

# Water Reclamation

When water enters a wastewater plant it is referred to as influent, this water is gray in color and has a musty/rotten egg odor. We refer to the first stage of treatment as the headworks, this is where the trash gets removed. Bar screens as the name implies are pieces of metal closely spaced to catch things that don't belong in the toilet. This trash builds up on the bar screen until the level in the channel begins to rise. Once the water reaches a certain level, a sensor trips and causes the bar screen to shift to raise the trash above the water level exposing a clean section of screen. It looks and behaves very similar to an escalator. The next stage in the headworks is the removal of detritus or grit. This is comprised of egg shells, coffee grounds, and other sandy substances. At this stage the water is slowed down in a clarifier to allow the grit to settle to the bottom. A pipe in the bottom of the clarifier allows this grit slurry to be pumped to a classifier where the grit is removed from the liquid.

Next the water travels to the Sequencing Batch Reactor(SBR) which essentially is a large concrete tank where nutrients in wastewater are broken down biologically. We use microorganisms to stabilize the various forms of nitrogen found in wastewater and take in phosphorous. Water is treated in batches within these tanks so that the water is fully processed before leaving the tank. Each batch is comprised of various stages in the treatment, some of the stages require oxygen to be added while others do not. When the batch is complete the solids settle to the bottom and the now clear liquid is decanted off the top.

From this point we add a chemical mixture known as Poly-Aluminum Chloride (PAC) this chemical aids in the removal of phosphorous and solids that are still present. This chemical is mixed in at a high rate of speed to ensure its distribution is uniform throughout the tank. The PAC is attracted to the remaining colloidal and suspended solids and thus stick to them until they become so heavy that they settle at the bottom of the next tank. In order to make the chemical stick to as many contaminants as possible the water is gradually slowed down in the proceeding tanks until the water reaches a complete stop. The now even cleaner water is decanted and travels to a filter comprised of sand. In this stage the water is forced through the sand removing any remaining impurities in the water.

Finally, the water travels to a bank of ultraviolet (UV) lights for disinfection. The UV light penetrates the cell walls of any bacteria or viruses that may still be present in the wastewater, thus damaging the DNA and RNA. This damage to the cells make it impossible for the organism to reproduce so it dies shortly thereafter.