

South Treatment Plant Facts (2013)

Technical Facts and Information about Wastewater Treatment Processes

1200 Monster Rd S.W.
Renton, WA 98057

Design Basis

- Average Dry Weather Flow (ADWF): 96 mgd
- Average Wet Weather Flow (AWWF): 115 mgd
- Peak Hourly or Wet Weather Flow (PWWF): 325 mgd
- 152 square mile service area includes 32 individual sewer jurisdictions.

Influent Pumping:

- 6 non-clog centrifugal pumps; 4 @ 100 mgd, 1 @ 62.5 mgd, and 1 @ 37.5 mgd
- "Firm" capacity: 390mgd (largest pump out of service)

Influent Screens

- Bar Screens: Eight mechanically cleaned screens each 6'W x 15'H; 2 with 0.75" bar spacing, 2 with 0.44" bar spacing, 4 with 0.375" bar spacing
- Screenings Transfer Pumps: Three non-clog centrifugal pumps 300gpm
- Screenings Dewatering Equipment: 3 rotary screw pumps 3,700gpm

Grit Removal, also known as *Pre-aeration*

- Pre-aeration Tanks: 3 total; 2 tanks @ 28.75'W x 125'L x 15'D; 1 tank @ 28.67'W x 117.5'L x 16'D; average design detention time 15.2 min each.
- Pre-aeration blowers: 2 turbo blowers each rated 100hp @ 2,200cfm
- Grit Pumps: 17 recessed-impeller pumps each rated 200 gpm @ 10hp (12 ea) and 15hp (5 ea)

Primary Sedimentation

- Sedimentation Tanks: 12 total; 8 South, 4 North; 34'W x 164'L x 9.5'D each.
- Raw Sludge Pumps: 12 recessed-impeller pumps each rated 250 gpm @ 20 hp.
- Scum Pumps: 6 total; 4 progressive-cavity pumps each rated 7.5hp @ 45gpm and 2 recessed-impeller pumps each rated 20hp @ 250gpm.
- Primary Treatment Removals (2013): 62% Suspended Solids removed and 43% BOD removed

Secondary Air Activated Sludge

- Aeration Tanks: 4 total @ 4.28MG each; 4 passes per tank each 30'W x 317.5'L x 15'D.
- Aeration Blowers: 7 total
 - ◇ 4 – "Turblex" single-stage mixed-flow blowers each rated 1,000hp @ 23,300cfm
 - ◇ 1 – "Hoffman" multi-staged blower rated 1,200hp @ 23,300cfm
 - ◇ 2 – "Hoffman" multi-stage blowers rated 600hp @ 14,000cfm

Secondary Clarifier Tanks

- 24 tanks total, each 100' diameter
 - ◇ 4 tanks @ 14.2'D with Peripheral Feed (Tanks #1 - #4) Detention time AWWF- 3.5hrs
 - ◇ 20 tanks @ 18.2'D with Center Feed (Tanks #5 - #24) Detention time AWWF- 4.5hrs
- Return Activated Sludge: 48 centrifugal variable-speed pumps each rated 25hp @ 3,000gpm
- Waste Sludge Pumps: 3 centrifugal variable-speed pumps each rated 40hp @ 1,750gpm

Disinfection

- Liquid Sodium Hypochlorite (12.5% NaOCl) Dosing: 2 Systems
 - ◇ East System: 2 storage tanks @ 12,000gal each; 3 "Tuthill" gear pumps each rated 1hp @ 5gpm; 1 "Waterchamp" rapid-speed mixer rated 20hp.
 - ◇ West System: 2 storage tanks @ 12,000gal each; 3 "Tuthill" gear pumps each rated 1hp @ 5gpm; 1 "Waterchamp" rapid-speed mixer rated 20hp.
- Contact Channels: 2 each @ 12'W x 12.1' deep:
 - ◇ North Channel: 1,650' L @ 1.76 MG volume (goes past ETS weir to Green River gate)
 - ◇ South Channel : 1,160' L @ 1.26 MG volume (goes to ETS weir)

Effluent Pumping

- "Firm" pumping capacity: 325mgd (largest pump out of service);

- Total installed pumping capacity: 360 mgd
- 4 Duty pumps each rated 650hp @ 56mgd
- 4 Peaking pumps each rated 2560hp @ 90mgd

Effluent Transfer and Marine Outfall

- Transfer Pipe: 9' dia. x 10miles long following the Duwamish River to Elliot Bay
- 2 Submarine Outfalls with Diffusers 630' below mean sea level
 - ◇ Outfall A- 9,801' L x 64" dia pipe with 497' L diffuser section
 - ◇ Out fall B- 9,431' L x 64" dia. pipe with 549' L diffuser section

Solids Treatment

- Dissolved Air Flotation Sludge Thickeners: 6 tanks total at 11' Depth; 4@55' dia. and 2@65' dia.
 - ◇ Solids Loading Capacity: 228,000 lbs/day for 55' tanks; 159,000 lbs/day for 65' tanks.
- Anaerobic Sludge Digestion: 5 digesters total at 100' dia.
 - ◇ 4 primary tanks with floating covers @ 43' deep and 25-day average detention.
 - ◇ 5th or "Blending" Tank with fixed cover @ 23' deep and 5-day average detention.
 - ◇ Solids Loading Capacity: 290,000 lbs/day average; 376,000 lbs/day max month.
- Centrifuge Dewatering: 3 Andritz Model D7LL Centrifuges
 - Capacity: 180 -300 gpm and 3,385 lbs/hr
 - Feed sludge: 2.8% - 3.2% solids
 - Dewatered Biosolids Product: 22% - 25% solids
 - Solids Capture: 95%
 - Polymer Dose: 35-45 Dry lbs. polymer per dry tons applied
- ◇ Polymer feed pumps: 3 Progressive-cavity @ 7.5hp each
- ◇ Sludge feed pumps: 3 Progressive-cavity @ 7.5hp and 380 gpm each
- ◇ Truck Haul: 34 cubic yard per truck; 6 hauls daily average; 60,000 wet tons hauled annually
- ◇ Polymer Storage and Makeup Systems for Dry and Liquid Polymer

Odor Control

- Primary: 2 Wet Scrubbing Packed Bed Towers each 26,000cfm capacity, 12' dia. with 10' packed bed depth, hypochlorite and caustic soda dosing, 500gpm scrubbing liquid circulation rate.
- Secondary: 2 Wet Scrubbing Packed Bed Tower at 33,400cfm capacity, 12' dia. with 10' packed bed depth, hypochlorite and caustic soda dosing, 500gpm scrubbing liquid circulation rate.
- DAFT: 1st stage – 1 Wet Scrubbing Packed Bed Tower at 1,000cfm capacity, 2.5' dia. with 10' packed bed depth, hypochlorite and caustic soda dosing, 15gpm scrubbing liquid circulation; 2ndStage - 2 Activated Carbon Scrubbing Towers each 16,500cfm capacity.
- Sludge Dewatering Building: 1st stage – 2 Wet Scrubbing Packed Bed Towers each 33,500cfm capacity, 12' dia. with 10' packed bed depth, hypochlorite and caustic soda dosing, 500gpm liquid circulation rate; 2nd Stage - 1 Activated Carbon Scrubbing Tower at 67,000 cfm capacity.

Septage

- 24 million gallons annually
- 4 million lbs solids annually or 3-5% of South Plant's influent solids

Energy/Gas and Heating Systems

- "Binax" Biogas Scrubbing System – 2.0 million ft³/day capacity or 11,000 therms/day.
 - ◇ Three gas compressors: 2 rated 150hp @ 0.6M ft³/day and 1 rated 350hp @ 1.25M ft³/day.
 - ◇ Three scrubbing water pumps: 2 rated 200hp @ 0.78mgd and 1 rated 250hp @ 0.86mgd.
 - ◇ Two Packed Bed Scrubbing Towers: 59' tall x 5' dia.
 - ◇ Three Gas Drying Sodium Aluminate Columns
- Co-Generation Facility – 8 MW Capacity
 - ◇ Two 3.5MW gas turbine generators with 24 million BTU/hr steam heat recovery systems; natural gas and scrubbed biogas fueled
 - ◇ One 1.0MW steam turbine generator
- Hot Water Boiler; Digester gas fueled @ 11.7 million BTU/hr capacity
- Heat pumps: Two units at 5 and 4.5 million BTU/hr each capacity (3 units are mothballed).
- Campus-wide hot water loop for heating of digesters, buildings and underground galleries