released water will eventually be used again, and end up going down someone else's drain to begin the process anew.