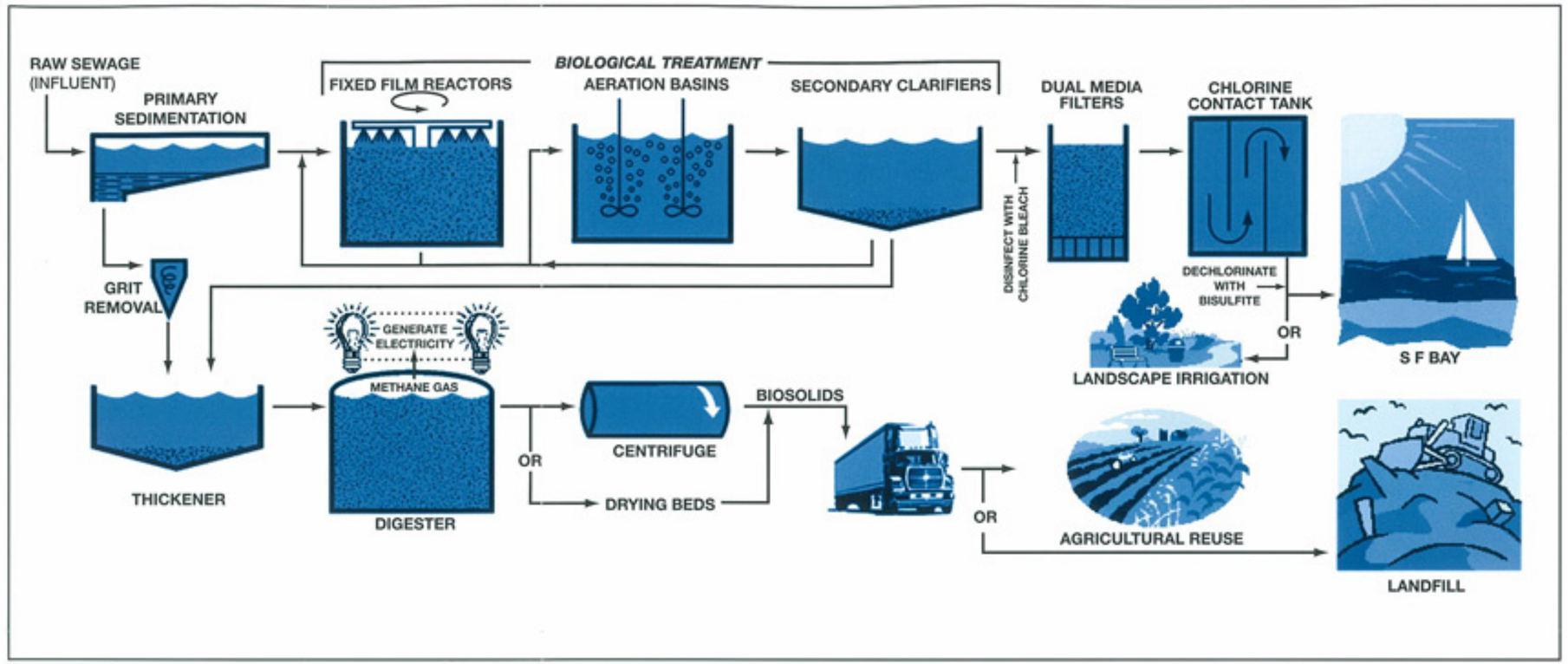
How the SBSA Wastewater Treatment Plant Works

Wastewater treatment is one of the "hidden" necessities of life on the Peninsula. The SBSA serves more than 200,000 people and businesses in our service area. By effectively treating wastewater at an advanced, two-stage biological treatment facility, the SBSA helps keep San Francisco Bay environmentally clean and safe. The treatment plant uses bacteria to remove organic material and toxins from the wastewater it treats. Sewage arrives at the plant through a series of pipelines and pump stations. The sewage then passes through physical and biological processes which result in high quality effluent being discharged to the deep water channel of the San Francisco Bay. The SBSA facility is designed to remove more than 97 percent of all solids, organic material and pathogens from the wastewater.



Primary sedimentation. The wastewater slowly flows through the primary sedimentation tanks where settling and skimming removes solids, floating grease and scum.

Fixed film reactors. The fixed film reactors are the first stage of the biological treatment. Wastewater is pumped to the top of the fixed film reactors where bacteria on the reactors consume most of the organic matter in the wastewater.

Activated sludge. The second stage of the biological treatment process is activated sludge. The microorganisms and the biodegradable matter they consume are collectively called "activated sludge." Air is continuously mixed into the wastewater and activated sludge which provides oxygen for the microorganisms to grow and consume the remaining biodegradable matter. This occurs in the aeration basin.

Secondary clarifiers. The activated sludge flows to the secondary clarifiers for final settling to separate the activated sludge from the wastewater. The activated sludge is sent back and reused at the aeration basins. At this point in the treatment process about 90% to 95% of the solids and biodegradable matter has been removed from the wastewater.

Disinfection. Chlorine bleach (sodium hypochlorite) is applied to the secondary clarifier effluent. The chlorine kills nearly all remaining bacteria.

Final filtration. The dual media filters have two layers, sand and anthracite coal, through which the secondary effluent flows to remove most of the remaining suspended particles.

Recycled water. During the dry season SBSA further treats some of the plant flow with coagulation and higher disinfection for use as recycled water for landscape irrigation in the SBSA service area.

Sludge thickening. Most of the solids collected by the primary tanks and some of the solids collected by the secondary clarifiers are sent to the sludge thickeners. This process further thickens the solids, reducing its volume in order that the next process, anaerobic digestion, can operate more efficiently.

Anaerobic digestion. Anaerobic (absence of oxygen) digestion is a two-stage biological process first converting large organic compounds to organic acids, and then converting these to carbon dioxide and methane. The process reduces solids volume, stabilizes the solids reducing the chance of odor, and reduces pathogens. The finished product is called biosolids. The methane gas is used to produce some of the electricity needed to run the plant's equipment, and for process and building heating.

Centrifuge and drying beds (dewatering). Much of the water in the biosolids is removed by either centrifuge or drying beds. For centrifuge operations, a polymer solution is added to aid the separation of solids from water. The liquid biosolids is passed through the centrifuge, leaving the dewatered biosolids. Another option used for dewatering is drying beds. Nature does the work of dewatering the biosolids, using sun and wind. This reduces the cost of operation. The biosolids have a high nitrogen content and can be used as an agricultural soil conditioner, a feed stock for composting, or disposal in a landfill.