

APPENDIX A

WPCP Schematic Flow Diagram

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HEADWORKS

The inlet control and overflow structures route sewage to Headworks 1 or Headworks 2, both of which are equipped with large bar screens to remove debris (e.g., rags, sticks, and rocks) that could clog machinery. After passing through the bar screens, flow enters the grit removal systems, which mechanically separate grit from water and organic matter. Grit and debris are trucked to a landfill.

PRIMARY TREATMENT

Influent is pumped from the Headworks to settling tanks (referred to as the East and West Primaries) where larger particles (solids) are settled out of the wastewater over a 1.7-hour period, resulting in the removal of about 50 percent of contaminants. Within each tank, fiberglass bars called "flights" skim fats, oils and grease (scum) off the surface of the liquid and gradually rotate to the bottom of the tank. Settled solids are conveyed to the digesters. To reduce peak flows between primary and secondary treatment, plant operators pump primary effluent to the Primary Effluent Equalization Basin for temporary storage.

SECONDARY TREATMENT

Primary effluent is pumped to one of two biological nutrient removal (BNR) systems to remove biological oxygen demand, suspended solids, and some dissolved solids through a biological conversion of these materials into settleable forms. Each BNR system consists of aeration tanks and clarifiers:

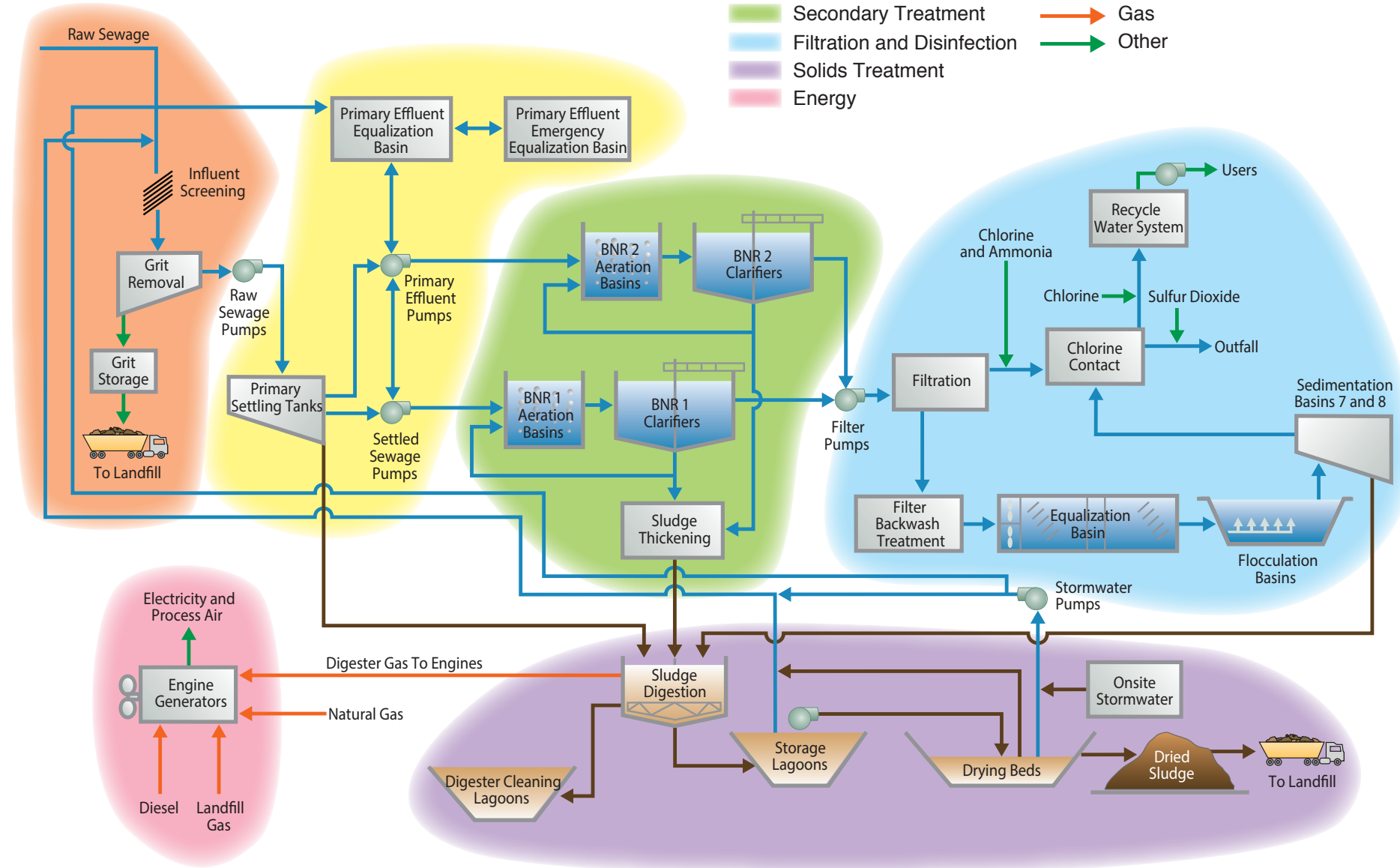
- In the **aeration tanks**, air is pumped into the flow; the oxygen-rich environment nurtures the growth of naturally occurring aerobic bacteria that remove organic pollutants in the water by attaching to suspended solids in the wastewater through flocculation.
- After aeration, the effluent is piped into **clarifiers** where the aerobic bacteria settle to the bottom. Vacuum-like rotating collectors withdraw the settled sludge, some of which is returned to the aeration tank to assist with treatment.

ENERGY

The WPCP uses digester gas (composed primarily of methane and carbon dioxide), landfill gas from nearby Newby Island Sanitary Landfill, and natural gas from Pacific Gas and Electric to meet the Plant's heat and power needs. The Plant's cogeneration system produces electricity and heat that is recovered and used for the digesters. Most of the energy consumed at the WPCP is for pumping and aeration (secondary treatment), which uses a combination of electric- and gas-driven blowers.

Legend

Process Area	Material
Headworks	Wastewater/Treated Water
Primary Treatment	Solids
Secondary Treatment	Gas
Filtration and Disinfection	Other
Solids Treatment	
Energy	



FILTRATION AND DISINFECTION

Filtration (or tertiary treatment) involves passing secondary effluent through filters containing layers of silica gravel, silica sand, and anthracite coal supported by an under-drain. The filters provide additional removal of biological oxygen demand and suspended solids.

Disinfection. Water treatment chemicals used in the disinfection process (chlorine and ammonia) are added to the filtered water, which drains into chlorine contact tanks beneath the filters. The chlorine contact tanks provide disinfection contact time between free chlorine (sodium hypochlorite) and water, and allows for additional removal of organics through sedimentation. Filtered disinfected water goes to the outfall at Artesian Slough or is diverted to the South Bay Water Recycling System.

Filter Backwash Treatment. The filters are periodically backwashed to flush out particles and prevent the filters from clogging. The filter backwash undergoes flocculation and sedimentation, whereby smaller particles combine into larger particles are settled out.

SOLIDS TREATMENT

Digestion. Solids are pumped to digester tanks (sludge from the BNR systems undergoes a thickening step first). The digesters use a biological process that relies on anaerobic bacteria to reduce volatile solids (which are converted to digester gas) and kill pathogens. Each digester consists of a cover, gas mixing system and pumped heating loops, which transfer heat to the sludge to enhance the process.

Residual Solids Management. After 25 to 30 days digested sludge is pumped to clay-lined storage lagoons for further stabilization and capped with water for odor control. After 3 years settled solids are dredged, pumped into drying beds and actively dried for up to 6 months. The dried "biosolids" are trucked to the landfill for use as daily cover.