KIER+WRIGHT

January 16, 2023

San Joaquin County
Department of Public Works
1810 E Hazelton Ave
Stockton, CA 95201

RE: Water Supply and Sewer Treatment Systems for Pacific Gateway

To Whom it May Concern,

Attached is our team's and analysis for water supply, potable-fire-irrigation systems, sanitary sewer treatment and storm drainage approaches for the Pacific Gateway Specific Plan and entitlements.

We have reviewed and submitted proposed generation rates for all major utilities and provided our team's attached approach to the water and wastewater treatment systems and look forward to meeting with County Public Works in January to discuss. We are in process on the following items to discuss with County Public Works and Planning Department.

Water Supply

We are preparing a Preliminary Technical Report to be submitted to the State Water Resources Control Board's Department of Drinking Water (DDW). The report will discuss infrastructure costs, results of well drillers water quality data and an economic analysis. We would like to discuss details with County staff and scheduling requirements as we proceed with CEQA review of the project. In addition we will work with staff to schedule meetings with City of Tracy, LAFCO, Irrigation Districts. We also want to discuss with the County having Cal Water or similar entity to operate and maintain the proposed systems.

Our team will be preparing a 610 Water Supply Assessment to support environmental document preparation needed by County Planning Department

We will also prepare a Title 22 application for DDW, which we expect will take 3 months plus a six-month review by DDW.

Wastewater

We will also prepare 4 reports for Regional Water Quality Control Board (RWQCB). All permits on wastewater will be submitted to the regional board since the project produces more than 10,000 gpd, These are permits tied to the wastewater treatment, recycled water system and water quality parameters associated with both.

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Storm Drainage

We have prepared an analysis of retention basin system required for Phase 1 and overall project.

Please review all the attached documents and tentative maps and we look forward to meeting with your team.

Sincerely,

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PRESIDENT
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TECHNICAL MEMORANDUM

DATE: November 23, 2022,
TO: Carter Reiff, PE
FROM: Glen M. Anderson, PE
SUBJECT: Pacific Gateway Development Wastewater Treatment and Disposal Systems

Introduction

As part of the preliminary development plans for the Pacific Gateway development (Project), Kier & Wright has contracted Schaaf & Wheeler to establish required wastewater generation rates for the proposed development, and to provide recommendations on wastewater collection, treatment, and disposal. This memorandum serves to provide estimated wastewater generation rates for the development as well as preliminary sewer collection system, treatment, and disposal infrastructure requirements.

The Project consists of developing existing farm land into industrial usage, as well as the addition of a university. The Project will convert approximately 1,603 acres existing agriculture land into multi-industrial use. The property is located in San Joaquin County, just south of the city of Tracy. The project is enclosed by Durham Ferry Rd. on the north, Tracy Blvd. on the west, S Bird Rd. on the east, and is parallel to California Aqueduct and Interstate 132. The project area is shown in Figure 1.

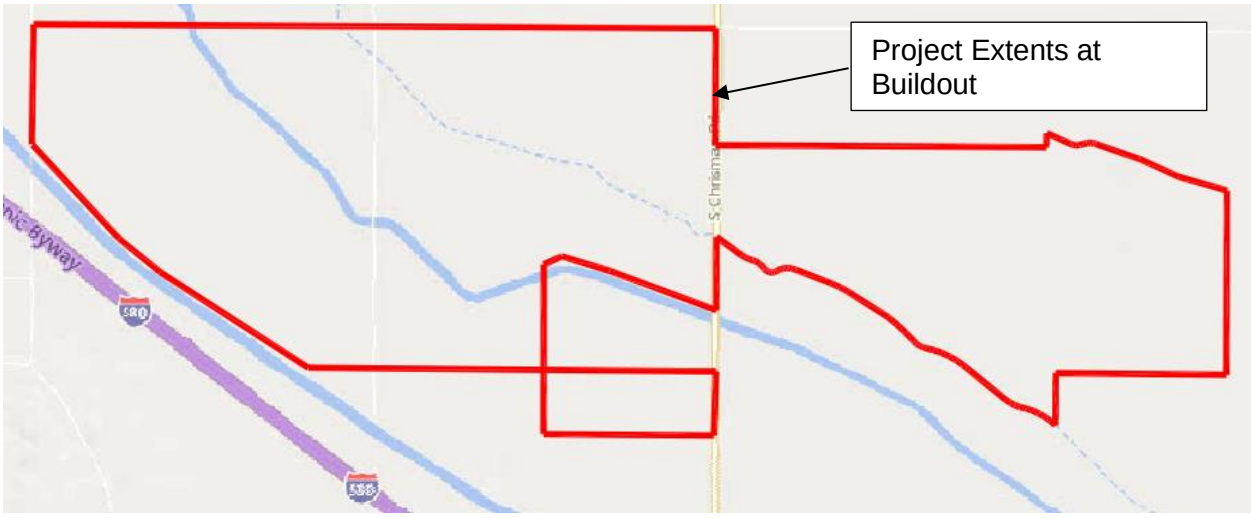


Figure 1. Project Area

Wastewater Generation

Due to the size of the Project, it is anticipated that construction will occur in phases. Figure 2 below shows the anticipated Project phases, with areas highlighted red anticipated to be the first phase.

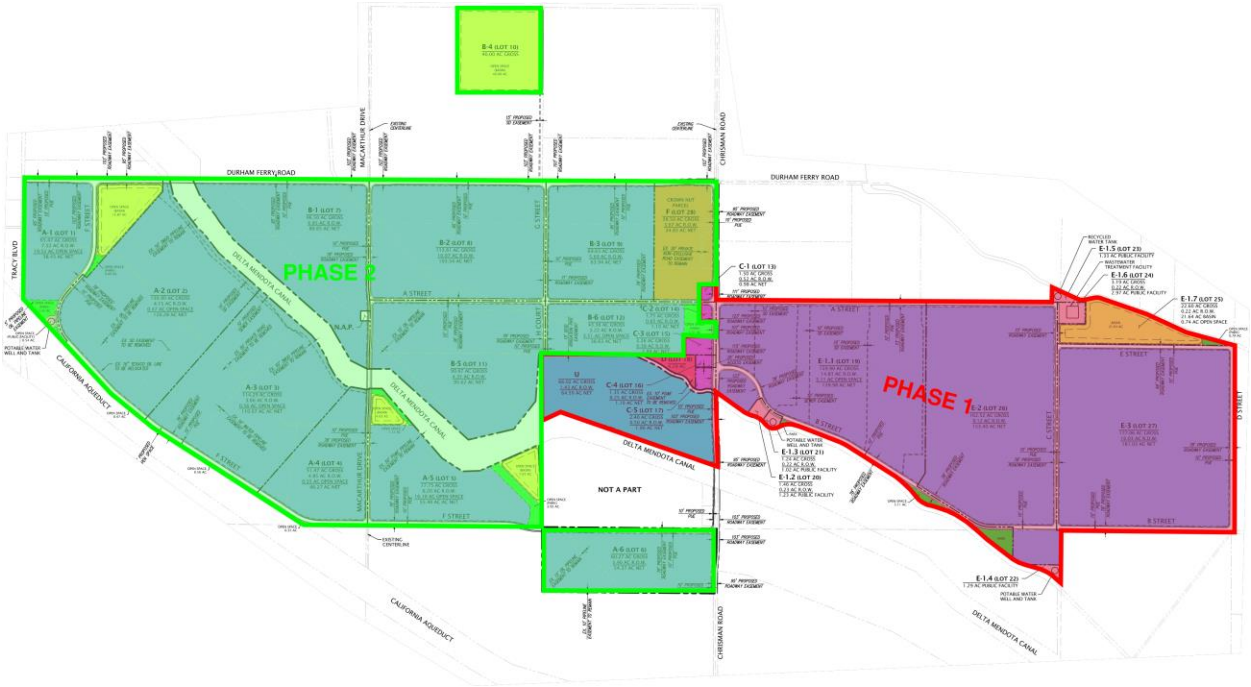


Figure 2. Project Phases

It is anticipated that 100 percent of the Project's wastewater will be generated from domestic use of potable water. To that end, wastewater generation is directly tied to the water demands of the Project. Schaaf & Wheeler has separately prepared a technical memorandum outlining the Project's water demands. Because fire water and irrigation water are to be separate systems within the Project, it is estimated that approximately 90 percent of domestic water will return to the sewer as wastewater. Table 1 outlines the sewer generation rates by area, indicating a total wastewater generation rate for the site of 0.237 million gallons per day (mgd).

Table 1. Estimated Sewage Generation

Area Name	ADD Water Use (gpd)	Average Sewage Generation (gpd)
A-1	9,493	8,544
A-2	18,891	17,082
A-3	16,572	14,915
A-4	7,463	6,717
A-5	11,274	10,146
A-6	8,739	7,865
B-1	13,993	12,593
B-2	16,473	14,826
B-3	10,096	9,087
B-4	5,800	5,220
B-5	14,496	13,046
B-6	6,287	5,658
C-1	3,000	2,700
C-2	3,500	3,150
C-3	6,520	5,868
C-4	2,700	2,430
C-5	4,800	4,320
D	622	560
E-1	27,696	24,927
E-2	23,565	21,209
E-3	25,674	23,106
U	25,620	23,058
Total	**263,365**	**237,028**

Wastewater Collection System

The Project's wastewater will be collected from each parcel through a traditional wastewater collection system. The Project's wastewater treatment plant (WWTP) is located in the eastern-most portion of the project. The wastewater collection system will route flows to the proposed WWTP. Figure 3 shows the approximate layout of the wastewater collection system as well as the location of the WWTP.

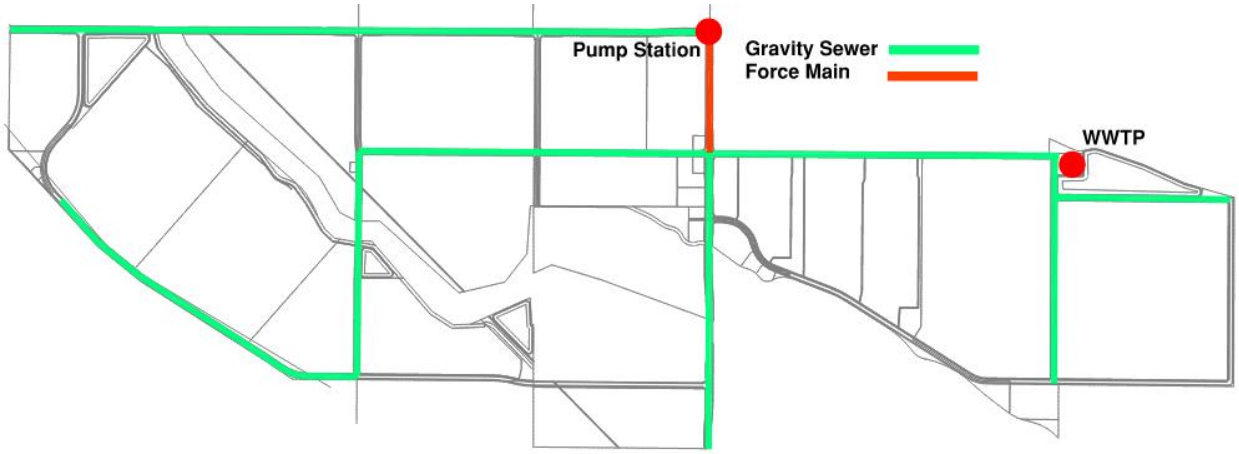


Figure 3. Wastewater Collection System

Due to the simple nature of the proposed wastewater system, manual calculations, using Manning's equation, were performed to determine pipe sizes. Flow in each pipeline was determined by apportioning the total wastewater flow shown in Table 1 to the proposed buildings for those areas. Pipeline slopes were selected to match the slope of the natural topography, to the maximum extent possible. Based on the calculations, the gravity pipelines will be 6-inch through 12-inch pipe, depending on location and amount of flow.

As shown in Figure 3, the bulk of the collection system is composed of gravity pipelines. A wastewater pump station will be necessary within the system, along Durham Ferry Road. It is also important to note that as configured, the wastewater collection system crosses the Delta Mendota Canal using an inverted siphon at two locations. It may be necessary to convert these to wastewater pump stations and force mains during design, pending hydraulic considerations, and agency feedback.

Wastewater Treatment System

In order to treat the approximately 0.24 mgd of wastewater, it is anticipated that a prepackaged WWTP will be installed. An operating permit issued by the Central Valley Regional Water Quality Control Board CVRWQCB will establish operating, performance and reporting requirements for on-site treatment and disposal facilities.

It is proposed that the wastewater will be treated to the *Disinfected Tertiary Recycle Water Standard* and will be suitable for use throughout the project site for landscape irrigation and/or at the surrounding farms in the area. The WWTP is proposed to include the following components:

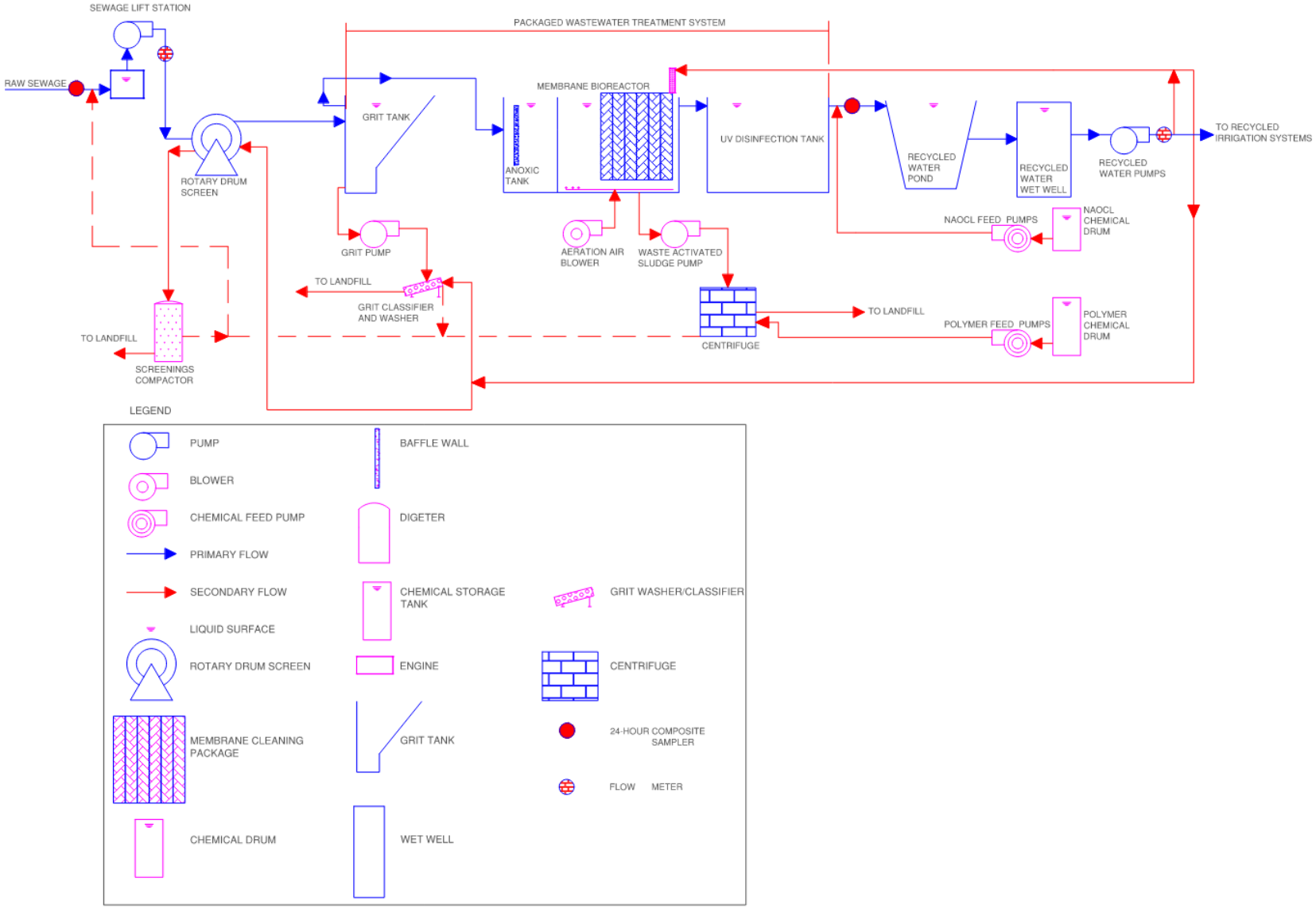
1. A flow equalization system (sewage pump station wet well).
2. (2) Rotary drum screens for screenings removal (1 unit for Phase 1).
3. Compactor for screenings disposal at landfill.
4. (2) Packaged MBR-based wastewater treatment above ground steel tank systems with grit tank, anoxic zone (nitrogen control), UV Channel (disinfection) and support equipment (One packaged train for Phase 1).
5. Sodium hypochlorite feed system to maintain the residual requirement anticipated in the Operating Permit.
6. Recycled water pump station to distribute irrigation water to on-site landscaped.
7. Plant water system for maintenance.
8. Plant compressed air system for maintenance.

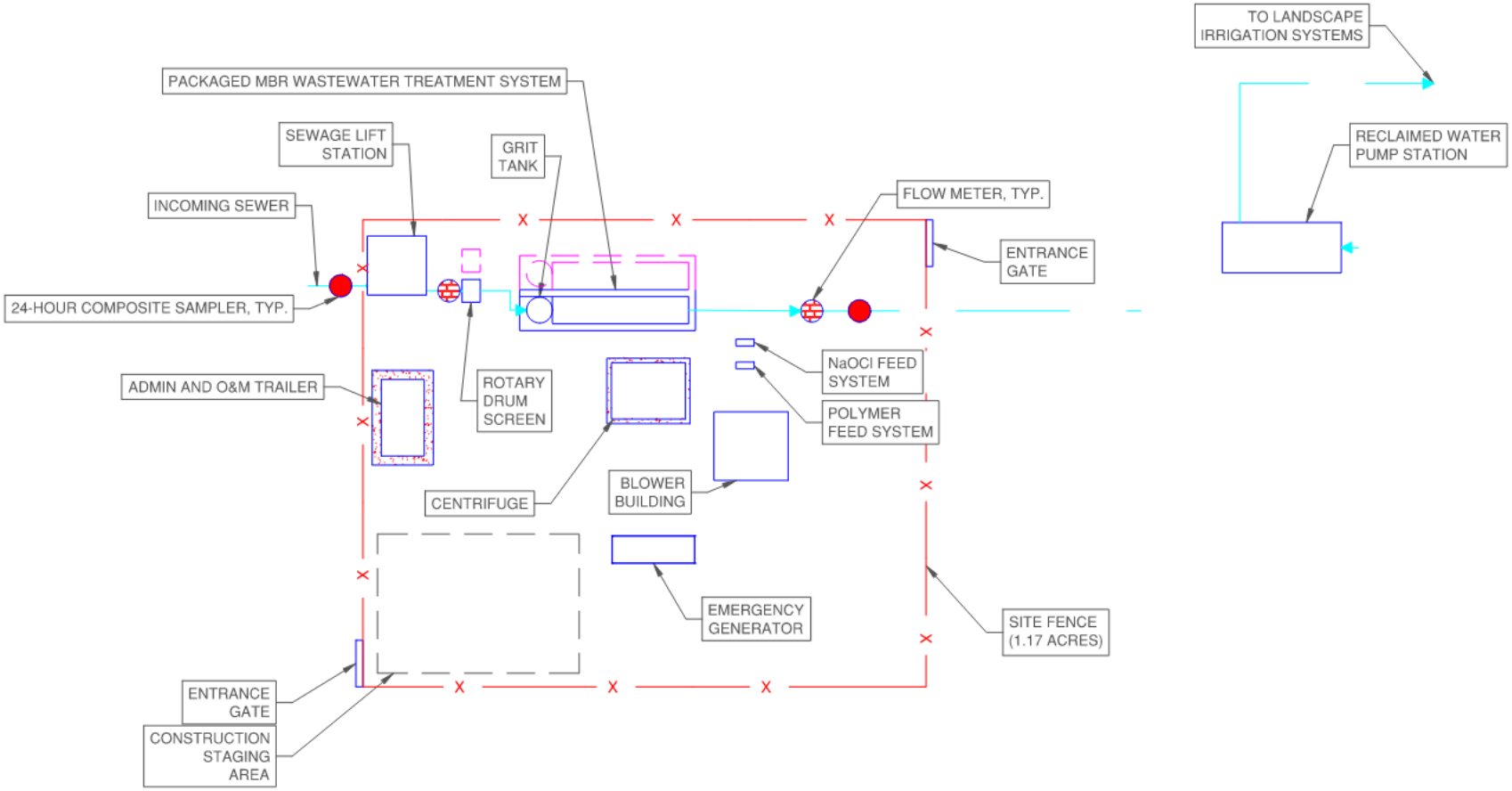
9. (2) centrifuges for drying of waste activated sludge, creating a product suitable for landfill disposal (1 for Phase 1).
10. Diesel engine driven emergency generator for backup power.

Figure 4 shows a flow diagram of the treatment system. Figure 5 shows a preliminary site layout with both Phase 1 and Ultimate Systems depicted. Approximately 1.17 acres will be needed for the ultimate tanks, equipment, building and accessories for the treatment system.

Treated Wastewater Disposal Facilities

Recycled water will be disposed of through irrigation of landscaping within the Project site and, potentially, to surrounding agricultural properties. The recycled water was generally described in Schaaf & Wheeler's Technical Memorandum discussing the water system


SEWAGE LIFT STATION
PACKAGED WASTEWATER TREATMENT SYSTEM
RAW SEWAGE
ROTARY DRUM SCREEN
GRIT TANK
MEMBRANE BIOREACTOR
ANOXIC TANK
UV DISINFECTION TANK
RECYCLED WATER POND
RECYCLED WATER WET WELL
RECYCLED WATER PUMPS
TO RECYCLED IRRIGATION SYSTEMS
NAOCL FEED PUMPS
NAOCL CHEMICAL DRUM
GRIT PUMP
AERATION AIR BLOWER
WASTE ACTIVATED SLUDGE PUMP
TO LANDFILL
GRIT CLASSIFIER AND WASHER
TO LANDFILL
SCREENINGS COMPACTOR
CENTRIFUGE
TO LANDFILL
POLYMER FEED PUMPS
POLYMER CHEMICAL DRUM
LEGEND
PUMP
BLOWER
CHEMICAL FEED PUMP
PRIMARY FLOW
SECONDARY FLOW
LIQUID SURFACE
ROTARY DRUM SCREEN
MEMBRANE CLEANING PACKAGE
CHEMICAL DRUM
BAFFLE WALL
DIGETER
CHEMICAL STORAGE TANK
ENGINE
GRIT TANK
WET WELL
GRIT WASHER/CLASSIFIER
CENTRIFUGE
24-HOUR COMPOSITE SAMPLER
FLOW METER


TO LANDSCAPE IRRIGATION SYSTEMS
RECLAIMED WATER PUMP STATION
PACKAGED MBR WASTEWATER TREATMENT SYSTEM
SEWAGE LIFT STATION
GRIT TANK
INCOMING SEWER
FLOW METER, TYP.
ENTRANCE GATE
24-HOUR COMPOSITE SAMPLER, TYP.
NaOCl FEED SYSTEM
ADMIN AND O&M TRAILER
ROTARY DRUM SCREEN
POLYMER FEED SYSTEM
BLOWER BUILDING
CENTRIFUGE
EMERGENCY GENERATOR
SITE FENCE (1.17 ACRES)
ENTRANCE GATE
CONSTRUCTION STAGING AREA

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TECHNICAL MEMORANDUM

DATE: November 23, 2022
TO: Carter Reiff, PE
FROM: Glen M. Anderson, PE
SUBJECT: Pacific Gateway – Water Demands and System Requirements

Introduction

As part of the preliminary development plans for the Pacific Gateway development (Project), Kier & Wright has contracted Schaaf & Wheeler to establish required water demands for the proposed development, and to provide recommendations on water system requirements. This memorandum serves to provide estimated water requirements for the development as well as preliminary water system infrastructure requirements.

The Project consists of developing existing farm land into industrial usage, as well as the addition of a university. The Project will convert approximately 1,603 acres existing agriculture land into multi-industrial use, a university, and commercial properties. The property is located in San Joaquin County, just south of the city of Tracy. The project is enclosed by Durham Ferry Rd. on the north, Tracy Blvd. on the west, S Bird Rd. on the east, and is parallel to California Aqueduct and Interstate 132. The project area is shown in Figure 1.

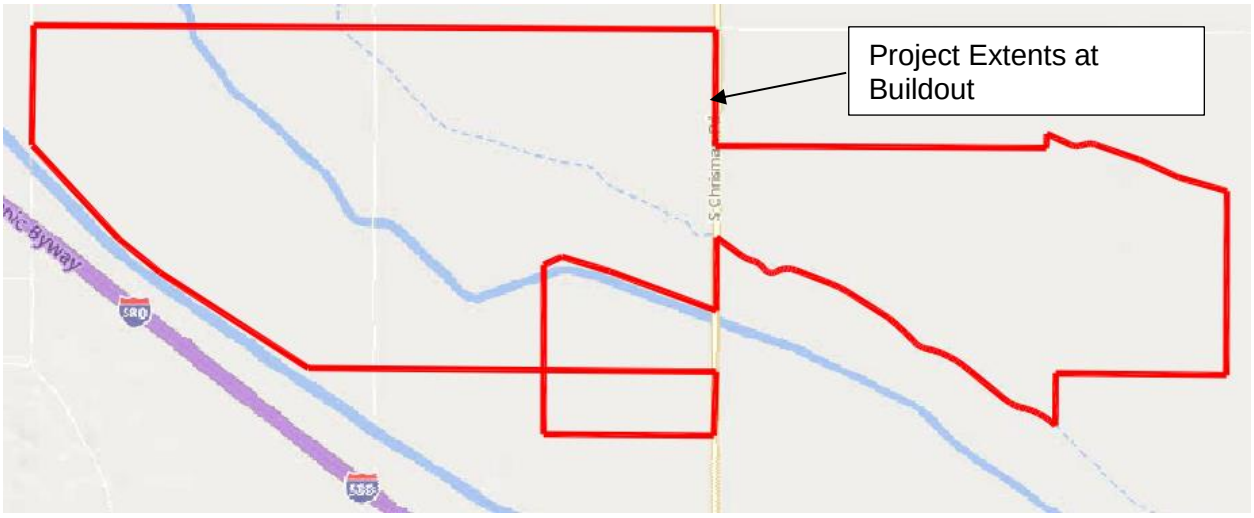

Figure 1. Project Area

WATER DEMANDS

Domestic Water Demand

The San Joaquin Public Works (SJPW) Improvement Standard, Section 4-2.0, establishes that industrial development site water demands shall be set at levels of similar facilities, or a minimum of 1,800 gallons per day per acre (gpd/ac). The 1,800 gpd/ac water demand is inconsistent with, and substantially greater than demands recently approved industrial developments within the County. Following the demand patterns of nearby industrial developments, Schaaf & Wheeler has established a proposed average day demand of 10 gpd per 1,500 square feet of industrial building, or approximately 290 gpd/ac of building.

For commercial parcels, the SJPW Improvement Standard requires 2,000 gpd/ac.

For the parcel zoned, “Public”, S&W assumed the University would accommodate an average of 2,000 students per day and generate an average day water demand of 12.81 gallons per day per student based upon research conducted.

Due to the size of the Project, it is anticipated that construction will occur in phases. Figure 2 below shows the anticipated Project phases, with areas designated as E-1 anticipated to be the first phase. It is also important to note that university water demands are not covered by this memorandum

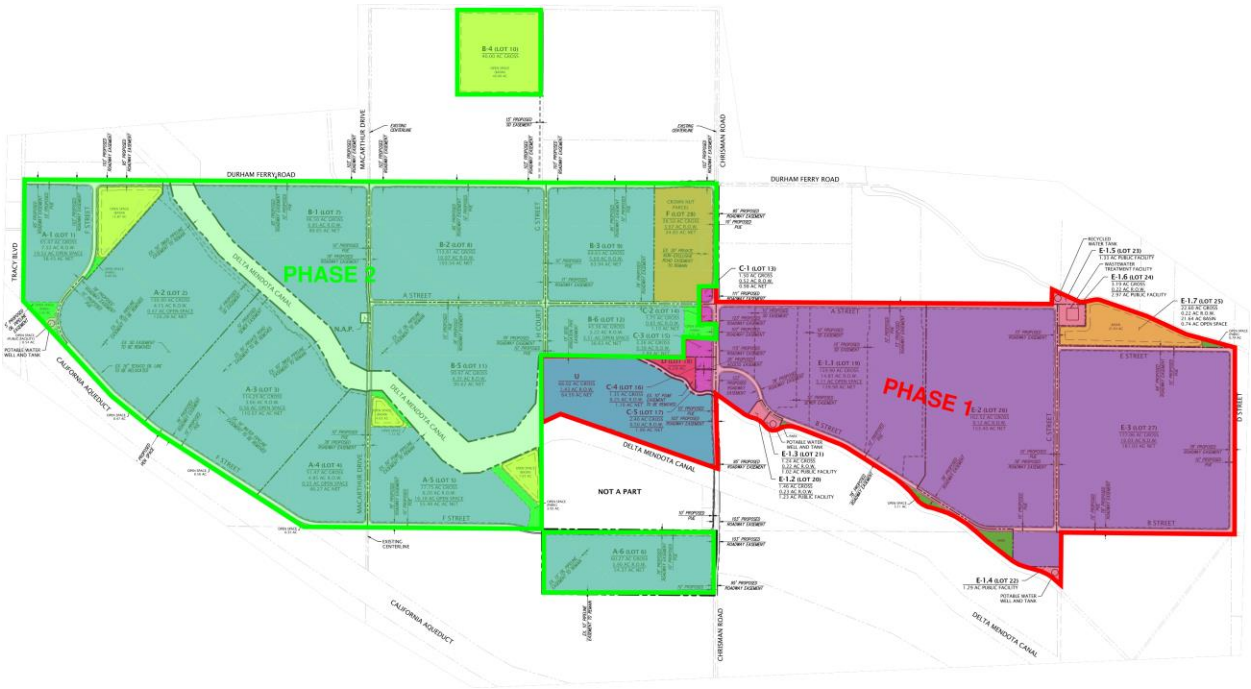

Figure 2. Project Phases

To establish approximate building sizes for each area, a building floor area ration (FAR) of 50% was assumed. The FAR represents the building square footage as a percentage of the overall parcel area. While a total FAR of 50% is likely not achievable for the proposed project, use of a 50% FAR will ensure that conservative water demands are estimated. The estimated average day water demands (ADD) for each area are summarized in Table 1.

Table 1. Average Water Demands

Area Name	Zoning	Area (ac)	Building Area (ac)	ADD (gpd)
A-1	Industrial	65.47	32.74	9,493
A-2	Industrial	130.90	65.45	18,891
A-3	Industrial	114.29	57.15	16,572
A-4	Industrial	51.47	25.74	7,463
A-5	Industrial	77.75	38.88	11,274
A-6	Industrial	60.27	30.14	8,739
B-1	Industrial	96.50	48.25	13,993
B-2	Industrial	113.61	56.81	16,473
B-3	Industrial	69.63	34.82	10,096
B-4	Industrial	40.00	20.00	5,800
B-5	Industrial	99.97	49.99	14,496
B-6	Industrial	43.36	21.68	6,287
C-1	Commercial	1.50	NA	3,000
C-2	Commercial	1.75	NA	3,500
C-3	Commercial	3.26	NA	6,520
C-4	Commercial	1.35	NA	2,700
C-5	Commercial	2.40	NA	4,800
D	Industrial	4.29	2.15	622
E-1	Industrial	191.01	95.51	27,696
E-2	Industrial	162.52	81.26	23,565
E-3	Industrial	177.06	88.53	25,674
U	Public	66.02	NA	25,620
Total		**1,574.38**	**749.10**	**263,365**

The Maximum Day Demand (MDD) and Peak Hour Demand (PHD) are both essential when designing components of the overall water system for the project. Peaking factors 2.2 (Maximum Day Demand) and 3.8 (Peak Hour Demand) were utilized from section 4-2.0 of the 2014 SJPW Standards.

Fire Water Demand

The expected fire flow demand requirements were established from the 2019 California Fire Code (CFC). With the large building sizes anticipated, a base fire flow of 8,000 gpm for 4 hours is assumed. However, it is presumed that the buildings will be equipped with fire suppression systems, that will allow for a significant reduction in fire flow to 2,000 gpm for 2 hours. In an effort to be conservative, the fire demand was set at 2,000 GPM for 4 hours. The final fire demand for the industrial warehouse buildings may be adjusted later in the planning process.

Irrigation Water Demand

The anticipated irrigation demand for the project site was estimated using the Estimated Total Water Use (ETWU) calculations. It is assumed that fifteen percent (15%) of the total area will be designated as Landscape Area (LA). The evapotranspiration (ETo) of 53.48 inches for the project location was obtained from the nearest California Irrigation Management Information System (CIMIS) station, station 71 (Modesto). The Evapotranspiration Adjustment Factor (ETAF) is 0.45 (non-residential). Table 2 displays the irrigation demand for the site in both gallons per year (gpy) and acre feet per year (apy). To determine these values the formula ETWU = (Et) X (0.62) X [(ETAF X LA)] was used.

Table 2. Estimated Irrigation Demand

Area Name	Area (ac)	ETWU (gpy)	ETWU (GPD)
A-1	65.47	6,500,757	17,810
A-2	130.90	12,997,542	35,610
A-3	114.29	11,348,274	31,091
A-4	51.47	5,110,646	14,002
A-5	77.75	7,720,083	21,151
A-6	60.27	5,984,430	16,396
B-1	96.50	9,581,840	26,252
B-2	113.61	11,280,755	30,906
B-3	69.63	6,913,819	18,942
B-4	40.00	3,971,747	10,881
B-5	99.97	9,926,389	27,196
B-6	43.36	4,305,374	11,796
C-1	1.50	148,941	408
C-2	1.75	173,764	476
C-3	3.26	323,697	887
C-4	1.35	134,046	367
C-5	2.40	238,305	653
D	4.29	425,970	1,167
E-1	191.01	18,966,085	51,962
E-2	162.52	16,137,209	44,212
E-3	177.06	17,580,939	48,167
U	66.02	6,555,369	17,960
Total	**1,574.38**	**156,325,981**	**428,290**

WATER SUPPLY

Capacity

As previously discussed the Project site is currently used for agricultural purposes, with much of the land used for growing almonds. Water for the existing site is supplied through 16 existing groundwater wells with capacities ranging from 50 gpm to 1,500 gpm.

According to the University of California Drought Management program, almond tress require between 41 and 54 inches of water per year. This translates to between 3.4 and 4.5 acre-feet per acre. With one acre-foot being equivalent to 325,851 gallons, and assuming the low end of required watering, this is an average flow of 3,035 gpd/acre (2.11 gpm/acre). Water requirements for existing and proposed use are summarized in Table 3.

Table 3. Existing v. Proposed Average Day Demand

Area Name	Area (ac)	Existing ADD (gpm)	Proposed ADD (gpm)
A-1	65.47	138.14	18.96
A-2	130.90	276.20	37.91
A-3	114.29	241.15	33.10
A-4	51.47	108.60	14.91
A-5	77.75	164.05	22.52
A-6	60.27	127.17	17.45
B-1	96.50	203.62	27.95
B-2	113.61	239.72	32.90
B-3	69.63	146.92	20.17
B-4	40.00	84.40	11.58
B-5	99.97	210.94	28.95
B-6	43.36	91.49	12.56
C-1	1.50	3.17	2.37
C-2	1.75	3.69	2.76
C-3	3.26	6.88	5.14
C-4	1.35	2.85	2.13
C-5	2.40	5.06	3.79
D	4.29	9.05	1.24
E-1	191.01	403.03	55.32
E-2	162.52	342.92	47.07
E-3	177.06	373.60	51.28
U	66.02	139.30	30.26
Total	**1,574.38**	**3,321.94**	**480.32**

As demonstrated in Table 3, the proposed development will use approximately 14.4% of the site's existing water demand. Fire water requirements are not considered as part of this calculation because fire water is not a consumptive use. Additionally, the above analysis does not consider that the Project will also be generating recycled water from the wastewater treatment plant that will offset a portion of the irrigation demands.

Domestic Water Sources

It is anticipated that the Project's domestic water needs will be met through the construction of between two and four groundwater wells, constructed in accordance with the State's standards. Preliminary hydrogeology and water quality testing has not been performed, so the well details and treatment requirements are undetermined at this time. It is anticipated that each well for domestic use will require some type of wellhead treatment to meet drinking water standards. Domestic water will be provided to the proposed project through a dedicated domestic water system.

Fire Water Sources

It is anticipated that the Project's fire water needs will be met through the construction of up to two groundwater wells, constructed in accordance with the State's standards. Fire water will be provided to the proposed project through a dedicated fire water system. Since this fire water system will not be connected to the domestic system, treatment is not anticipated.

Irrigation Water Sources

It is anticipated that the Project's irrigation water needs will be met through use of recycled water, supplemented by the construction of irrigation wells, constructed in accordance with the State's standards. Irrigation water will be provided to the proposed project through a dedicated recycled water system. Since this irrigation water system will not be connected to the domestic system, treatment of wastewater to potable water reuse standards is not anticipated.

WATER SYSTEMS

Domestic Water System

To determine required pipe sizing, a pipe network was created in EPANET, and peak hour water demands were placed strategically at locations to simulate maximum water demands at potential building location. In addition to the pipes, approximate booster pump station and storage tank sizes were determined. Due to the large elevation change across the entire site, it is anticipated that Two pressure zones will be required to supply water at acceptable service pressures. These pressure zones are shown schematically in Figure 3.

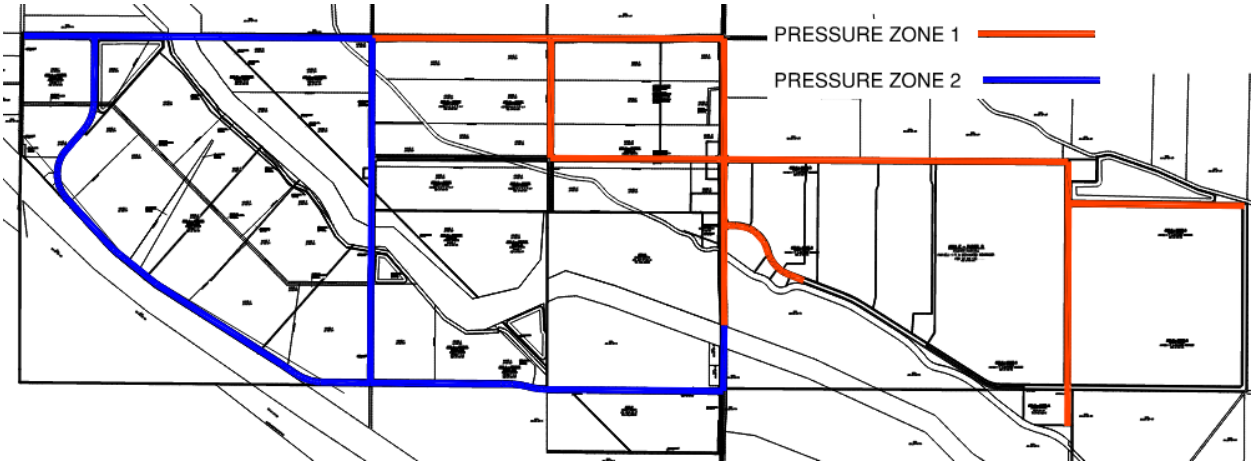

Figure 3. Pressure Zones

Preliminary pipe sizes were determined using the EPANET model and vary between 6-inch through 12-inch pipe within the project.

In addition to the system pipeline, storage tank(s) will be required for the domestic water system. State standards require a minimum storage volume equivalent to 8 hours of the MDD, plus the required fire flow demand. Since the fire system is entirely separate from domestic system, the domestic system is only required to store 8 hours of MDD flow. Table 4 summarizes the Project's required domestic storage in million gallons (MG). While only 193,000 gallons of storage is required for domestic purposes, dead storage within tanks, and commonly available storage tank requirements lead Schaaf & Wheeler to recommend a minimum of 250,000 gallons of domestic storage. This storage may be split between two reservoirs, depending on project phasing and ultimate pressure zone configuration. A booster pump system will be installed adjacent to the storage tank(s) to supply water to the domestic system

Fire Water System

Schaaf & Wheeler prepared a fire flow model, similar to the domestic model, using EPANET. The model revealed that for a fire flow of 2,000 gpm. 12-inch pipeline is sufficient.

As previously stated, the identified design fire flow assumed for this project is 2,000 gpm for a 4-hour duration. State standards require that we store the fire flow, which will require 480,000 gallons of fire storage. Given dead volume within the storage tanks, it is estimated that a 600,000 gallon storage tank will be required. It may be possible to split this storage volume between pressure zones, but a fire pump will be necessary at each tank location.

Table 4. Required Domestic Storage

Area Name	8-Hrs MDD (mg)
A-1	0.007
A-2	0.014
A-3	0.012
A-4	0.005
A-5	0.008
A-6	0.006
B-1	0.010
B-2	0.012
B-3	0.007
B-4	0.004
B-5	0.011
B-6	0.005
C-1	0.002
C-2	0.003
C-3	0.005
C-4	0.002
C-5	0.004
D	0.000
E-1	0.020
E-2	0.017
E-3	0.019
U	0.019
Total	**0.193**

Irrigation Water System

Because little is known about the irrigation requirements at this time, no model has been created for the irrigation system That said, because irrigation is a non-essential use, irrigation schedules can be adjusted to minimize system peaks, reduce system component size. It is estimated that 8-inch pipe will be sufficient to meet irrigation demands. The irrigation system will consist of a recycled water storage tank and booster station, located at the wastewater treatment plant, and supplemental irrigation wells to offset demands in excess of recycled water capacity. Instead of additional storage tanks for supplemental irrigation water, the irrigation system can be configured such that the wells discharge directly to the distribution system and equipped with hydropneumatics tanks to minimize well cycling.