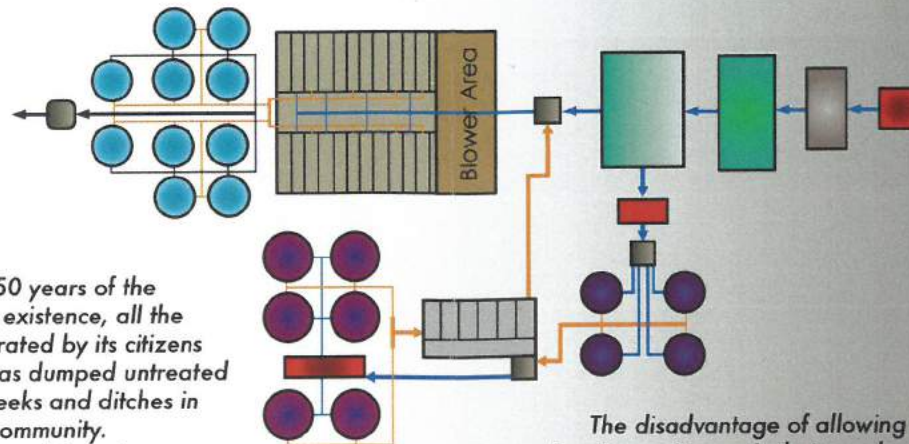


City of Memphis



City of Memphis
Division of Public Works
T. E. Maxson
Wastewater Treatment Facility
2685 Steam Plant Rd
Memphis, Tennessee 38109
Phone: (901) 789-0510

T. E. Maxson Wastewater Treatment Plant



During the first 150 years of the City of Memphis' existence, all the wastewater generated by its citizens and businesses was dumped untreated into the rivers, creeks and ditches in and around the community.

This was in fact one of the primary causes of the famous yellow fever epidemic of 1878.

It was not until 1975 that the first attempt was made to treat a portion of the city's wastewater. In August of 1975 construction was completed on the T.E. Maxson Treatment Facility and it began operations.

Named after former City Engineer Thomas E. Maxson this plant now serves a population of over 300,000 people in the southern half of the city and county. The people, businesses, and industries in this area, which basically includes everything south of Poplar Avenue, generate approximately 72 million gallons of wastewater each day (MGD).

If nature were left to treat this wastewater in its own natural way then the organic portion of the wastewater would be naturally decomposed through an aerobic process and/or an anaerobic process. With an aerobic degradation process, free oxygen is used by certain types of bacteria and other microorganisms to maintain their activity as they utilize the organic waste as a food source. This is a comparatively rapid degradation process, requiring from just a few hours up to several days, and is characterized by a lack of obnoxious odors.

The anaerobic degradation process, on the other hand, utilizes a different group of microorganisms that thrive where no free oxygen exists. The anaerobic organisms also utilize the organic portion of sewage as a food source but the degradation of the organic particles will require at least several days and possibly several years. Furthermore, this process is characterized by unpleasant odors.

The disadvantage of allowing nature to treat wastewater on its own is that man has a tendency to discharge more sewage into a lake, stream or river than it can treat aerobically. Nature is continually dissolving free oxygen from the atmosphere into a body of water with the help of waves or turbulence. The living animals in the water, such as fish and microorganisms, must be able to utilize this oxygen in order to live. If too much sewage is discharged into a stream then the microorganisms will use the dissolved oxygen is gone, then the anaerobic organisms will take over. The aerobic organisms, as well as fish and other aquatic life that depend on free oxygen, will die and the body of water will turn black and begin to emit a foul odor.

In order to avoid this type of stream deterioration a treatment plant must maintain a controlled aerobic or anaerobic degradation process that will remove almost all of the organic matter from the wastewater before it is discharged into a stream. The Maxson Treatment Facility employs both physical removal and aerobic degradation of the pollutants in the wastewater. The total amount of time required to complete this treatment process is about twelve hours.

The pollutants in the wastewater are measured in terms of Biochemical Oxygen Demand, otherwise known as BOD, and Total Suspended Solids, abbreviated as TSS. BOD is a measurement of the amount of free oxygen that would be consumed in the normal degradation process. TSS is simply a measurement of the concentration of both organic and inorganic particles within the sewage. The wastewater that enters the Maxson Plant usually brings with it over 500,000 lbs. of BOD and approximately 350,000 lbs. of TSS each day. It is interesting to note that over 50% of the BOD and 35% of the TSS originates from local industries while only about 25% of the wastewater flow can be attributed to industries.

1

The interceptor sewer is approximately forty feet below ground level when it enters the plant site. The sewage is forced to flow through bar screens designed to remove large objects that might damage downstream pumps and equipment. Influent sewage is pumped with capacity to reach 160 MGD.

After the influent pumps lift the wastewater, the sewage flows through grit tanks. Grit tanks are designed to physically remove only the heaviest particles from the waste stream, such as sand. The grit removed in these tanks is placed into trucks and hauled to a local landfill along with debris removed by the bar screens.

2



The addition of fine bar screens in 2013 served to remove fibrous and plastic material from the waste stream. The fine screens, with openings of 3/8", remove those objects that clog pipes, then remove 80 percent of the water content, preparing waste for disposal in a sanitary landfill.

3



The primary clarifier effluent flows by gravity to the ABF (Activated Biological Filter) Tower Pump Station. The four ABF towers represent the first stage of the biological treatment process. The pump station lifts a mixture of primary clarified effluent and thousands of pounds of microorganisms, recycled from the secondary clarifiers, to the top of the ABF towers. A rotary distributor sprays the liquid over the surface over the surface of each tower and it trickles through 21 feet of wooden slats. Each slat is covered by a growth of microorganisms. These organisms, both in the liquid mixture and attached to the wooden slats, eat the organic pollutants in the wastewater.

5



Once the sewage/microorganism mixture reaches the bottom of the ABF towers it flows by gravity to a screw pump station. The Archimedes screws lift the liquid up to a level, which will allow it to flow by gravity through the remainder of the treatment process.

6



7

The next step in the treatment is a group of tanks in which the sewage/microorganism mixture is held for several hours. These tanks are called contact tanks. Huge blowers constantly force air through diffusers in the bottom of the contact tanks. This creates an ideal aerobic environment suited for the completion of the rapid biological degradation of the organic portion of the sewage.



8

Wastewater flows by gravity to four primary clarifiers. Gravity and a long detention time are used to remove 50 to 60 percent of the influent TSS and 10 to 15 percent of the influent BOD. The BOD and solids, which settle to the bottom of the primary clarifiers, are called primary sludge. All primary sludge is pumped to the primary sludge dewatering facility, which is the first step of sludge disposal process.

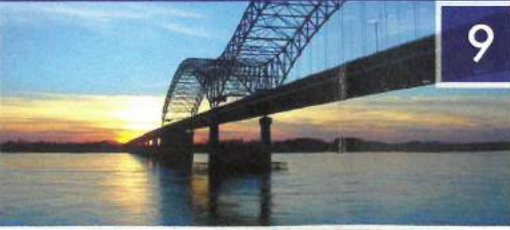
4



Then the liquid stream flows to the secondary clarifiers. The microorganisms settle to the bottom of the clarifiers while the clear, sparkling effluent overflows the clarifiers on the surface.

The effluent is then discharged directly into the Mississippi River. By this time over 95% of the original BOD and TSS has been removed from the waste stream.

9



T.E. Maxson Wastewater Treatment Plant