Response to Questions

TO THE PROSPECTIVE PROPOSERS UNDER RFP NO. 9156

Professional Services to Prepare an Energy Management Plan

SACRAMENTO AREA SEWER DISTRICT

SacSewer received the following questions during the optional pre-proposal meeting and via email. Responses to those questions are below:

1. **Question:** Is there any available energy data related to SacSewer's existing wastewater assets, building square footage, and overall scope of those assets that would help develop the scope of work for responding to the proposal? A breakdown of energy usage between process buildings, admin buildings, and other assets could provide a clearer understanding of the issues that need to be addressed.

   Answer: *SacSewer can provide a high-level equipment list for the EchoWater Facility and Collection System Operations. SacSewer is looking for a consultant to help us determine what information we can glean from the energy-use data and create an energy management plan.*

   Appendix A of this document provides the EchoWater Facility process overview, pumping capacity details, Plant Motor Control Center Sitemap, ACE Table – Critical Asset List, and the EchoWater Facility Buildings map.

   Table 1 summarizes Collection System Pump Stations, and Table 2 summarizes Interceptor Pump Stations.

   Table 1: Collection System Pump Stations

Pump Stations Total HP	Number of pump stations
<50hp	71
50-99 HP	12
100-199HP	11
200-299 HP	5
300-400 HP	5
400-500 HP	1
500-600	1

Table 2: Interceptor Pump Stations

Pump Stations Total HP	Number of pump stations
100-499 HP	19
500-999HP	2
Over 1000 HP	7

Table 3 provides a summary of major process pumps at the EchoWater Facility.

Table 3:EchoWater Facility - Major Process Pumps

Pump HP	Number of pumps
100 – 499 HP	10
500-999 HP	2
Over 1000 HP	11

Table 4 provides a summary of the large EchoWater Facility Buildings.

Table 4: EchoWater Facility - Large Building sizes

Building Description	Area (Square Feet)
O & E Building	35,000
Admin Building	18,500
Lab Building	28,000
Safety Building	18,000

The Goethe Facility Administration Building is 74,200 square feet, and the warehouse is 35,000 square feet.

The existing NACY building has been approved for replacement, and construction will begin in January 2027. The new building will be 30,000 square feet and LEED certified.

2. **Question:** For Task 2: *Prepare Energy Management Plan* and Task 3: *Develop an Energy Roadmap*, is SacSewer intentionally separating the two so that the roadmap for developing the Energy Management Plan is independent of the actions SacSewer would take to become a net energy producer?

   Answer: *Yes.*

3. **Question**: Is this a single or multi-award project?

   Answer: *Single.*

4. **Question:** Does SacSewer prefer time and materials pricing, a fixed fee, or a deliverable-based cost proposal?

Answer: *Per page 11 of the RFP, "Compensation will be on a time-and-materials basis, with an authorized not-to-exceed amount."*

5. **Question:** For the energy tracking dashboard, it was mentioned that SacSewer prefers an Excel-based interface. Does this mean SacSewer is not seeking a more advanced or graphical user interface-style dashboard?

   Answer: *SacSewer is looking to track the energy data using an Excel database template. A simple dashboard capable of reporting and tracking the energy data for all SacSewer facilities. Consultants may propose an advanced interface-style dashboard as an optional item.*

6. **Question:** Does SacSewer have an existing timeline in mind for the completion of this project?

   Answer: *SacSewer anticipates completing the project within 12-18 months of its award.*

7. **Question:** Is SacSewer considering any energy management outside the treatment process? Is there interest in electrifying or decarbonizing assets associated with your labs or administrative buildings?

   Answer: *Those considerations could all be proposed under the energy roadmap. SacSewer is looking into the advanced fleet regulations and electrifying our fleet vehicles, as we have already installed EV chargers at our facilities. Any considerations into energy reduction and energy production can be proposed. Some of those considerations could fall in the grant opportunities section. Many electrification projects have opportunities for grant funding. SacSewer would like to include those projects in the Energy Management program.*

8. **Question:** Regarding the list of major process equipment, if the buildings, labs, and administrative facilities are included in the scope of work, could SacSewer provide a rough order of magnitude estimate of the square footage associated with those assets?

   Answer: *Refer to the response for question 1.*

9. **Question:** Is there an existing grant administrator the selected consultant will work with?

   Answer: *No. If grants are identified, it would be up to the project team to seek and apply to those grant opportunities.*

10. **Question:** Can SacSewer clarify whether consultants are required to work with local subcontractors?

    Answer: *It is acceptable for the consultant to hire subcontractors. While SacSewer prefers the use of local subcontractors, it is not a strict requirement.*

11. **Question:** Does SacSewer require the cost proposal to be separate from the proposal narrative, and can it be in digital or hardcopy form?

Answer: *Yes, that is correct. The cost proposal must be submitted separately and can be provided either as a password-protected digital file or in a sealed envelope. SacSewer does not open the cost proposal until a consultant has been selected for the project. If the cost proposal is not submitted in the required format, the proposal will be rejected.*

12. **Question:** Can SacSewer elaborate on the expectation for an in-person site investigation or an investigation of items at the facility?

    Answer: *If that is required for the consultant to understand SacSewer's processes and facilities, then those site visits can be included in the proposal.*

13. **Question:** Is there an existing budgeted amount for the project?

    Answer: *There is no existing budget amount.*

14. **Question:** In Task 3, the social, environmental, and financial factors are mentioned. Can SacSewer give an idea of how in-depth they want to go?

    Answer: *We are looking at the triple-bottom line for any efforts that are part of our sustainability program. For the energy management plan, we plan to enhance the community in our service area, be fiscally responsible to our rate payers, and be environmental stewards. For example, for the environmental factors consideration, were renewable energy sources evaluated, for social, were social impacts considered, and for financial, were the renewable energy sources evaluated for capital costs, long-term operation, and maintenance costs, and savings compared to other energy sources.*

15. **Question:** Will these slides be available for download after the presentation?

    Answer: *Yes, the presentation has been posted on the Business Opportunities page, along with the RFP.*

16. **Question:** For future projects identified in the Energy Management Plan, is SacSewer expecting to meet a specific envisioned sustainability or LEED criteria?

    Answer: *There are no specific LEED criteria, but sustainability is a priority, as it is a focus area. All projects will be evaluated using social, environmental, and financial factors before implementation.*

17. **Question:** Task 1 mentions preparing a technical memorandum summarizing the energy audit. Is there additional information on what the energy audit entails, or is it referring to the existing meter data?

    Answer: *Per the RFP, prepare a technical memorandum summarizing the energy audit, which includes SacSewer's current energy performance, delineated between the EchoWater Resource Recovery Facility and the Collection System assets.*

18. **Question:** For Task 1, are the assets already mapped to their respective meters, or is it part of the scope to determine which assets are connected to each meter?

    Answer: *This is one of the challenges with the process meters at the EchoWater facility. These process meters are integrated into the SMUD meters. We expect the consultant to perform a data analysis to determine which assets are associated with each meter and help identify improvements needed for tracking key data.*

19. **Question:** For task 3, is there an expectation of evaluating plans for BioGen in 2027 and improving that process as well?

    Answer: *No, evaluating and improving the BioGen project is outside the scope of this effort. However, since the BioGen project is a significant component of SacSewer's goal to become a net energy producer, information from that facility should be considered and incorporated when developing the Energy Roadmap.*

20. **Question:** The RFP notes that the consultant should maintain all certifications and qualifications required by California and SacSewer. Are there any specific qualifications or certifications that are dealbreakers for this RFP?

    Answer: *No.*

21. **Question:** Will a list of attendees be shared, including those in-person?

    Answer: *No, the list of attendees is for SacSewer use only.*

22. **Question:** Can you confirm whether the insurance statement will be included in the page count?

    Answer: *Insurance Statement does not count towards the page count.*

23. **Question:** Please clarify how many client references are needed. Contact numbers are asked for in two places in the RFP. The first ("Related Experience") requests a summary of similar work over the last five years, which will include a large list of clients and projects. However, later in the RFP ("References"), a "minimum of three public agency contacts" is requested. Can you confirm whether a number for each client/project in the "Related Experience" summary is required, or whether the three "References" will be sufficient?

    Answer: *For the "Related Experience Section", please provide minimum of two related project experience within the last five years with a contact person, including the telephone number of the project owner, for each project listed. For the "Reference Section", please provide the three public agency contacts.*

24. **Question:** The RFP references a dashboard for the EchoWater Facility to track energy demand. Is this something SacSewer wants to update regularly, or something to measure past loads to determine what demand was in the past to plan for the future? Does this need to be updated in real time on an ongoing basis?

Answer: *The Excel or database template that will serve as the dashboard will be updated annually by SacSewer staff and should be able to store past data. Please see response to a similar question above.*

25. **Question:** For the digital submission of this RFP, does SacSewer prefer a USB/CD or will an email to the project manager suffice?

    Answer: *We need four hard copies of the proposal delivered to the Goethe office and an email submission of the proposal as well by the proposal submission deadline stated in Section 4 of the RFP. Please email the proposal only to the project manager, and a separate email with the cost proposal password protected.*

26. **Question:** Can you confirm if digital only is acceptable for the RFP, or does SacSewer still require the respondents to provide four hard copies delivered to Goethe Road?

    Answer: *See response to Question 25.*

27. **Question:** Can SacSewer share the number of assets owned in the portfolio and their rough square footage (e.g., EchoWater Facility, Collection System assets, commercial buildings including labs, offices, etc.)?

    Answer: *See Response to Question 1.*

28. **Question:** Can SacSewer please confirm that the Energy Management Plan team does not wish to have a technical review or optimization analysis for the BioGen project in construction?

    Answer: *See Response to Question 19**.***

Thank you,
Lakshmi Jayaprakash
Assistant Civil Engineer
Sacramento Area Sewer District

Appendix A

EchoWater Facility: Process Overview

Flow Path through the Plant – The Big Racetrack

Overview

SRWTP is laid out like a big racetrack. Flow comes into our Plant via the Influent and Effluent (I & E) Building, makes its circuit through the Primary, Secondary and Tertiary Treatment processes, then leaves the plant via the I & E Building before heading for the river as treated effluent.

Glossary of Terms

As wastewater passes through our Plant, it takes on different definitions depending on where it is and how it has been processed. Some basic terminology and abbreviations you should familiarize yourself with are as follows:

Collection System

Influent Flow – Flows from the Collection System combined with Plant recycle flows coming into the Plant via the Influent Conduit.

Head Gates – Control point of Influent Flow into the Plant processes.

I & E Building (Influent Side)

Influent and Effluent (I & E) Building – As its name implies, influent comes into the building and effluent leaves the building. It is the start and finish line of the Big Racetrack.

Bar Screens – Mechanically raked screens remove large objects from the waste stream that are processed and sent off-site for burial.

Influent Wet Pit – Flow coming through the Bar Screens is deposited in the Influent Wet Pit where it must be pumped up into the Plant's hydraulic gradient.

Influent (I) Pumps – The Influent Pumps take wastewater from the Influent Wet Pit and lift it up into the Plant's hydraulic gradient, after which it flows by gravity through the various Plant processes.

Primary Influent (PI) – PI is defined here as flow entering the Primary Treatment Area from the "I" Pumps.

Primary Treatment Area

The Primary Treatment Area contains the following structures and processes:

- Head Recovery Cones
- Primary Influent Channel
- Grit Tanks
- Primary Distribution Channels
- Primary Sedimentation Tanks (PSTs)
- Primary Collection Channel
- Primary Effluent Channel
- East CAB Blowers

Head Recovery Cones – A large fiberglass cone at the end of the influent pump discharge line that forces water past it to preserve the effective head pressure of the pump.

Primary Influent Channel – This structure conducts Primary Influent (PI) into the Primary Division Channels

Grit Tanks - Grit tanks produce as byproducts grit and grit scum.

- Grit is processed and sent off-site for burial
- Grit Scum is sent to the Digester Complex for further processing
- Flow coming from the Grit Tanks goes to the Primary Distribution Channel

Primary Distribution Channels – These structures conduct PI into the Primary Tanks

Primary Sedimentation Tanks (PSTs) – Primary Sedimentation Tanks produce as byproducts:

- Primary Sludge (PS)
- Primary Scum (PSC)
- Both PS and PSC are sent to the Digester Complex for further processing

Primary Effluent (PE) – PE is defined here as flow leaving the Primary Area

Primary Collection Channel – Collects flows leaving the Primary Sedimentation Tanks

Primary Effluent Channel – Collects flows leaving the Primary Collection Channel and sends them to PEPS

- PE can be diverted from the PE channel to ESB-A at the emergency diversion structure

Primary Effluent Pumping Station (PEPS) – Major pump station that lifts all PE from the PE channel to the PE flow distribution structure/BNR facility. PE can be diverted to ESB A from this structure

Secondary Treatment Area

The Secondary Treatment Area contains the following structures and processes:

- PE flow distribution structure
- RAS classifying selectors and RAS pre-anoxic basins
- WAS collection channel and WAS pumps
- BNR basins and associated equipment
- BNR blower building
- Mixed liquor collection channel and splitting structure
- SST mixed liquor channels
- West CAB Blowers
- Three batteries of Secondary Sedimentation Tanks (SSTs)
    - Each battery of SSTs is served by its own Mixed Liquor (ML) channel

- Each battery contains 8 SSTs
- Each SST has 2 RAS pumps

- Secondary Effluent (SE) channels
  - Each battery of SSTs is served by its own SE channel
- Effluent Observation Structure (EOS)

PE flow distribution structure – Structure that receives discharge of PEPS and evenly distributes the flow to the in-service BNR basins

RAS Classifying Selector – Aerated RAS basin designed to cause some RAS solids to float so that they can be selectively wasted

RAS Pre-anoxic Basins – Unaerated RAS basin designed to dissipate DO from RAS and to conduct the RAS to be distributed to the in-service BNR basins

Biological Nutrient Removal (BNR) – The specific secondary biological treatment process which is designed to remove ammonia nutrients from the wastewater, specifically ammonia and other nitrogen compounds

BNR Basin – Tanks in which BNR treatment occurs, containing a series of aerated and unaerated zones and in which PE and RAS are combined

Blower Building – Houses large centrifugal air compressors which supply aeration air for the BNR process. This building also houses the mixed liquor channel aeration blower, which supplies aeration air exclusively for the mixed liquor collection channel.

Mixed Liquor (ML) – The liquid contained in and leaving the BNR basins for the SSTs. It is a combination of RAS and PE or SE

Mixed Liquor Collection Channel – the channel which receives the biologically treated mixed liquor from the BNR basins and conducts the mixed liquor to the Mixed Liquor Splitting Structure

Mixed Liquor Splitting Structure – The structure which receives biologically treated ML flow from the Mixed Liquor Collection Channel and distributes it to the SST ML channels

SST Mixed Liquor Channels – The channels which receive ML flow from the ML Splitting Structure and conduct ML to the SSTs. There is one SST ML Channel dedicated to each SST battery

Secondary Sedimentation Tanks (SSTS) – Tanks that slow the velocity of the flow stream so that heavy will settle to the bottom, light solids will float to the top, and liquid with the solids removed exits the SST as secondary effluent (SE).

West Channel Aeration Blowers (CAB) – blowers which provide air to the SST mixed liquor channels to keep the ML mixed and aerated

Tertiary Treatment Facility

The Tertiary Treatment Facility contains the following major structures and processes:

- Filter Influent Pumping Station (FIPS) and associated equipment
- Filter Influent (FTI) Channels
- Filter Diversion Channels and Seasonal Flow Diversion Structure (SFDS)
- Granular media filters (GMF) and associated equipment
- Disinfection Contact Basins
- Sodium hypochlorite and sodium bisulfite storage and metering facilities
- Reclaimed water pump stations

Filter Influent Pumping Station (FIPS) – Structure to where secondary effluent is conveyed from the SSTs. At FIPS, the secondary effluent flows through a drum screen to remove large debris and is then pumped by one or more of the 4 filter influent pumps to the filter influent channels.

Granular Media filters (GMF) – FIPS discharges to 2 channels (filter influent channels) which usually convey the water (now called filter influent or FI) 20 filter beds containing filter media, associated valves and miscellaneous equipment. Alternatively, under certain plant conditions, the FIPS discharge can be diverted from the FI channels to the Seasonal Flow Diversion Structure (SFDS), which effectively bypasses the filters.

Disinfection Contact Basins – After filtration or from the seasonal flow diversion structure, the water flows to the Disinfection Contact Basins (DCB). As it does, the water is dosed with sodium hypochlorite (hypo), which is a disinfectant. Disinfection takes time, which the DCBs provide. The DCBs are just channels which are in place to ensure that the water has enough time to be in contact with the hypo. Also at the DCBs are several analyzers which detect the amount of hypo in the water at various phases of the disinfection process.

Sodium hypochlorite, sodium bisulfite and other chemical storage and metering facilities – These facilities include storage tanks, metering pumps, and other miscellaneous equipment for the various chemicals used in the TTF area.

Reclaimed water pump stations – Pump stations that provide high pressure reclaimed water (WRH), low pressure reclaimed water (WRL) and transfers water to the water reclamation facility (WRF Transfer) from the DCB Effluent Channel (DEC) for various utility uses throughout the plant.

Effluent Observation Structure (EOS) – Structure at the end of the DECs where total chlorine residual is monitored and can be controlled (by the addition of sodium bisulfite) before heading to the I/E building.

The Big Racetrack

Now that we can talk in terms all may understand, we shall proceed with a discussion of the Big Racetrack.

To reiterate, SRWTP is laid out like a big racetrack. Flow comes into our Plant via the Influent and Effluent (I & E) Building, makes its circuit through the Primary, Secondary and Tertiary Treatment processes, then leaves the plant via the I & E Building before heading for the river as treated effluent.

I & E Building (Influent Side) – Influent flow comes into the Plant from the

Collection System via the I & E Building's influent side

- Influent flow passes through the Bar Screens and goes to the Influent Wet Pit
- From the Influent Wet Pit influent flow is pumped by the "I" Pumps up into the Plant's hydraulic gradient beginning at the Primary Treatment Area

Primary Influent (PI) -The flow coming from the I & E Building and going into the Primary Treatment Area is defined as Primary Influent (PI)

- Primary Influent (PI) is essentially raw wastewater with a high Biochemical Oxygen Demand (BOD)

Primary Sedimentation Tanks (PSTs) – After treatment in the Grit Tanks, Primary Influent (PI) flow slows in the PSTs where heavy solids sink and light solids float

- Both light solids (Primary Scum – PSC) and heavy solids (Primary Sludge – PS) are sent to the Digester Complex for further treatment

Primary Effluent (PE) - Flow leaving the Primary Treatment Area and going to the Secondary Treatment Area is defined as Primary Effluent (PE)

- Primary Effluent (PE) has a reduced BOD load, greatly reducing the load on the BNR process.
- Primary treatment is far simpler and more cost effective than BNR treatment, and thus it's preferable to remove as much BOD as possible during primary treatment.

Primary Effluent Pumping Station (PEPS) - PE is lifted from the PE channel to the PE flow distribution structure with the PE pumps at the Primary Effluent Pumping Station (PEPS)

PE flow distribution structure – In this stricture, PE is evenly distributed to the in service BNR basins.

RAS classifying selector and RAS pre-anoxic basins – RAS pumps discharge to the RAS classifying selector.

- In the selector the RAS is aerated to help undesirable floating solids to float to the surface. The surface is skimmed into the WAS collection channel.
- After the WAS collection channel, the RAS basin is called the RAS pre-anoxic basin. The pre-anoxic basin is not aerated and allows the DO to be depleted from the RAS. This basin conducts the RAS to be distributed to the BNR basins.

WAS Collection Channel and WAS Pumps – Once RAS enters the WAS collection channel it is known as "waste activated sludge" or "WAS". The WAS pumps draw off of the WAS collection channel and continuously remove a portion of BNR solids to control the size of the biomass.

BNR Basins – The in-service BNR basins receive PE flow from the PE flow distribution structure. The BNR basins also receive RAS flow from the RAS pre-anoxic basin. In these basins there are several biological processes taking place under various conditions. In simple terms:

- In the aerated zones, the microorganisms consume carbonaceous BOD. The dissolved oxygen in these zones is measured and controlled by the amount of air added to the basin. In these zones, the microorganisms are (in simple terms) "breathing" dissolved oxygen and eating carbonaceous BOD.

- Also in the aerated zones, the microorganisms consume ammonia. This process is called "nitrification". Nitrification and carbonaceous BOD consumption happen simultaneously by different organisms. Nitrification converts ammonia to nitrate. In these zones, the microorganisms are (in simple terms) "breathing" dissolved oxygen and eating ammonia.

- In the anoxic zones, there is no DO, there is nitrate (the byproduct of the nitrification process) and there is carbonaceous BOD. In these zones, the microorganisms are (in simple terms) "breathing" nitrate and eating carbonaceous BOD.

Mixed Liquor Collection Channel and splitting structure – The flow leaving the BNR basins is a combination of treated water (which will later become secondary effluent) and the microorganisms (which will later become RAS). This mixture is known as "mixed liquor". After leaving the BNR basins, the mixed liquor from all in-service BNR basins combines in the mixed liquor collection channel. The mixed liquor collection channel conducts the mixed liquor to the mixed liquor splitting structure, which distributes mixed liquor to SST battery 1, 2, and 3 mixed liquor channels.

SST battery 1, 2 and 3 mixed liquor channels – after leaving the mixed liquor splitting structure, where mixed liquor is distributed to the SST battery mixed liquor channels. There is one channel dedicated to each battery of SSTs.

Secondary Sedimentation Tanks (SSTs) – Mixed Liquor (ML) flows from the mixed liquor channels into the secondary sedimentation tanks, where it is slowed once again, and heavy solids sink and light solids float. In this case, the heavy solids make up the biomass used for secondary treatment. There are three batteries of SSTs containing eight tanks each. Mixed Liquor (ML) enters the SSTs and after the clarification (settling) process produces the following flow streams:

- Return Activated Sludge (RAS) – the mass of microorganisms which settle to the bottom of the SST, and pumped by the RAS pumps back to the BNR basins via the WAS classifying selector.

- Waste Activated Sludge (WAS) – a portion of RAS (and thus a portion of the total biomass) which is removed from the BNR system to control the size of the biomass. The amount of solids wasted is a primary control parameter for the BNR process.

- Secondary Scum (SSC) – floatable solids (scum) skimmed from the surface of the SSTs

- Secondary Effluent (SE) – the effluent of the SSTs. The biologically treated wastewater from which biomass has been removed by settling in the SST.

Secondary Effluent (SE) – Flow leaving the SSTs is defined as Secondary Effluent (SE)

- SE has a greatly reduced BOD load and is ready to be filtered and then disinfected at the Tertiary Treatment Facility (TTF), but must first be lifted by the Filter Influent Pumping Station (FIPS).

Filter Influent Pumping Station (FIPS) – Pump station which consists of 2 high capacity and 2 low capacity pumps, which lift secondary effluent to the filter influent structure. At this point, the water is called Filter Influent (FTI).

Filter Influent Structure (FTI Structure) – An intermediate structure, from where FTI is conveyed to the FTI Channels and/or the Flow Through Diversion Structure.

- Filter Influent (FTI) Channels – Channels which convey FTI to the Granular Media Filters (GMF). This is the normal flow path for FTI.

- Flow Through Diversion Structure – This structure can allow some or all of the FTI to bypass the GMFs and flow directly from the FTI Structure into Disinfection Contact Basins (DCBs) 1, 2 and/or 3. Doing this allows the plant to keep operating in the event of very high flows and/or process upsets. In other words, this rarely happens.

Granular Media Filtration (GMF) – As the name implies, the GMFs are filters, which use granular (consisting of small grains) media to physically catch and remove solids. The flow leaving the filter is known as Filtered Effluent (FTE).

- FTE flows though two conduits, where it is dosed with sodium hypochlorite, and then into the Disinfection Contact Basins (DCBs)

- A small portion of the FTE is pumped by the Filter Backwash (FBW) pumps to be used for backwashing the filters.

    - As solids are caught in the filter media, they accumulate in the media. This would eventually plug the filters and make them unusable. To remedy this problem, FTE is periodically pumped backwards through the filters to remove the accumulated solids. This process is called "backwashing".

    - The backwash water becomes very contaminated with solids as it cleans the filter, so is not suitable to proceed in the process. This contaminated water is called Waste Filter Backwash (WFBW). It is collected in the WFBW basin, and then pumped by the WFBW pumps back to the Primary Influent channel for re-treatment.

Disinfection Contact Basins (DCBs) - From the FTE conduits, the FTE flows to the Disinfection Contact Basins (DCBs). In simple terms, the more time that the sodium hypochlorite is in contact with the water, the more effective the disinfection will be. The DCBs are channels that provide extra time for the water to be in contact with the sodium hypochlorite to ensure effective disinfection. After the DCBs, the water is known as Chlorinated Final Effluent and flows through a series of channels and conduits back to the I & E Building, but on the effluent side this time.

I & E Building (Effluent Side) – Chlorinated Final Effluent (CFE) is then sent from the I & E Building via the "E" Pumps or the Effluent Pump Bypass Valves to the River Station for de-chlorination and eventual discharge into the Sacramento River.

Conclusion

So what we've done here is take you through all the Plant processes, beginning and ending at the I & E Building, thereby demonstrating that the main Plant at SRWTP is laid out like a big racetrack.

Everything comes into the Plant via the I & E Building, flows through the Plant in a big circle then leaves the Plant via the I & E Building. It's the start and finish line of our Big Racetrack.

Flow Control through the Plant

An old Operator at SRWTP once observed, "I could run this place with a toilet bowl float and an electrical switch," and he wasn't far wrong.

Controlling flow through the plant revolves almost exclusively around level indicators.

A level set point is entered into the PCCS computer or manually controlled for virtually every tank and channel (the toilet bowl float), and then some type of pump or mechanism turns on, off or modulates its speed to maintain that level (the electrical switch).

Here's the Catch

The only caveat is, ***and this is a salient point***, most of the individual processes do not work in concert with one another to maintain a given flow throughout the entire Plant.

The computer control strategies in each process area of the Plant are only concerned with maintaining a level within the confines of that particular area. All they are programmed to do is maintain a set level in the tanks and channels located within that process area.

In other words:

- The I & E Building does not talk to Primary Treatment Area
- The Primary Treatment Area does not talk to the Secondary Treatment Area
- The Primary Treatment Area does not talk to the online Mixed Sludge Tank
- The online Mixed Sludge (MS) Tank does not talk to the Fixed Cover Digesters
- The Fixed Cover Digesters do not talk to the online Blending Digester

It sounds pretty strange in a place such as SRWTP, with all its sophisticated computer technology, that the strategies controlling flow through our various processes don't talk to one another.

But this method of flow control throughout our various processes actually works.

I & E Building

Flow coming from the Collection System is essentially uncontrolled. Other than closing the Head Gates we have no option but to accept everything that the Collection System can throw at us during all weather conditions.

As such, after having passed through the Bar Screens, flow going into the Influent Wet Pit must be pumped up into the Plant's hydraulic gradient beginning in the Primary Treatment Area using the "I" Pumps.

However, the "I" Pump control strategy doesn't care what's going on in the Primary Treatment Area. All it's concerned with is maintaining level set point in the Influent Wet Pit.

The "I" Pumps will pump whatever they have to in order to keep the Influent Wet Pit at set point, and the Primary Treatment Area be damned. That's what the "I" Pump control strategies are programmed to do.

Primary Treatment Area

Once flow has reached the Primary Treatment Area, all its control strategies care about is maintaining a level set point in the Primary Sedimentation Tanks.

By modulating a series of gates at the end of each battery of Primary Sedimentation Tanks (PSTs), the Primary Treatment Area control strategies will maintain a set water surface elevation level (WSEL) in the PSTs without regard to the hydraulic flow they are sending to the Secondary Treatment Area.

In addition, the Primary Treatment Area sends a great deal of flow to the online Mixed Sludge Tank located in the Digester Complex. The control strategies modulating flow to the online Mixed Sludge (MS) Tank coming from the Primary Treatment Area do not care how much Primary Sludge (PS) or Primary Scum (PSC) they are sending to the MS Tank.

Like the control strategies controlling level in the Primary Sedimentation Tanks, the Primary Sludge and Primary Scum Pumps will pump whatever amount of PS and PSC they are told to in order to maintain levels in those two systems.

That's what the Primary Treatment Area control strategies are programmed to do. All they care about is maintaining levels within this area, and let the rest of the Plant be damned.

Mixed Sludge (MS) Tank

There is only one Mixed Sludge (MS) Tank online at any given time in our present configuration. In the future when we build more Digesters it will become necessary to run both MS Tanks.

However, the fundamental control strategies governing level in the Mixed Sludge Tanks will not change.
Essentially, what the online MS Tank does is present a Mixed Sludge flow to each in-service Fixed Cover Digester.
Each in-service Fixed Cover Digester then takes whatever amount of Mixed Sludge it requires to maintain a level set point within itself.

The remainder of Mixed Sludge not used by the Fixed Cover Digesters is then returned to the online MS Tank and is taken into account as the MS Tank's control strategy seeks to maintain a level set point within itself.

As a result there can be a lot of unused Mixed Sludge circulating throughout the Digester Complex at any given time, but at present the demands of our Fixed Cover Digesters are sufficient to maintain level set point within the Mixed Sludge Tank.

That's what the MS Tank control strategies are programmed to do, and let levels in the Fixed Cover Digesters be damned.

Fixed Cover Digesters

The control strategies governing level within each Fixed Cover Digester do not care what's going on inside the online Blending Digester to which they are pumping.

Digested Sludge (DS) spills over on a regular basis into "standpipes" located at each Fixed Cover Digester, depending on how much Mixed Sludge (MS) is being fed into the tank.

Whenever levels reach a certain point inside each Fixed Cover Digester's standpipe, dedicated Digested Sludge (DS) Pumps will pump down the standpipe and send DS to the online Blending Digester.

Blending Digesters

The online Blending Digester will maintain its level based on the demands of the Bio-solids Recycling Facility (BRF). Whenever BRF can't take sufficient flow to maintain level set point in the online Blender, it will pump its contents to the Sludge Storage Basins (SSBs).

Secondary Treatment Area

One exception to this "rule" is that the Secondary Treatment Area talks to the I & E Building, in that level of the Secondary Effluent (SE) channels controls the speed of the Effluent (E) Pumps, or the modulation of the Effluent Pump Bypass Valves

Essentially, if the level of the river is higher than that of our Secondary Effluent (SE) channels, in order to maintain level set point in our Secondary Treatment Area we have to either pump more SE to the river or let more SE flow to the river by gravity.

Control of the "E" Pumps is governed by a control strategy that seeks to maintain a level set point in the Secondary Effluent channels coming from the Secondary Sedimentation Tanks (SSTs).

If we are using gravity to flow to the river, the PCC basically uses manual control to set the Effluent Pump Bypass Valves to whatever position is required to maintain level set point in the Secondary Effluent channels.

Appendix R: Revision Record

RevDate	RevNo	RevBy	Description
1/6/08	1	PMB	This is an entirely new module to be used in the instruction of incoming Plant personnel.
2/21/24	2	RKB	Added BNR and TTF

OPERATOR TRAINING GUIDE

O&M Support - Process Support Team - WTPO Training Office
Sacramento Regional Wastewater Treatment Plant

Plant Areas | Equipment Prefixes | Pipe Systems | Operator Training Guides Web Page | POO Lesson Plan

Plant Operations Overview

SRWTP Treatment Processes

Table of Contents

SRWTP Treatment Processes

Overview

The Sacramento Regional Wastewater Treatment Plant (SRWTP) provides secondary level wastewater treatment for its influent flows coming from the Collection System. These processes can be broken down into five basic components:

- Influent Collection System
- Liquid Processes
- Solids Processes
- Gas Management System (GMS)
- Chemical Handling Facilities
- Effluent Discharge System

Influent Collection System

The Sacramento County Regional Sewer District (SCRSD) has one of the largest collection systems in the world. It is the main conveyance of raw sewage into the Sacramento Regional Wastewater Treatment Plant (SRWTP). This collection system is comprised of:

- City Interceptor (combined sewer, 60 MGD max flow)
- Sludge Storage Basin (SSB) by way of NST and returns via the City Interceptor
- Emergency Storage Basin-A (ESB-A) return
- Emergency Storage Basin-D (ESB-D) return via the City Interceptor
- Central Trunk (60″ diameter line)
- Central Interceptor (102′ diameter line)
- Bradshaw Interceptor (108″ diameter line)
- Elk Grove Trunk (54″ diameter line)
- Lower Northwest Interceptor (LNWI) – 96″ diameter line
- Laguna Interceptor (108″ diameter line)
- Septage Disposal area
- 60″ overflow from Storm Water Pump Station
- The Influent Junction Structure (IJS)
- The Influent Conduit
- The Surge Relief Conduit

To give you an idea of how large most of these pipelines coming into the Plant are, go take a look at a section of one preserved out in the west employee parking lot with a nearby plaque describing it as "Newton's Pipe."

Diurnal Flow

The term "diurnal flow" is defined as the amount of flow delivered by the collection system during any twenty-four hour period. It's another way of saying that late at night, when everybody's in bed and not flushing their toilets, there's not going to be as much water coming down the pipe as there was during the day.

This holds true under dry weather flows. However, during storms we may get the majority of our flow late at night or at any other time of day depending on when and how hard it's raining.

You also need to remember that during a storm, while it may have stopped raining, it can take hours for peak flows to hit us simply because it takes that long for the water to get here via the Collection System.

Thus diurnal flow describes the peaks and valleys of flow coming into our Plant over a day's time, and those peaks and valleys can occur at any time of the day or night.

Influent Flow

"Influent Flow" is considered to be all of the wastewater collected by the sanitary sewer systems that flow into SRWTP, and the flows generated by the plant itself that are being recycled back to our process for further treatment.

A portion of our influent is from the combined sewer system coming from the city of Sacramento's downtown area. Because the City's combined sewers include a large storm water drainage system, our influent flows can increase dramatically in a short period of time during wet weather.

Flow coming into SRWTP from the outside interceptors and the Emergency Storage Basins (ESBs) passes through the Influent Junction Structure (IJS), and is transferred via a large Influent Conduit to the northeast corner of the Influent and Effluent (I & E) Building.

It should be noted here that the Influent Conduit is equipped with a Surge Relief Conduit designed to relieve hydraulic pressure on the Influent Conduit in the event there is an emergency shutdown of our Plant head gates.

Influent Flows Coming from the Plant

Return flows generated by the plant itself and going into the Influent Conduit downstream of the Influent Junction Structure are:

- Plant wastewater flows from Sump 252, including:
    - Drainage from the Storm Water Pumping Station during wet weather

- Overflow from the Mixed Sludge (MS) tanks in Area 8
- The Primary Influent (PI) Diversion Structure drain

Liquid Processes

The SRWTP Liquid Processes are designed to move large amounts of wastewater through the Plant, providing Biochemical Oxygen Demand (BOD) reduction and volatile solids removal.

Influent Flow and Pre-chlorination

- **Influent Flow –** Wastewater coming from the Collection System and entering the I & E Building is known as Influent Flow, or simply "influent."
- **Pre-chlorination** – Hypochlorite is injected at the IJS itself, in order to control odors in the Influent Flow.

I & E Building (Influent side)

- **Head Gates** – Influent Flow enters the I & E Building via the Head Gates which allow us to stop flow coming in from the Collection System if necessary.
- **Bar Screens** – Influent Flow then passes through the Bar Screens where solids caught on the screens is raked off mechanically and collected.
- **Screenings** – Solids removed by the Bar Screens are normally sent through a grinding process, dewatered by rotary screens then sent off-site for land disposal. These solids are known as screenings.
- **Influent Wet Well** – Screened wastewater then enters the Influent Wet Well, a large pit from which the Influent Pumps take suction.
- **Influent (I) Pumps** – Screened wastewater (influent) is picked up by the Influent (I) Pumps and pumped up into the Plant's hydraulic gradient. After being pumped into the hydraulic gradient wastewater flows by gravity through the rest of the Plant.

Primary Treatment Area

- **Aerated Grit Tanks** – The Influent Pumps send wastewater to the Primary Treatment Area as Primary Influent (PI) where it enters the Aerated Grit Tanks. By infusing the wastewater with air, heavy inorganic solids sink in these tanks.
- **Grit** – The material collected by the Grit Tanks is known as Grit and it is sent to the I & E Building, dewatered, then sent off-site for land disposal.
- **Grit Scum** – Lighter material removed by the Grit Tanks is sent to the Primary Sedimentation Tanks (PSTs) for collection by the Primary Scum (PSC) system inside the PSTs . Light material collected by the Grit Tanks is known as Grit Scum.
- **Primary Sedimentation Tanks (PSTs)** – Flow then goes to the Primary Sedimentation Tanks (PSTs) where it slows down, giving heavy solids a chance to sink and lighter solids a chance to float.

- **Primary Sludge (PS) and Primary Scum (PSC) –** Heavy solids removed by the Primary Treatment process are known as Primary Sludge (PS). Light solids are known Primary Scum (PSC).

    - Both PS and PSC are collected by the Primary processes and sent to the Solids Processes in the Digester Complex.

- **Primary Effluent (PE)** – A significant amount of solid material and Biochemical Oxygen Demand (BOD) is still left in the wastewater after the Primary processes. Wastewater leaving the PSTs is known as Primary Effluent (PE).

- **Primary Effluent Pumping Station (PEPS)** – The primary effluent now doesn't have enough pressure to continue through the process by gravity. To remedy this, the PE is lifted by the Primary Effluent Pumping Station (PEPS). This pump station is made up of 4 very large pumps which lift PE to the secondary treatment process

Secondary Treatment Area

- **Biological Nutrient Removal (BNR) Basins** – Once pumped at PEPS, flow then passes to the Secondary Treatment Area where it is subjected to a biological treatment process. Specifically at this plant, this process is known as biological nutrient removal or BNR. As the name implies, this process biologically removes nutrients, namely BOD and ammonia. We achieve this by mixing the PE with a mass of microorganisms (biomass or "bugs" in common operator speak) which we have selectively bred to have certain favorable characteristics.

- **Aeration** - The microorganisms we use for BNR are (mostly) aerobic, which means they require oxygen to do their job. The bugs use oxygen which is dissolved in the liquid which is called dissolved oxygen or DO. Because the bugs are continuously consuming oxygen, we must continuously supply more oxygen. We do this by bubbling air up through the liquid from the bottom of the BNR basins. To achieve this requires the air to be pressurized, which we do with large air compressors in the BNR blower building.

- **Mixed Liquor (ML)** – Liquid contained in the BNR basins is a mixture of PE (which is gradually turning into secondary effluent) and bugs. This mixture is known as Mixed Liquor (ML). The flow leaving the BNR basins is also called mixed liquor.

- **Secondary Sedimentation Tanks (SSTs)** – After the BNR basins, the flow has been treated to a very high quality; however, it is contaminated with all of the bugs we used to do the job. To remedy this problem, Mixed Liquor goes to the Secondary Sedimentation Tanks (SSTs). Here the wastewater slows once more and again heavy material has a chance to sink and light material has a chance to float. The sinking heavy material is the bugs and is continuously returned to the BNR basins to continue the biological treatment process.

- **Secondary Scum (SSC)** – Light material collected by the Secondary Sedimentation Tanks is sent to the Digester Complex. This light material collected by the SSTs is defined as Secondary Scum (SSC).

- **Return Activated Sludge (RAS)** – The heavy biomass which settles in the SSTs is known as return activated sludge or RAS. The RAS pumps pump the RAS back to the WAS classifying selector, then the RAS pre-anoxic basin and then its distributed to the in-service BNR basins. In this way, the bugs are in a continuous cycle of treating in the BNR basins, flowing to the SSTs, settling in the SSTs, and then being returned as RAS to start the process all over again.

- **Waste Activated Sludge (WAS)** – A percentage of the biomass is being continuously removed or "wasted" from the BNR process. Doing this is necessary to maintain a biological stable process. The amount wasted can have dramatic effects on the biological process and is the largest control parameter in the biological process. This is accomplished by pumping RAS to the solids area to be further processed. This wasted RAS is knows as Return Activated Sludge or WAS.

- **Secondary Effluent (SE)** – Flow leaving the SSTs is known as Secondary Effluent (SE). It is important to note that SE has not yet been chlorinated for disinfection.

Tertiary Treatment Facility (TTF)

- **Filter Influent Pumping Station (FIPS) –** Secondary Effluent flows through the SE channels to the Filter Influent Pumping Station, where pumps lift the flow to the TTF facility.

- **Filter Influent (FTI) –** The Secondary Effluent that has been lifted to the TTF facility is known as Filter Influent. It flows into the FTI Structure. From the FTI structure, FTI flows normally through the FTI channels and to the Granular Media Filtration beds. During periods of very high plant flows, and/or process upsets, the physical capacity of the filters can be exceeded. During these periods, the filters can be bypassed from the FTI structure, through the Seasonal Flow Diversion Structure (SFDS) where FTI will be chlorinated and conveyed to DCBs 1, 2 and 3.

- **Granular Media Filtration (GMF) –** FTI flows through the GMF filter beds, where particulate solids are caught and removed by the filter media. The filtered water leaving the filters is called Filtered Effluent (FTE)

- **Filter Backwash (FBW) and Waste Filter Backwash (WFBW) –** A portion of the FTE is pumped with the FBW pumps backwards through the filter beds to scour and remove the accumulated solids. After flowing through the filter and becoming contaminated with scoured solids, this water is known as Waste Filter Backwash (WFBW) and is captured in the WFBW basins, then pumped by the WFBW pumps to the primary influent channels.

- **Filter Effluent (FTE) Headers –** There are 2 filter effluent headers under the floor of the TTF pipe gallery. These conduits receive FTE from the filters and convey the flow to the DCBs. Sodium hypochlorite is injected into the FTE in the FTE headers. The flow is then measured with magnetic flow meters and conveyed to the DCBs.

- **Disinfection Contact Basins (DCBs) –** 4 DCBs provide time for the sodium hypochlorite to sufficiently disinfect the flow. DCBs 1, 2, and 3 are all identical with identical functions. DCB 4 can be different in that it can be configured to be the only DCB to supply the reclaimed water pump stations. Because of this, DCBs 1, 2, and 3 can receive unfiltered, chlorinated SE from the SFDS and DCB 4 cannot. Allowing unfiltered SE to flow to the recycled water system would be a violation of or recycled water permit. Also at the DCBs are several analyzers at various locations which monitor the amount of sodium hypochlorite in the water.

- **Chlorinated Final Effluent (CFE) –** The water leaving the DCBs has been sufficiently disinfected and still has a chlorine residual. This water has been fully treated and is on its way to being discharged to the Sacramento River. This water Is now called Chlorinated Final Effluent (CFE).

- **Final Effluent (FE)** – It should be noted here that on some older Plant drawings, Secondary Effluent (SE) that has been chlorinated is shown as "Final Effluent (FE)." A bit confusing, but we generally call chlorinated FTE "Chlorinated Final Effluent," even though it is our "final effluent." CFE is a more exact term for what we're sending into the Effluent Discharge System.

- **Effluent Observation Structure (EOS)** – The CFE leaving the DCBs passes through channels called the Disinfection Effluent Channels, which carry it to a structure called the Effluent Observation Structure. This structure is little more than a sampling location where the chlorine residual is measured again. From here, the CFE continues on to the effluent side of the I & E building.

I & E Building (Effluent side)

- **Effluent Pump Suction Manifold** – The E Pump Suction Manifold is essentially an extension of the pipes leaving the Effluent Observation Structure (EOS).

- **Effluent (E) Pumps** – The Effluent Pumps enable us to pump against the head of the river when its level is higher than that of our Effluent Pump Suction Manifold.

- **Effluent Pump Bypass Valves –** When the river is lower than our Effluent Pump Suction Manifold, by means of modulating valves we can bypass the Effluent Pumps and send Chlorinated Final Effluent (CFE) coming from the EOS directly to the river by gravity.

In this manner we have completed the circuit in the Big Racetrack, wherein Influent Flow comes into the I & E Building, goes through our Plant liquid processes, then flows back to the I & E Building where it exits the Plant and heads for the Sacramento River.

EchoWater Facility: Pumping Capacity Details

Plant Process Tanks

Needless to say, it takes big tanks to handle big flows.

The following table gives you an idea of the number and dimensions of our current tanks:

Aerated Grit Removal Tanks - 4	32 ft. x 108 ft. Avg. liquid depth: 18 ft. Max. hydraulic capacity each: 100 MGD
Primary Sedimentation Tanks (PST) - 12	38 ft. x 254 ft. Avg. liquid depth: 9.5 ft. Max. hydraulic capacity each: 30 MG
Biological Nutrient Removal (BNR) basins – 8 (normally 5 in service)	Total volume each: 14,800,000 gal. 1,978,610 cu. Ft. Design capacity each: 43 MGD Avg. Approx. liquid depth: 27 ft.
Secondary Sedimentation Tanks (SST) – 24 (number in service varies with seasonal flow)	Diameter: 130 ft. Side liquid depth: 20 ft. Max. hydraulic capacity each: 18 MGD
Granular Media Filters (GMF) – 20 (typically all in service in various modes)	Media area: 1395 sq. ft. Max. allowable (from permit) flow each: 10,460 GPM
Disinfection Contact Basins (DCB) – 4, each with 3 passes	Pass length: 345 ft Pass width: 20 ft Average water depth: 27 ft
Fixed Cover Digesters -6 normally in service	Diameter: 110 ft. Side liquid depth: 38.5 ft. Center liquid depth: 38 ft. Normal liquid volume each: 385,000 cu. ft.
Blending Digesters (Floating cover) – 2 (normally only one in service)	Diameter: 110 ft. Side liquid depth: 38.5 ft. Center liquid depth: 38 ft. Normal liquid volume each: 385,000 cu. ft.

Plant Pumping Capacities

At the risk of sounding redundant, it takes big pumps to handle big flows.

The following table gives you an idea of the number and capacities of the pumps we utilize to move so much flow to such large tanks:

Influent Pumps - 5	Capacity each: 125 MGD Horsepower each: 1250
Grit Pumps - 19	Capacity each: 250 GPM
Primary Sludge (PS) Pumps - 12	Capacity each: 265 GPM
Primary Scum (PSC) Pumps – 6	Capacity each: 50 GPM

Primary Effluent (PEPS) Pumps - 4	Capacity each: 120 MGD Horsepower each: 450 HP
Secondary Scum (SSC) Pumps - 6	4 at 1,500 GPM (Batteries I & II SSTs) 2 at 2500 GPM (Battery III SSTs)
Return Activated Sludge (RAS) Pumps – 2 per tank, running one in lead with one as backup – Total 48	Capacity each: 3300 GPM
Waste Activated Sludge (WAS) Pumps – 4	4 at 4000 GPM
Filter Influent Pumps (FIPS) – 2 High Capacity Pumps, 2 Low Capacity Pumps	High Capacity Pumps: • Capacity each: 170 MGD • Horsepower each: 1250 HP Low Capacity Pumps: • Capacity each: 110 MGD • Horsepower each: 800 HP
Filter Backwash Pumps – 4	4 at 50 MGD
Waste Filter Backwash (WFBW) Pumps - 4	4 at 8.25 MGD
Effluent Pumps - 4	Capacity each: 125 MGD Horsepower each: 1500

Average Concentrations after Treatment

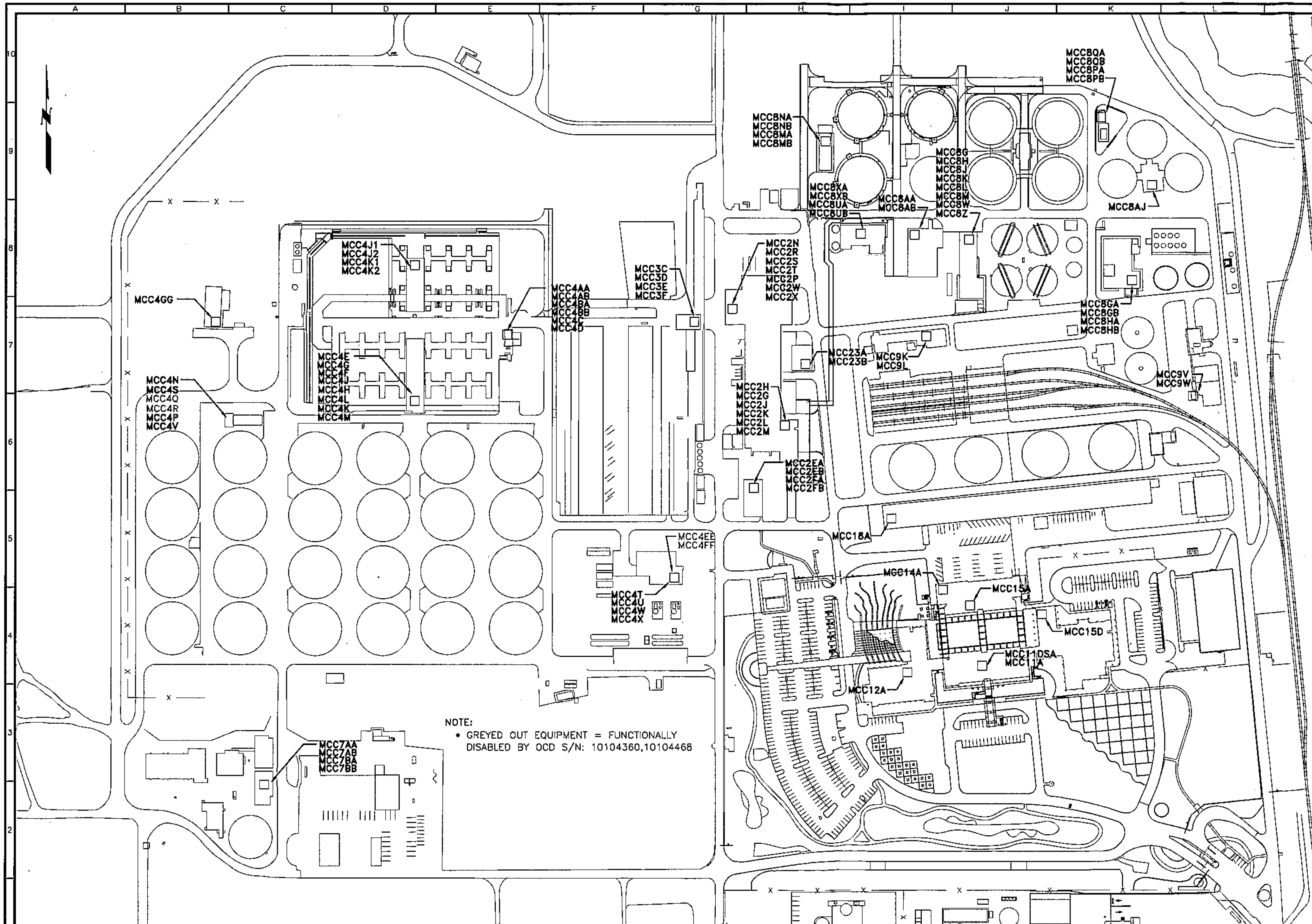
The following figures are based on a monthly dry weather discharge of 146 MGD. Unless otherwise noted, these are daily averages of the main constituents found in our effluent after Plant treatment processes.

The symbol "µg/l" means "micrograms per liter."

Average Effluent Temperature	80.2° F (Summer)	68.3° F (Winter)
BOD (5-Day, 20° C Biochemical Oxygen Demand)	3 mg/l	3,700 lbs/day
Total Suspended Solids	2.4 mg/l	2,000 lbs/day
Total Coliform (discharge limits of)	Weekly Median: 23 MPN/100 ml	Daily Max: 500 MPN/100 ml (2 consecutive)
pH	6.8	
Ammonia (30 day average)	<1.0 mg/l	
Arsenic	2.2 µg/l	

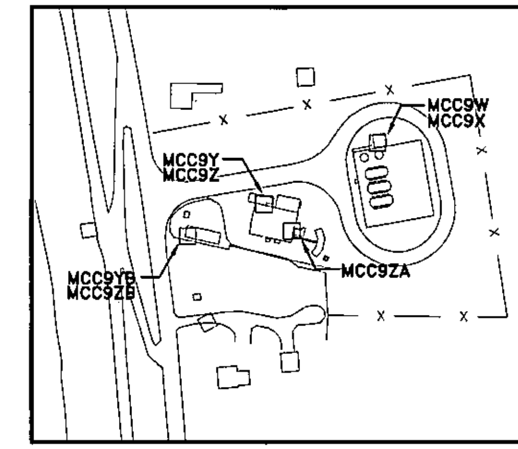
FIELD VERIFIED

MECHANICAL: N/A BY: N/A
ELECTRICAL: 02/05/2020 BY: KORY HAMMACK
CONTROL SYSTEMS: N/A BY: N/A

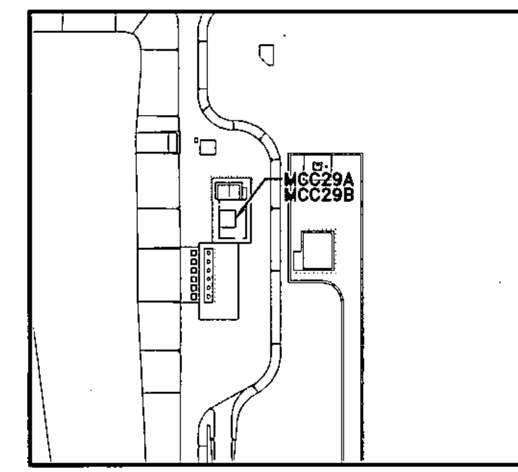


NOTE:
- GREYED OUT EQUIPMENT = FUNCTIONALLY DISABLED BY OCD S/N: 10104360,10104468

SRWTP PROCESS AREA



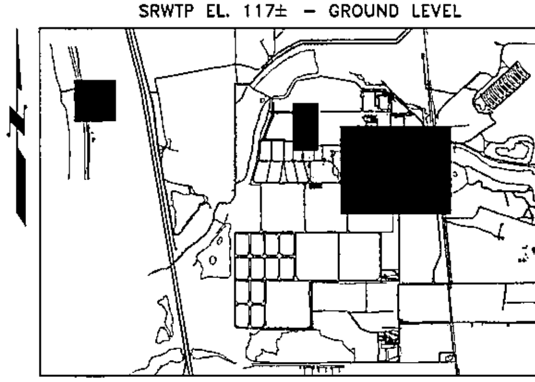
OUTFALL AREA



ESB-D SUBSTATION

KEY PLAN

SRWTP EL. 117± - GROUND LEVEL



SHADED AREA IS SHOWN ON THIS DRAWING

REGIONALSAN
Sacramento Regional County Sanitation District

MASTER SET

THIS DOCUMENT CONTAINS THE MOST CURRENT, BEST AVAILIBLE INFORMATION. UPDATE THIS DOCUMENT WHEN CHANGES OCCUR.

REVISIONS

ZONE	REV.	DESCRIPTION	BY	DATE	CAD	ZONE	REV.	DESCRIPTION	BY	DATE	CAD
I5	1	PER DCN-3842	JB	03/06	JC						
VAR	2	PER DCN-8535	RB	04/15	RAA						
VAR	3	PER DCN-8959	MB	12/15	HS						
VAR	4	PER DCN-13451	KH	12/20	BAM						
VAR	5	PER DCN-19435	AG	02/23	GF						
VAR	6	PER DCN-19459	AG	04/23	JFK						

SCALE
NO SCALE
LINE IS 2 INCHES AT FULL SIZE
(IF NOT 2"-SCALE ACCORDINGLY)

DRAWN G. OCAMPO
DATE 3/2004

GENERAL

MOTOR CONTROL CENTER (MCC) PANEL LOCATIONS

FILE NUMBER
10008304

DRAWING NUMBER
MCC-LOCATIONS

SHEET NUMBER
1 OF 2

ACE Table - Critical Asset List

	See SMP 4 Section 4.2.2 for Duty Unit Quantity Assumptions Function / Process Unit:	SMP 4.1: Equip Criticality (CoF): 4 | 5 | 6 | 7	Total Qty	Qty Used	Task Code 20: Critical Full Duty / Regulatory Minimum No. Required I/S Maximum completion time = 14 days Work Priority = 44, 45, 46, 47	Task Code 10: Urgent Standby Duty / Redundancy Minimum No. Available Work Priority = 24, 25, 26, 27	Task Code 15: Mandatory Minimum Available Units Work Priority = 34, 35, 36, 37	Task Code 5: Non-Urgent Repair No Full Duty / Redundancy Reduction Work Priority - 14, 15, 16, 17	Exceptions: Operational Context	Team
100	**UTILITIES / GLOBAL EQUIPMENT**									
101	**Reclaimed Water Pump Station**									B
102	WRH Pumps (also fire suppression system)	7	4	4	3	1	3			B
103	WRL Pumps	4	3	3	2	1	2			B
104	**I/E Building Utilities**									H
105	WHWS Pumps	5	3	3	2	1	2			H
106	WP Pumps (P25915, P25916)	6	2	2	1	1	1			H
107	WN Pumps (P25911, P25911, P25912, P25913)	6	4	4	2	2	2			H
108	**SA/UA Compressors**	7	4	4	3	1	3		UA and SA systems have 1 duty and 1 standby compressor each. Cross-connect shut normal operations, Cross-connect open for capacity or redundancy as needed.	H
109	**Electrical System (2 redundant 69 kV feeds)**	7	2	2	2		1		Scheduled Maintenance only during dry season April through Oct.	E
110	**All Other Electrical Equipment**	4-7	All	All	All		All		Criticality dependent on system - load being served. Scheduled Maintenance only during dry season April through Oct.	E
111	**AHUs, ACUs and HPs comfort building cooling**	3	All	All	All		All		No BCE required, repair at lowest immediate cost.	F
112	**Process Equipment Climate Control**	4	All	All	All		All		Heating, cooling, and ventilation units intended to control the climate of process-related instrumentation/controls shall be considered part of the treatment process. Quantities required to sustain this function (at 75% efficiency) shall be sustained at all times.	F
113	**Extreme Work Environment**	4	All	All	All		All		Heating, cooling, and ventilation units intended to control the climate in extreme work environments shall be considered part of the treatment process. Quantities required to sustain this function (at 75% efficiency) shall be sustained at all times.	F
114	**Pump Station Instrumentation / Control Systems**	7	All	All	All		All			I
115	**CTS-PLANT: Plant Cathodic Test Stations**	4	All	All			All		Report any deficiencies to Eng.	Eng
116	**FA: Fire Alarm System**	7	All	All	All		All		No BCE required, repair at lowest immediate cost.	CS
117	**CARTS**	3	All	All		All	All		Repairing carts is never an EM.	Mech
118	**Regulatory Instrumentation (including covered processes)**	5	All	All	All		All			All
119	**Safety/Security Instrumentation**	6,7	All	All	All		All			All
120	**PCF (Conveyance Systems)**	5	All	All	All		All		Use Task Code 10 for media change out.	I
121	**Pipelines - Pressurized**	7	All	All	All		All		Use Task Code 10 if redundancy is available.	All
122	**Pipelines - Gravity**	7	All	All	All		All		Use Task Code 10 if redundancy is available.	All
123	**Protective Devices (PSVs, PRVs, etc)**	5-7	All	All	All		All			
200	**PRELIMINARY PROCESS**									

	See SMP 4 Section 4.2.2 for Duty Unit Quantity Assumptions Function / Process Unit:	SMP 4.1: Equip Criticality (CoF): 4 | 5 | 6 | 7	Total Qty	Qty Used	Task Code 20: Critical Full Duty / Regulatory Minimum No. Required I/S Maximum completion time = 14 days Work Priority = 44, 45, 46, 47	Task Code 10: Urgent Standby Duty / Redundancy Minimum No. Available Work Priority = 24, 25, 26, 27	Task Code 15: Mandatory Minimum Available Units Work Priority = 34, 35, 36, 37	Task Code 5: Non-Urgent Repair No Full Duty / Redundancy Reduction Work Priority - 14, 15, 16, 17	Exceptions: Operational Context	Team
201	**HEADWORKS: Headworks**									H
202	Bar Screens	7	5	5	5		3		Bar Screen #2 (BSN21108) is for high flow and emergency/maintenance redundancy.	H
203	Loop, Screen Room Level (LEL Alarm Loop -Bar Screen Room)	7	1	1	1		1			H
204	Barscrn4: Bar Screen 4 (Trash Rack)	7	1	1	1					H
205	Bar Screen Crane	7	1	1	1		1			H
206	Influent Channel Isolation Gates	7	3	3	3		2		Jan & Feb: 3 gates required at all times.	H
207	Influent Channel Diversion Gates	7	3	3	3		2		Jan & Feb: 3 gates required at all times.	H
208	Rotry Dewatering Screen (Screenings Handling (HYCOR))	4	4	2	1	1	1		Screening Room 1: old GRO Hycors abandoned in place	H
209	**INFPUMP-SYS: Influent Pump System**									H
210	Influent Sewage Pumps	7	5	5	3	2	2		Jan & Feb: 5 pumps required at all times; Dec, Mar & Apr: 1 pump may be out of service for maintenance.	H
211	**PRIM-CHNL: Primary Influent Channel**									H
212	PI Channel Drain Gate	4	1	1	1		1			H
213	PI Channel Diversion Gates	7	2	2	1	1	1			H
214	PI Diversion Injectors	4	8	8	6	2	6			H
215	PI Channel Gates	6	3	3	3		3			H
216	**GRIT-SYS: Grit Removal System**									H
217	Aerated Grit Tanks	4	4	4	4		3		Dec to Feb: 4 Grit Tanks required at all times.	H
218	Grit Pumps (per Tank)	4	5	5	5		5			H
219	Grit Transmission Lines (per Tank)	4	2	2	2		2			H
220	Grit Classifiers	4	4	4	4		3		Dec to Feb: 4 Classifiers required at all times.	H
221	Grit Silo Hoist (Grit Hoppers)	4	2	2	1	1	1			H
222	Grit Ejector (Grit Ejectors and Hopper Transmission Lines)	4	2	2	1	1	1		The west grit classifier system is the Full Duty System. The east system is the backup/redundant system. The east grit classifier system will be exercised the minimum amount necessary to ensure the health of the equipment.	H
223	Grit Dewatering System Conveyors	4	2	2	1	1	1		The west grit classifier system is the Full Duty System. The east system is the backup/redundant system. The east grit classifier system will be exercised the minimum amount necessary to ensure the health of the equipment.	H
300	**PRIMARY PROCESS**									

	See SMP 4 Section 4.2.2 for Duty Unit Quantity Assumptions **Function / Process Unit:**	**SMP 4.1: Equip Criticality** (CoF): 4 | 5 | 6 | 7	**Total Qty**	**Qty Used**	**Task Code 20: Critical Full Duty / Regulatory** Minimum No. Required I/S Maximum completion time = 14 days Work Priority = 44, 45, 46, 47	**Task Code 10: Urgent Standby Duty / Redundancy** Minimum No. Available Work Priority = 24, 25, 26, 27	**Task Code 15: Mandatory** Minimum Available Units Work Priority = 34, 35, 36, 37	**Task Code 5: Non-Urgent Repair No Full Duty / Redundancy Reduction** Work Priority - 14, 15, 16, 17	**Exceptions: Operational Context**	**Team**
301	**PRIM-SED-SYS: Primary Sedimentation System**									B
302	Primary Sedimentation Tanks (3 tanks per battery)	6	12	12	12		9	Dec thru Feb.: all I/S; March: 11 Available.		B
303	Primary Sludge Pumps	6	12	12	12		9			B
304	Primary Scum Pumps / Grinders	6	6	6	6		5	Dec thru March: all I/S		B
305	Scum Longitudinal Collectors	6	12	12	12		9			B
306	Sludge Longitudinal Collectors	6	12	12	12		9			B
307	Scum Collector Screws / Troughs	4	12	12	12		9			B
308	PSC Transmission Lines	6	2	2	1	1	1			B
309	PS Transmission Lines	6	2	2	1	1	1			B
310	PS/CS Transmission Lines	6	1	0				Spare		B
311	PE Hydraulic Gates (per battery)	6	2	2	2		1			B
312	WRH Spray	4	4	4	4		3			B
313	Primary Effluent Diversion Gates	6	4	4	2	2	2			B
314	**PEPS: Primary Effluent Pumping Station**									
315	Gravity PE Diversion Gates	5	5	5	3	2	2			B
316	Discharge PE Diversion Gates	5	5	5	3	2	2			B
317	CFE Distribution Gates	5	2	2	2	1	1			B
318	BNR Diversion Gates	5	2	2	2	1	1	We need both		B
319	PE Primary Scum Pumps	4	**2**	1	2	1	1	Lead/Lag, could use portable scum-sucker pump if needed		B
320	PE Jetting Pumps	4	**2**	1	1	1	1	Two 100 % pumps		B
321	CFE Distribution Structure Drainage Pump	4	1	1	1		1			B
322	**PEPS Biofilter: Primary Effluent odor control**									
323	Vacuum Pump	4	4	2	2	1	1	Only run one skid		B
324	NSS SSE MOV	4	1	1	1		1			B
325	SCLS SSE MOV	5	1	1	1		1	Never use		B
326	Biofilter Outlet H2S Analyzer	5	2	2	2		1	Operations can take manual samples if the analyzer is unavailable		B
327	Stack H2S Analyzer	5	1	1	1		1			H
328	FAE H2S Analyzer	5	2	2	1		1	AIT505650 and AIT505651 in header upstream of Odor Control Fans		H
329	FAE LEL Analyzer	5	1	1	1		1			H
330	Biofilters	5	2	2	2		1			H
331	Odor Control Fan	5	3	3	2	1	2	If fan shuts down, PLC will auto-start the next one		H
332	Odor Control Stack Fan	5	2	2	1	1	1	Need both for two Odor control fans		H

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450	**NITRIFYING SIDE TREATMENT (NST)**									
451	**Flow Diversion Structure**									
452	Motorized Slide Gates	5	2	2	2		2			B
453	**Influent Pumping Station**									
454	Influent Pumps	5	2	2	2		2		One strategic spare pump available in stores in case of a failure of one pump. See EW Maintenance Strategy.	B
455	**Fine Screening / NSBR Splitter Box**									
456	Fine Screens	5	1	1	1		1		Long lead times. Stock spares in Stores: 1 ea. Eaton Interlock Kit, part no. C321KM60B and 2 ea. Eaton Contact, part no. CN15DN3AB.	B
457	Screenings Conveyor	5	1	1	1		1			B
458	**Nitrifying Sequence Batch Reactor (NSBRs - 3 total)**									
461	Waste Activated Sludge Submersible Pump (1 per NSBR, 3 total)	5	3	3	3		3			B
462	Aeration Blowers (2 per NSBR, 6 total, 3 may be added in future)	5	6	6	6		6			B
463	**Equalization (EQ) Basin / Effluent Pumping Station**									
464	NST Effluent Pump	4	3	3	2	1			Odor control at ESB-A	B
465	**Lime Storage & Feed Facility**									
466	Lime Storage & Feed Facilities	5	2	2	1	1	1			B
	SECONDARY PROCESS									
	SEC-PROCESS: Secondary Process									
500	**Biological Nutrient Removal: BNR**									
501	**BNR Basins (1-8)**								Out of service basins will be cycled during the dry season (summer)	B
502	BNR Basins (Structure)	6	8	8	5	1	5		Nov-Mar 8 tanks available;	B
505	Vertical Mixer - AX Zone (per basin)	5	4	4	3	1	3			B
507	Submersible Mixer - MLF/AN Zone (per basin)	5	4	4	3	1	3			B
508	Submersible Mixer - DeOx Zone (per basin)	5	1	1	1		1			B
509	Submersible Mixer - RAS Pre-Anoxic Zone (per basin)	5	7	7	6	1	6			B
510	ML Recycle Pumps (per basin)	5	2	2	2	1	1		Lead/Lag	B

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512	WAS Pump	5	4	4	2	1	2		Two pumps are needed at all times. Failure of function will result in an increase in operating costs due to inability to control MLSS and solids retention time.	B
513	WAS Flow Meter	5	2	2	2		2		Magnetic type; flow based calculation	B
515	Basin Drain Pump (No.1 - vertical axial)	4	2	2	1	1	1		Operations can switch to the spare pump in the other drain station to minimize transfer delay.	B
517	Basin Drain Pump (No.2 - rotary lobe)	4	2	2	1	1	1		Operations can start the spare pump in the other drain station to minimize transfer delay.	B
519	Gallery Sump Pump per location	4	2	2	1	1	1		Lead/Lag	B
525	Storm Drain Water Pumps per location	4	2	2	2	1	1		Lead/Lag	B
534	Scum Pump / Collector	4	16	16	13	3	10		8-Deox Zones; 4-Oxic Zones; 2-ML Channel; 1-RAS Pre-Anoxic; 1-PE Flow Splitting Structure	B
536	PE Flow Splitting Structure Scum Channel Isolation Gate	5	4	4	0	4	2			B
537	PE Flow Splitting Structure Basin Isolation Gate	5	8	8	7	1	6		Assume one basin out of service	B
544	ML Flow Splitting Structure Effluent Distribution Gates	5	24	24	18	6	16		One gate in operational per SST in service	B
547	ML Effluent Flow Splitting Structure Scum Pit Gate	4	3	3	3		3		Failure could result in excessive cleanup efforts	B
548	RAS Pre-Anoxic Basin Outlet Gate per channel	4	2	2	2	2	2			B
550	WAS Collection Channel Selector Inlet Gate (Weir)	4	2	2	1	1	1		Failure could result in excessive cleanup efforts; critical for WAS process	B
558	Basin Aeration Air Flow Control Valve Per Basin	5	10	10	10		9		Assume one basin out of service; loss of one aeration grid may be acceptable for short periods until repairs can be completed.	B
559	WAS Aeration Air Flow Control Valve	4	2	2	1	1	1			B
560	RAS Pre-Anoxic Zone Outlet Box Valve	4	2	2	1	1	1			B
561	PE Distribution Flow Meter Per Basin	5	1	1	1		1			B
562	Basin MLF/AN Chimney PE Flow Meter Per Basin	5	1	1	1		1			B
563	Basin RAS Flow Meter Per Basin	5	1	1	1		1			B
564	Aeration Air Flow Meter	4	82	82		82	81		2-WAS, 10-per Basin; loss of one aeration grid may be acceptable for short periods until repairs can be completed.	B
570	**BNR Aeration Blowers**									B
571	Main Aeration Blowers	5	6	5	3	1	2			B
580	**Secondary Sedimentation Tanks: SSTs**									B
581	Secondary Sedimentation Tanks	5	24	24	18	6	16		22 Tanks required Nov - Mar	B
582	RAS Pumps (2 per SST)	5	2	2	2		1			B

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										B
600	**EMERGENCY STORAGE BASIN SYSTEM**									B
601	Emergency Diversion Gates (Secondary Effluent V42858, V428589)	6	2	2	2				Gates must be operated together to avoid spill to Primary Deck.	B
602	ESB-A Inlet and Outlet Gates (ea.)	7	1	1	1					B
603	ESB-A Return Inlet (Gate)	6	1	1	1		1			B
604	ESB-B Inlet Gate	4	1	1	1					B
605	ESB-B Outlet and Drain Gates (ea.)	5	1	1	1					B
606	ESB-C1 Inlet Gate and Outlet Gates (ea.)	4	1	1	1					B
607	ESB-C1 Drain Gate	5	1	1	1					B
608	ESB-C2 Inlet and CFE Inlet Gates (ea.)	4	1	1	1					B
609	ESB-C2 Drain Gate	5	1	1	1					B
610	ESB-C3 Inlet and CFE Inlet Gates (ea.)	4	1	1	1					B
611	ESB-C3 Outlet Gate	6	1	1	1					B
612	ESB-C3 Drain Gate	5	1	1	1					B
613	ESB-D Inlet Gate	4	1	1	1					B
614	ESB-D Inlet Valves	6	2	2	2		1			B
615	ESB-D Drain Valve (Gate)	6	1	1	1		1		May be out of service for less than 8 hours for preventive maintenance.	B
616	ESB-D Pumps	5	6	6	5	1	5		November thru March – 6 full duty pumps required.	B
617	Flow Through Diversion Structure Pumps	4	2	2	2	1	1			B
618	Flow Through Diversion Structure Exhaust Fans	6	2	2	2				Fans are needed for adequate ventilation and personnel entry into structure.	B
619	Flow Through Diversion Structure FE Valves (V910015 and V910016)	6	2	2	2		2			B
620	Flow Through Diversion Structure FE Valves (V910017 and V910018)	5	2	2	2		2			B
621	SSE and CLS Connections to Interceptors SSE Valves	5	3	2	2		2		Includes Future NST and PEPS valves.	B
	ESB Washdown System									
622	ESB Motorized Monitors	5	34	34	34				Four units can be used simultaneously; there's no redundancy.	B
623	CLS Booster Pump	5	1	1	1		1			B
624	Washdown Pumps	5	4	4	3	1	3			B
	Storm Drain Pumping Station									
625	Storm Drain Pumps	4	4	4	2	2	2			B
626	Underdrain Pumps	6	3	3	2	1	2		Passive-overflow duck bill can be used as emergency back up.	B

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										B
700	**SECONDARY EFFLUENT SYSTEM**									B
701	**EFFPUMP-SYS: Effluent Pump System**									B
702	Effluent Pumps	6	4	4	3	1	2		Dec to Feb all pumps required for Full Duty.	B
703	Effluent Flow Meter	6	1	1	1		1		Must be in service when discharging to river.	B
704	Effluent Bypass Valves	6	4	4	4		2		Nov to Apr all valves required for Full Duty.	B
705	**EOS-SYS: North/South Final Effluent Channel**									B
706	EOS / SSB Flush / BRF Pumps (EOS-PMP: North/South	4	2	2	1	1	2		One pump is dedicated to the BRF supply.	B
707	EOS Channels	5	2	2	1	1	1		Nov to Apr both channels and supporting equipment are necessary for Full Duty.	B
708	EOS Injector Pumps	4	2	2					See EOS Channels. Used for SSB Flushing	B
800	**OUTFALL FACILITY**									
801	Outfall Compliance Instruments/Sampling	5	All	All	All		All		CFE & DFE, temp, Ph, turbidity (including sample pumps and lines).	H
802	Composite Samplers (2 I/S / 24-hr period)	5	4	4	3	1	2			H
803	BioAssay Lab	5	1	1	1		1		Maintenance will be performed when the BioAssay test is not underway.	H
804	BioAssay Pumps	5	2	2	2		1			H
805	P4 Sampling Pump	5	1	1	1		1		Maintenance will be performed when the P4 test is not underway.	H
806	Outfall Siphon Equipment at Backflow Structure	5	1	1	1		1		Maintenance will be performed when flow is diverted.	H
807	Siphon Vacuum Pumps (Outfall-Vac)	5	2	2	2		2		Two vacuum pumps are needed to ensure functionality of the siphon at all times. A	H
808	Siphon Break Valve	5	1	1	1		1			H
809	Effluent Backflow Valve (including backup power and control)	6	1	1	1		1		Maintenance will be performed when flow is diverted.	H
810	X09 Telemetry / Radio Telemetry	4	**2**	1	2		2		XO9 Telemetry is the primary/lead asset intended to be in service at all times. The	H
811	Generator	4	1	1	1		1			H
812	**Outfall Chemical Systems**									H
813	**X09-Caustic: Outfall Caustic**									H
814	Caustic Tanks	5	2	2	2		2		OCD	H
815	Caustic Pumps	5	2	2	2		2		OCD	H
816	Caustic Circulation Pumps	5	2	2	1	1	1		OCD	H
817	**X09-Bisulfite: Outfall Bisulfite**									H
818	Bisulfite Tanks	4	6	6	5	1	1		A minimum of five SBIS/Bisulfite tanks must be available.	H
819	Bisulfite Tank Vent Carbon Scrubber	6	1	1	1		1			H
820	Bisulfite Fill Pumps	4	2	2	1	1	1			H

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821	Bisulfite Feed Pumps	5	**2**	1	1				Assumes the other DCS SBIS metering pumps are available.	H
822	Bisulfite Containment Sump Pumps	5	**2**	1	1					H
823	Bisulfite Apron Sump Pumps	5	**2**	1	1					H
824	DCS SBIS Metering Pump (Big and Small)	5	4	4	3	1	2		Spare pump available in Stores. Two Small must be available at all times	H
825	DCS SBIS Unload Pump	5	2	2	1	1				H
826	DCS Submersible Chemical Sump Pumps	5	2	2	2				Spare pump avaialble in Stores.	H
827	DCS SBIS Fume Scrubber	5	1	1	1					H
830	**S02-INJ-SYS: Sulfur Dioxide Chemical Injection System**									
831	SO2 Injector Pumps	5	4	4	1	3	2			H
832	SO2 Injectors	5	6	6	2	4	4			H
900	**SOLIDS PROCESS, DIGESTION**									
901	**WAS-SYS: Waste Activated Sludge System**									
902	North WAS Pumps	4	2	0						B
903	South WAS Pumps - Small	4	4	4	3	1	3		Long lead time (23-30 calendar days) to repair the motors. (See BDR 11/28/12).	B
904	South WAS Pumps - Large	4	1	1	1		1			B
905	North / South RAS Classifier	4	2	2	1	1	1			B
906	BATT 1 & 2 SSC Pumps	4	3	3	2	1	2			B
907	BATT 3 SSC Pumps	4	2	2	1	1	1			B
908	ML Channel SSC Pumps	4	3	3		3	3		These pumps may run to fail.	B
909	WAS Transmission Lines	4	2	2	2		1		One serves GBT and one serves DAFT.	B
910	**WAS-DAFT: Waste Activated Sludge Dissolved Air Flotation Thickeners**									B
911	DAFT Thickeners (1000 gpm/ea.)	4	4	3	2	1	2		May require starting second GBT to go to 2 DAFT operation.	S
912	**GBT-SYS: Gravity Belt System**	4								
913	GBT (900 gpm/ea.)	4	4	4	3	1	2		At management direction, Full Duty = 2 to meet digester detention time.	S
914	GBT Polymer Blending Units	4	2	2	1	1	1			S
915	GBT Polymer Feed Pumps	4	3	3	1	2	1			S
916	GBT TWAS Pumps	4	2	2	1	1	1			S
917	TWAS Transmission Lines	4	2	2	2		2		Both used if GBT's in-service.	S
918	**MIX-SLU-SYS: Mixed Sludge System**									
919	MS Tanks	4	2	2	1	1	1		Both tanks are required in order to clean primary sludge lines.	S

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920	MS Transfer Pumps	4	**3**	2	1	1	1	The (1) Vaughn is the Full Duty System. The (1) Wemco is the backup/redundant		S
921	MS Transfer Transmission Flow Meters	4	2	2	1	1	1			S
922	MS Transfer Transmission Lines	4	2	2	1	1	1			S
923	**MIX-SLU-HEX: Mixed Sludge HEX Loop**									
924	MS HEX Circulation Pumps	4	2	2	2		1			S
925	MS HEX Hot Water Pumps	4	8	8	8		6			S
926	**DIG-SYS: Digester System**									
927	Blending Digester (Dig 9)	4	1	1		1		Digester 4 may be used as a blending digester.		S
928	Primary Digesters (Batt 2 and Batt 3 and Dig 4)	4	7	7	5	2	5	(2) Batt 2 and (2) Batt 3 and any other (1) Digester is the Full Duty System and the		S
929	CS Mixing Pumps (per Digester)	4	1	1	1		1			
930	HEX (per Digester)	4	1	1	1		1			S
931	Blender DS Transfer Pumps (per digester)	4	3	3	1	2	1			S
932	Drain Pumps	4	1	1	1		1			S
933	**DIG-BAT-3: Digester Battery 3**							See Primary Digesters.		S
934	MS Feed Pumps (per Digester)	4	1	1	1		1	The Feed Pumps will be exercised the minimum amount necessary to ensure the		S
935	MS Feed Pump Standby (Swing Pump)	4	1	1	1		1	The Feed Pumps will be exercised the minimum amount necessary to ensure the		S
936	MS Feed Valves (1 per Digester)	4	1	1		1		Feed Valves are lead and pumps are the backup.		S
937	Draft HEX Tube Mixers (per Digester)	4	3	3	2	1	1			S
938	Draft Tube Mixers (per Digester)	4	6	6	2	4	2			S
939	DS Pumps (per Digester)	4	2	2	1	1	1			S
940	CS Mixing Pumps (per Digester)	4	1	1		1		Not needed if all draft tube mixers are running.		S
941	CS Mixing Pump Standby (P83518)	4	1	0						S
942	Digester Drain Pump (per battery)	4	1	1		1		Strategic Spare Available.		S
943	Flame Arresters (per Digester)	4	2	2	2		2			S
944	MS Flow Meter (per Digester)	4	1	1	1		1			S
945	DS Flow Meter (per Digester)	4	1	1	1		1			S
946	LSG Flow Meter (per Digester)	4	1	1	1		1			S
947	**DIG-BAT-2: Digester Battery 2**							See Primary Digesters.		S
948	MS Feed Pumps (per Digester)	4	1	1	1		1			S
949	MS Feed Pump Standby	4	1	1	1		1			S
950	DS Pumps (per Digester)	4	2	2	1	1	1			S
951	CS Mixing Pumps (per Digester)	4	1	1	1		1			S
952	HEX (per Digester)	4	1	1	1		1			S

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953	GRC (per Digester)	4	1	1		1	1		Stock one GRC blower in Stores. One spare GRC motor with the correct electrical	S
954	Drain Pumps (per Battery)	4	1	1		1			Strategic Spare Available.	S
955	MS Flow Meter (per Digester)	4	1	1	1		1			S
956	DS Flow Meter (per Digester)	4	1	1	1		1			S
957	LSG Flow Meter (per Digester)	4	1	1	1		1			S
958	**GMS-SYS: Gas Management System**									S
959	Scrubbers	5	9	9	9		8			S
960	Waste Gas Burners	5	6	6	6		6			S
961	Ground Flares	5	3	3	2	1	2			S
962	LSG Holding Tanks	5	2	2	1	1	1			S
963	MSG Compressors	5	4	4	2	2	2			S
964	MSG Stg 1 HEX	5	2	2	1	1	1			S
965	MSG Stg 2 HEX	5	2	2	1	1	1			S
966	MSG Stg 3 HEX	5	2	2	1	1	1			S
967	MSG Transmission Lines	5	2	2	2		2			S
968	LSG Transmission Lines	5	2	1	1		1			S
969	**GMS-INST: GMS Alarm Loops**									S
970	LEL Alarm Loops	7	3	3	3		3			S
971	H2S Alarm Loops	7	4	4	4		4			S
972	UVIR Alarm Loops	7	4	4	4		4			S
973	**SSB-SYS: Solids Storage Basin System**									S
974	DS Valve Pad 2	4	1	1	1		1			S
975	SSB Pond	4	20	20	20		18		Mandatory Maintenance scheduled only during harvest season.	S
976	SSB Fans	5	10	10	8	2	8		These assets are required by air permit. Only 1 out of service in Battery 1 and (1)	S
977	Brush Aerators (per SSB)	4	2	2	2		1		Gridbees are operationally equivalent to Brush Aerators.	S
978	DS Feed Valves (per SSB)	4	2	2	2		2			S
979	**DLD-SYS: L-DLD System**									S
980	LDLD	4	**5**	3	3		3		2 DLD are closed and capped.	S
1000	**HVAC CENTRAL PLANT (SRWTP)**									
1001	**100123-BLR: Central Plant Boilers**									F
1002	Boilers	5	3	3	2	1	2			F
1003	Boiler Feed water Pumps - Steam Turbine	5	2	2	1	1	1		Only 1 used except when Cogen Starts.	F

	See SMP 4 Section 4.2.2 for Duty Unit Quantity Assumptions **Function / Process Unit:**	**SMP 4.1: Equip Criticality** (CoF): 4 | 5 | 6 | 7	**Total Qty**	**Qty Used**	**Task Code 20: Critical** **Full Duty / Regulatory** Minimum No. Required I/S Maximum completion time = 14 days Work Priority = 44, 45, 46, 47	**Task Code 10: Urgent** **Standby Duty / Redundancy** Minimum No. Available Work Priority = 24, 25, 26, 27	**Task Code 15: Mandatory** Minimum Available Units Work Priority = 34, 35, 36, 37	**Task Code 5: Non-Urgent Repair** **No Full Duty / Redundancy Reduction** Work Priority - 14, 15, 16, 17	**Exceptions: Operational Context**	**Team**
1004	Boiler Feed water Pumps - Electric	5	1	1	1		1		Only 1 used except when Cogen Starts.	F
1005	Blow down Tank	5	1	1	1		1			F
1006	Boiler Chemical Feed Pumps	5	4	3	2	1	2		These quantities are applicable in both wet and dry seasons. These three pumps	F
1007	**100123-HEX: Central Plant Heat Exchangers**									F
1008	Boiler HEX (Old)	5	**2**	1	1		1			F
1009	Boiler HEX (Zone E - B3 DIG)	5	**2**	1	1		1			F
1010	**100123-CHR: Central Plant Chillers**									F
1011	Chillers (Big)	5	**2**	1	1		OS		Only used during warm season, maintenance during cold season.	F
1012	Chillers (Small)	5	1	1	1		OS		Only used during cold season, maintenance during warm season.	F
1013	De-Aeration Tank	5	1	1	1		1			F
1014	**100123-HVAC: Central Plant HVAC**									F
1015	HVAC: Zone Pumps Chilled Water - Electric	5	4	4		4			Used to backup the steam turbine-driven chilled water pumps.	F
1016	HVAC: Zone Pumps Chilled Water - Steam Turbine	5	**7**	4	4		4			F
1017	HVAC: Zone Pumps Hot Water - Electric	5	5	5		5			Used primarily for temperature modulation/control, not backup for the steam turbine-	F
1018	HVAC: Zone Pumps Hot Water - Steam Turbine	5	6	6	6		6			F
1100	**HEAVY EQUIPMENT SOLIDS**									
1101	**MOBILE-HEAVYEQ-SOL: Heavy Equipment Solids**								All solids heavy equipment required during harvest season.	S
1102	Mud Cat (Dredge)	4	2	2	2		2			S
1103	Injection Tractors	4	**4**	2	2	2	2		Full duty units are 550-833 and 550-834. Backup units are 558-506 and	S
1104	Plow Tractors	4	2	2	2		2		Full duty units are 550-831 and 550-832.	S
1105	Disc Tractors	4	1	1	1		1		Full duty unit is 550-828.	S
1106	Hose Reel Tractor	4	1	1	1		1		Full duty unit is 550-829.	S
										S
1200	**STORMWTR P.S.: Stormwater System**									
1201	Stormwater Pumps to Headwork's (#1 to #4)	4	**4**	1		1			Pump #4 is the standby for #5.	H
1202	Stormwater Pumps to Plant (#5)	4	1	1		1	1			H
1203	**SUMPS**									H
1204	Sump 213 Pumps (Bar Screen Room)	6	3	3	2	1	2			H
1205	Sump 404 Pumps (Area 4)	6	3	3	2	1	2			H
1206	Sump 941 Pumps (Area 9 Patio)	6	2	2	2		2		Use portable pump if all pumps are out of service.	H
1207	Sump 945 Pumps (OCSS)	6	2	2	2		2			H

	See SMP 4 Section 4.2.2 for Duty Unit Quantity Assumptions Function / Process Unit:	SMP 4.1: Equip Criticality (CoF): 4 | 5 | 6 | 7	Total Qty	Qty Used	Task Code 20: Critical Full Duty / Regulatory Minimum No. Required I/S Maximum completion time = 14 days Work Priority = 44, 45, 46, 47	Task Code 10: Urgent Standby Duty / Redundancy Minimum No. Available Work Priority = 24, 25, 26, 27	Task Code 15: Mandatory Minimum Available Units Work Priority = 34, 35, 36, 37	Task Code 5: Non-Urgent Repair No Full Duty / Redundancy Reduction Work Priority - 14, 15, 16, 17	Exceptions: Operational Context	Team
1208	Sump 211 Pumps (Influent Pump Room)	6	2	2	2		2			H
1209	Sump 223 Pumps (Effluent Pump Room)	6	2	2	2		2			H
1300	**CAA: Channel Aeration**									H
1301	Channel Aeration Blowers (West)	5	4	4	2	1	2			B
1302	Channel Aeration Blowers (East)	5	3	3	2	1	1			H
1400	**ODORCONTROL: Odor Reduction System**									
1401	I&E ORT: Biological	5	1	1	1		1			H
1402	I&E ORT: FCF	5	8	8		8				H
1403	Primary ORT: Biological / Chemical	5	1	1	1		1	The chemical portion of the Primary ORT is not in use.		H
1404	Primary ORT: FCF	4	5	5		5		Returning these redundant units to service must be scheduled and planned in		H
1405	MVUs: RAS Channel	4	5	5	1	4	1	Have one Standby (spare) ready to be placed in service.		H
1500	**TERTIARY TREATMENT PROCESS**									B
1501	**WRFCHEM-SYS: WRF Chemical Storage**									B
1502	**Coagulant Feed System**	4								B
1503	Coagulant Storage Tank	4	1	1	1		1			B
1504	Coagulant Feed Pumps	4	2	2	1	1	1			B
1505	Flash Mixer (Waterchamp)	4	1	1	1		1	Water Champ is the primary mixer.		B
1506	Rapid Mixer	4	1	1		1		Backup to Flash Mixer.		B
1507	**Disinfection System**									B
1508	Hypochlorite Storage Tank (SCLS Storage Tank)	4	1	1	1		1			B
1509	Hypochlorite Feed Pumps	4	4	4	1	3	1			B
1510	Chlorine Mixer (Waterchamp/Rapid Mixer)	4	2	2	1	1	1			B
1511	Chlorine Contact Basin	4	1	1	1		1			B
1512	**Dechlorination System**									B
1513	Dechlor - Bisulfite Tank (CSO Storage Tank)	4	1	1	1		1			B
1514	Dechlor - Bisulfite Feed Pumps	4	2	2	1	1	1			B
1515	**Analyzer Systems**	4								B
1516	CCT Effluent Turbidimeter (Compliance Point)	4	1	1	1		1			B
1517	pH Analyzer (Compliance Point)	4	1	1	1		1			B
1518	CCT Effluent Cl2 Residual (Compliance Point)	4	1	1	1		1			B

	See SMP 4 Section 4.2.2 for Duty Unit Quantity Assumptions **Function / Process Unit:**	**SMP 4.1: Equip Criticality** (CoF): 4 | 5 | 6 | 7	**Total Qty**	**Qty Used**	**Task Code 20: Critical** **Full Duty / Regulatory** Minimum No. Required I/S Maximum completion time = 14 days Work Priority = 44, 45, 46, 47	**Task Code 10: Urgent** **Standby Duty / Redundancy** Minimum No. Available Work Priority = 24, 25, 26, 27	**Task Code 15: Mandatory** Minimum Available Units Work Priority = 34, 35, 36, 37	**Task Code 5: Non-Urgent Repair** **No Full Duty / Redundancy Reduction** Work Priority - 14, 15, 16, 17	**Exceptions: Operational Context**	**Team**
1519	**WRFFILTER-SYS: WRF Sand Filter System**									B
1520	Filter Feed Pumps	4	2	2	1	1	1			B
1521	Flocculation System - Tank and Slow Mixer	4	1	1	1		1			B
1522	Sand Filters	4	4	4	4		4			B
1523	Low Pressure Blowers	4	2	2	1	1	1			B
1524	Chemical Clean System	4	1	1	1		1			B
1525	Backwash Pumps	4	2	2	1	1	1			B
1526	**WRFPUMP-SYS: WRF Storage and Pump System**									B
1527	Air Compressor	4	1	1	1		1			B
1528	WRF Transfer Pumps (5 MGD each)	4	2	2	1	1	1			B
1529	Mudwell Pumps	4	3	3	2	1	2			B
1530	Distribution Pumps	4	6	6	4	2	4		Two small pumps available at all times (Task Code 20 will be used).	B
1531	Distribution Transmission Pipeline	4	1	1	1		1			B
1532	Backup Well (1750 gpm capacity)	4	1	1	1		1			B
1533	**WRF Instrumentation**									B
1534	WRF Turbidimeters	4	All	All	All		All			B
1535	CCT Influent Cl2 Residual	4	1	1	1		1			B
1536	WRF Flowmeters	4	All	All	All		All			B
1537	Water pressure to Distribution System	4	1	1	1		1			B
										B
1600	**CHEMICAL SYSTEM**									
1601	**CHEM-HANDLING: Chemical Handling**	5								H
1602	**Disinfection Chemical Storage (DCS)**									H
1603	SCLS Bulk Storage Tank	5	10	10	8/9	1			Eight SCLS tanks minimum in the summer and ten required in the winter.	H
1604	SCLS Day Tank	5	2	2	1	1				H
1605	SCLS Metering Pump for Effluent Chlorination (701, 702, 703)	5	3	3	2	1			Must have a minimum of 3 pumps available and dedicated to effluent chlorination between 701, 702, 703, 401 and 402 for chlorination.	H
1606	SCLS Metering Pump for Odor Control (401, 402, 403)	5	3	3	2	1			Must have a minimum of 2 pumps available and dedicated to odor control between	H
1607	SCLS Transfer Pumps (Tanks 1, 2)	5	2	2	1	1				H
1608	SCLS Transfer Pumps (Tanks 3, 4, 5)	5	2	2	1	1				H
1609	SCLS Transfer Pumps (Tanks 6, 7)	5	2	2	1	1				H

	See SMP 4 Section 4.2.2 for Duty Unit Quantity Assumptions **Function / Process Unit:**	**SMP 4.1: Equip Criticality** (CoF): 4 | 5 | 6 | 7	**Total Qty**	**Qty Used**	**Task Code 20: Critical** **Full Duty / Regulatory** Minimum No. Required I/S Maximum completion time = 14 days Work Priority = 44, 45, 46, 47	**Task Code 10: Urgent** **Standby Duty / Redundancy** Minimum No. Available Work Priority = 24, 25, 26, 27	**Task Code 15: Mandatory** Minimum Available Units Work Priority = 34, 35, 36, 37	**Task Code 5: Non-Urgent Repair** **No Full Duty / Redundancy Reduction** Work Priority - 14, 15, 16, 17	**Exceptions: Operational Context**	**Team**
1610	SCLS Transfer Pumps (Tanks 8, 9, 10)	5	2	2	1	1				H
1611	SCLS Unload Pump	5	4	4	2	2			Minimum of one unload pump per side.	H
1612	SCLS Strainers	5	All	All	All		All			H
1613	Wetlands Pump Station Pumps	4	2	2	1	1				H
1614	IJS Injectors	5	4	4	4		3			H
1615	**Ferric Chloride**									H
1616	Pumps	4	2	2	1	1	1			H
1617	Piping (including strainers)	4	All	All	All		All			H
1618	Tanks	4	6	6	3	3	3			H
1619	**Chemical Rail Yard**	4	All	All	All		All		Notify management if any failure occurs.	H
										H
1700	**INTERCEPTORS**								Equipment listed below is maintained by SacSewer since 7 / 2020 except for odor	
1701	**PUMP STATIONS: Pump Stations**									
1702	**N19 - Arden PS**									I
1703	1100 hp pumps (1, 2 and 4)	7	3	3	3		2			I
1704	800 hp pumps (3)	7	1	1		1	1		Pump VFD is currently non-operational. Unit operated manually.	I
1705	1500 KW Generators (Bldg)	7	3	3	3		2		Generators are used as backup power at D05. Notify management if any failure	I
1706	12 Ton Crane (Motor Room)	3	1	1	1		1		The crane may be occasionally taken out of service for long-term maintenance in	I
1707	Sluice Gates (Upper WW, Lower WW and Influent)	7	3	3	3		1		Inlet gate must always be in operation.	I
1708	Knife Gate Valves (each pump)	7	**5**	4	3	1	2			I
1709	Surge Tanks	7	4	4	4		3			I
1710	**N40 - Iron Point Road PS**									I
1711	185 hp pumps (100, 200, 300)	7	3	3	2	1	1			I
1712	500 KW Generator (Building)	7	1	1	1		1			I
1713	Sluice Gate (WW)	7	1	1	1		1			I
1714	Biofilter	5	1	1	1					I
1715	Crane (WW)	4	1	1		1				I
1716	Accumulators (surge system)	7	2	2	1	1	1			I
1717	**N50 - South River PS**									I
1718	1750 hp pumps (West Pump 1100, East Pump 1200)	7	2	2	2		1			I
1719	350 hp pumps (West Pump 1500, East Pump 1600)	7	2	2		2	2			I
1720	Bio Scrubbers	5	2	2	1	1	1			I

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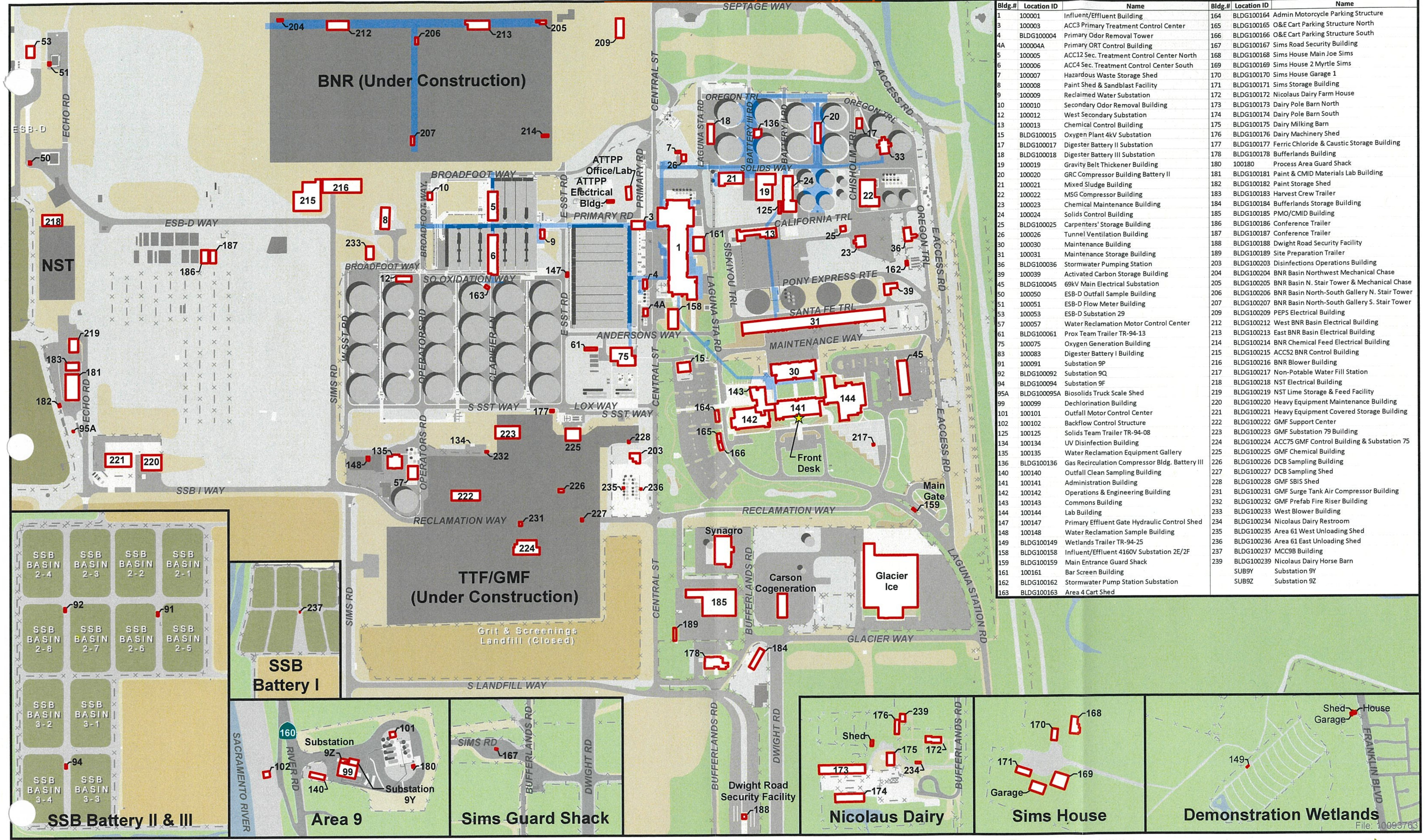
1721	Carbon Filters	5	2	2	1	1	1			I
1722	2000 KW Generator (Building)	7	2	2	2		1	Need 2nd generator to start second pump.		I
1723	Sluice Gates (East WW, West WW)	7	2	2	2		1			I
1724	Roller Gates (East WW, West WW)	4	2	2		2				I

EchoWater Facility: Building Map



Bldg.#	Location ID	Name	Bldg.#	Location ID	Name
1	100001	Influent/Effluent Building	164	BLDG100164	Admin Motorcycle Parking Structure
3	100003	ACC3 Primary Treatment Control Center	165	BLDG100165	O&E Cart Parking Structure North
4	BLDG100004	Primary Odor Removal Tower	166	BLDG100166	O&E Cart Parking Structure South
4A	100004A	Primary ORT Control Building	167	BLDG100167	Sims Road Security Building
5	100005	ACC12 Sec. Treatment Control Center North	168	BLDG100168	Sims House Main Joe Sims
6	100006	ACC4 Sec. Treatment Control Center South	169	BLDG100169	Sims House 2 Myrtle Sims
7	100007	Hazardous Waste Storage Shed	170	BLDG100170	Sims House Garage 1
8	100008	Paint Shed & Sandblast Facility	171	BLDG100171	Sims Storage Building
9	100009	Reclaimed Water Substation	172	BLDG100172	Nicolaus Dairy Farm House
10	100010	Secondary Odor Removal Building	173	BLDG100173	Dairy Pole Barn North
12	100012	West Secondary Substation	174	BLDG100174	Dairy Pole Barn South
13	100013	Chemical Control Building	175	BLDG100175	Dairy Milking Barn
15	BLDG100015	Oxygen Plant 4kV Substation	176	BLDG100176	Dairy Machinery Shed
17	BLDG100017	Digester Battery II Substation	177	BLDG100177	Ferric Chloride & Caustic Storage Building
18	BLDG100018	Digester Battery III Substation	178	BLDG100178	Bufferlands Building
19	100019	Gravity Belt Thickener Building	180	100180	Process Area Guard Shack
20	100020	GRC Compressor Building Battery II	181	BLDG100181	Paint & CMID Materials Lab Building
21	100021	Mixed Sludge Building	182	BLDG100182	Paint Storage Shed
22	100022	MSG Compressor Building	183	BLDG100183	Harvest Crew Trailer
23	100023	Chemical Maintenance Building	184	BLDG100184	Bufferlands Storage Building
24	100024	Solids Control Building	185	BLDG100185	PMO/CMID Building
25	BLDG100025	Carpenters' Storage Building	186	BLDG100186	Conference Trailer
26	100026	Tunnel Ventilation Building	187	BLDG100187	Conference Trailer
30	100030	Maintenance Building	188	BLDG100188	Dwight Road Security Facility
31	100031	Maintenance Storage Building	189	BLDG100189	Site Preparation Trailer
36	BLDG100036	Stormwater Pumping Station	203	BLDG100203	Disinfections Operations Building
39	100039	Activated Carbon Storage Building	204	BLDG100204	BNR Basin Northwest Mechanical Chase
45	BLDG100045	69kV Main Electrical Substation	205	BLDG100205	BNR Basin N. Stair Tower & Mechanical Chase
50	100050	ESB-D Outfall Sample Building	206	BLDG100206	BNR Basin North-South Gallery N. Stair Tower
51	100051	ESB-D Flow Meter Building	207	BLDG100207	BNR Basin North-South Gallery S. Stair Tower
53	100053	ESB-D Substation 29	209	BLDG100209	PEPS Electrical Building
57	100057	Water Reclamation Motor Control Center	212	BLDG100212	West BNR Basin Electrical Building
61	BLDG100061	Prox Team Trailer TR-94-13	213	BLDG100213	East BNR Basin Electrical Building
75	100075	Oxygen Generation Building	214	BLDG100214	BNR Chemical Feed Electrical Building
83	100083	Digester Battery I Building	215	BLDG100215	ACC52 BNR Control Building
91	100091	Substation 9P	216	BLDG100216	BNR Blower Building
92	BLDG100092	Substation 9Q	217	BLDG100217	Non-Potable Water Fill Station
94	BLDG100094	Substation 9F	218	BLDG100218	NST Electrical Building
95A	BLDG100095A	Biosolids Truck Scale Shed	219	BLDG100219	NST Lime Storage & Feed Facility
99	100099	Dechlorination Building	220	BLDG100220	Heavy Equipment Maintenance Building
101	100101	Outfall Motor Control Center	221	BLDG100221	Heavy Equipment Covered Storage Building
102	100102	Backflow Control Structure	222	BLDG100222	GMF Support Center
125	100125	Solids Team Trailer TR-94-08	223	BLDG100223	GMF Substation 79 Building
134	100134	UV Disinfection Building	224	BLDG100224	ACC75 GMF Control Building & Substation 75
135	100135	Water Reclamation Equipment Gallery	225	BLDG100225	GMF Chemical Building
136	BLDG100136	Gas Recirculation Compressor Bldg. Battery III	226	BLDG100226	DCB Sampling Building
140	100140	Outfall Clean Sampling Building	227	BLDG100227	DCB Sampling Shed
141	100141	Administration Building	228	BLDG100228	GMF SBIS Shed
142	100142	Operations & Engineering Building	231	BLDG100231	GMF Surge Tank Air Compressor Building
143	100143	Commons Building	232	BLDG100232	GMF Prefab Fire Riser Building
144	100144	Lab Building	233	BLDG100233	West Blower Building
147	100147	Primary Effluent Gate Hydraulic Control Shed	234	BLDG100234	Nicolaus Dairy Restroom
148	100148	Water Reclamation Sample Building	235	BLDG100235	Area 61 West Unloading Shed
149	BLDG100149	Wetlands Trailer TR-94-25	236	BLDG100236	Area 61 East Unloading Shed
158	BLDG100158	Influent/Effluent 4160V Substation 2E/2F	237	BLDG100237	MCC9B Building
159	BLDG100159	Main Entrance Guard Shack	239	BLDG100239	Nicolaus Dairy Horse Barn
161	100161	Bar Screen Building		SUB9Y	Substation 9Y
162	BLDG100162	Stormwater Pump Station Substation		SUB9Z	Substation 9Z
163	BLDG100163	Area 4 Cart Shed			

N

SRWTP Buildings

March 2022

Legend

Buildings

Underground Tunnels (shaded blue)

REGIONALSAN
TAKING THE WASTE OUT OF WATER