FROM FLUSH TO FINISH

A SUMMARY OF WASTEWATER TREATMENT

- Once Water is used in households and businesses it is discharged to The City's network of piping and 72 lift stations.
- Wastewater is over 90% dirty water from showering, laundry, food preparation and dishwashing.
- Lift stations and the extensive piping network are critical pieces of infrastructure that convey Wastewater throughout the City miles from the origin to the Wastewater plants, Where the Treatment begins.

COLLECTIONS

INFLUENT WASTEWATER

- The Headworks is the pretreatment process where Influent or Untreated Wastewater enters the facility from the Collections system.
- Pictured are the Screening and Grit removal processes, this equipment removes large debris such as Rags and heavier material such as sand from the wastewater, preventing downstream clogging of pumps and equipment.
- Once Pretreatment is completed, Wastewater is pumped to the Aeration basin where the wastewater is introduced to the "Bugs".

AERATION BASIN: WHERE THE "BUGS" LIVE

Biological treatment of the wastes begins in our Aeration Basin where our "bugs" stabilize the wastes by converting them into simpler compounds.

- As Operators, we create the right conditions for our bugs to thrive, controlling many process and seasonal variables so optimum treatment is achieved.
- Pictured is an Aerator, this introduces oxygen into the basin for the bacteria to consume.
- By providing the right conditions we Culture bacteria to treat a variety of harsh pollutants giving them a stable food source, adequate time, and air for complete stabilization to occur.

WHAT THE "BUGS" DO

- The bugs need oxygen to survive and reproduce just like we do. We add air and give them enough time to "eat" the wastes.
- The microorganisms we develop becomes a culture of bacteria, what is known as activated sludge. We monitor the population frequently using a microscope to determine changes in the process.
- In the operation of the plant we concentrate this sludge and some of it is removed from the process to maintain balance in the system and the remaining is recycled and goes back to the beginning of the treatment process to treat more wastes.
- The microorganisms we utilize exist in natural systems such as lakes, ponds, and river beds.
- In the Wastewater process we accelerate the treatment of harsh compounds, that would otherwise take months or years in nature to stabilize, to a much shorter time of days/weeks so water can be returned sooner to the environment for beneficial recharge to our aquifers.

- Below are 2 of the most desirable "bugs" that we call indicator organisms, that consume the excess bacteria treating the wastes.
- The larger microorganism in the left of the video is known as a Rotifer.
- The microorganism to the right is a Stalked Ciliate these organisms draw the bacteria towards its mouth to consume.

Clarification

- Once the Wastewater has completed treatment in the Aeration basin, Flow is sent to sedimentation tanks, known as Clarifiers.
- These tanks allow us to let gravity do the work of separating the activated sludge from the treated water allowing compaction and sludge removal, before being sent to the next steps, solids disposal and the disinfection process.

- Pictured below from Left to Right is the Treatment steps from Raw Influent to the Treated Effluent.

Solids Disposal

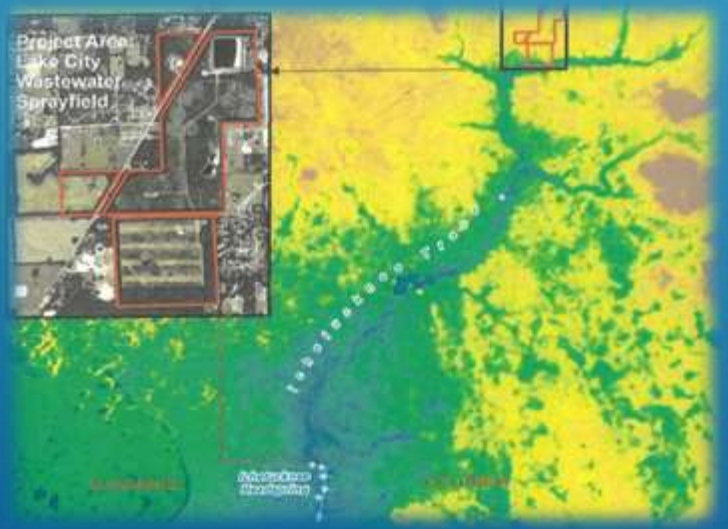
- After treatment, a portion of the solids that are removed from the system daily, are further stabilized in our digesters.
- We further concentrate the solid material where a gallon can spend an additional 15-20 days before final disposal.
- The solids are then thickened by a centrifuge to remove even more water and recapture the solids. We try and achieve the driest possible solids to reduce hauling costs.
- The solids are then applied to designated state approved sites or landfilled.

DISINFECTION

- Once leaving Clarification the Wastewater is disinfected using Sodium hypochlorite (bleach) to kill any pathogens and microbes that could cause diseases or harm the environment.
- After spending adequate time in the chambers, the Wastewater is then sent to our Spray fields/Wetlands to be reintroduced into the environment for final treatment.

Wetlands: where the water is disposed of

- Once the Wastewater leaves the plant, we pump it over 7 miles to the Treatment Wetlands, where specific plants are utilized to aid in further removal of Nitrogen and Phosphorus, protecting our Springs and waterways we all enjoy!
- The Wetland is a 120 acre site that is monitored and sampled frequently to ensure compliance with state regulations before discharge.
- Most of the water is absorbed into the aquifer for beneficial recharge and some is evaporated through the leaves of the plants.
- Look out for ALLIGATORS!!!



Florida's Natural Wonder: Our Springs

- Many do not know that North Florida is home to the largest concentration of 1st magnitude springs (greater than 64 MGD flows) not only in the U.S. but in the World.
- In efforts to protect these springs, The state of Florida has a multitude of projects designed to reduce impacts to our springs, protecting minimum flow levels and nutrients in the BMAP(s) zones.
- In closing, many Wastewater operators have the view of being environmental stewards, doing our part to protect our natural resources, and ensuring human activities do not affect our waterways for years and generations to come.