INITIAL STUDY

CITY OF ST. HELENA

WWTRP PHASE I UPGRADES PROJECT

NOVEMBER 2020

LEAD AGENCY:

City of St. Helena
1572 Railroad Avenue
St. Helena, CA 94574

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TABLE OF CONTENTS

CITY OF ST. HELENA WWTRP PHASE I UPGRADES PROJECT

1 INTRODUCTION 1-1
1.1 Project Summary / Environmental Checklist Form 1-1
1.2 Purpose of Study 1-2
1.3 Organization of the Initial Study 1-3
1.4 Environmental Factors Potentially Affected 1-3
1.5 CEQA Determination 1-4

2 PROJECT DESCRIPTION 2-1
2.1 Introduction 2-1
2.2 Project Location 2-1
2.3 Project Background 2-1
2.3.1 Existing Wastewater Treatment and Disposal Operations 2-1
2.3.2 Waste Discharge Requirements 2-2
2.4 Project Description 2-7
2.4.1 Project Objectives 2-7
2.4.2 Project Components 2-7
2.4.3 Treatment Capacity and Effluent Quality 2-16
2.4.4 Construction Activities 2-16
2.4.5 Operation and Maintenance Activities 2-17
2.5 Regulatory Requirements, Permits, and Approvals 2-17
2.5.1 City of St. Helena Approvals 2-17
2.5.2 U.S. Department of Agriculture 2-17
2.5.3 San Francisco Bay Regional Water Quality Control Board 2-17
2.5.4 State Historic Preservation Office 2-18

3 ENVIRONMENTAL ANALYSIS (CHECKLIST) 3-1
3.1 Evaluation of Environmental Impacts 3-1
3.1.1 Evaluation Terminology 3-1
3.1.2 Cumulative Impact Analysis 3-1
3.2 Aesthetics 3-3
3.2.1 Environmental Checklist 3-3
3.2.2 Setting 3-3
3.2.3 Discussion of Impacts 3-6
3.2.4 Mitigation Measures 3-9
3.3 Agriculture/Forestry Resources 3-10
3.3.1 Environmental Checklist 3-10
3.3.2 Setting 3-11
3.3.3 Discussion of Impacts 3-12
3.3.4 Mitigation Measures 3-13
3.4 Air Quality 3-15
3.4.1 Environmental Checklist 3-15
3.4.2 Setting 3-15
3.4.3 Discussion of Impacts 3-21
3.4.4 Mitigation Measures 3-25
3.5 Biological Resources 3-27
3.5.1 Environmental Checklist 3-27

3.5.2 Setting...3-28
3.5.3 Discussion of Impacts...3-33
3.5.4 Mitigation Measures 3-37
3.6 Cultural Resources 3-38
3.6.1 Environmental Checklist...3-38
3.6.2 Setting...3-38
3.6.3 Discussion of Impacts...3-44
3.6.4 Mitigation Measures 3-45
3.7 Energy 3-46
3.7.1 Environmental Checklist...3-46
3.7.2 Setting...3-46
3.7.3 Discussion of Impacts...3-49
3.7.4 Mitigation Measures 3-51
3.8 Geology/Soils...3-52
3.8.1 Environmental Checklist...3-52
3.8.2 Setting...3-53
3.8.3 Discussion of Impacts...3-56
3.8.4 Mitigation Measures 3-59
3.9 Greenhouse Gas Emissions...3-60
3.9.1 Environmental Checklist...3-60
3.9.2 Setting...3-60
3.9.3 Discussion of Impacts...3-65
3.9.4 Mitigation Measures 3-68
3.10 Hazards and Hazardous Materials 3-69
3.10.1 Environmental Checklist...3-69
3.10.2 Setting...3-70
3.10.3 Discussion of Impacts...3-73
3.10.4 Mitigation Measures 3-76
3.11 Hydrology/Water quality 3-78
3.11.1 Environmental Checklist...3-78
3.11.2 Setting...3-79
3.11.3 Discussion of Impacts...3-84
3.11.4 Mitigation Measures 3-87
3.12 Land Use/Planning 3-89
3.12.1 Environmental Checklist...3-89
3.12.2 Setting...3-89
3.12.3 Discussion of Impacts...3-91
3.12.4 Mitigation Measures 3-92
3.13 Mineral Resources...3-93
3.13.1 Environmental Checklist...3-93
3.13.2 Setting...3-93
3.13.3 Discussion of Impacts...3-93
3.13.4 Mitigation Measures 3-94
3.14 Noise...3-95
3.14.1 Environmental Checklist...3-95
3.14.2 Setting...3-95
3.14.3 Discussion of Impacts...3-103
3.14.4 Mitigation Measures 3-108
3.15 Population and Housing (and Environmental Justice) 3-109
3.15.1 Environmental Checklist...3-109
3.15.2 Setting...3-109
3.15.3 Discussion of Impacts...3-110
3.15.4 Mitigation Measures 3-111
3.16 Public Services 3-112
3.16.1 Environmental Checklist...3-112
3.16.2 Setting...3-112

3.16.3 Discussion of Impacts....3-113
3.16.4 Mitigation Measures....3-114
3.17 Recreation....3-115
3.17.1 Environmental Checklist....3-115
3.17.2 Setting....3-115
3.17.3 Discussion of Impacts....3-115
3.17.4 Mitigation Measures....3-116
3.18 Transportation....3-117
3.18.1 Environmental Checklist....3-117
3.18.2 Setting....3-117
3.18.3 Discussion of Impacts....3-118
3.18.4 Mitigation Measures....3-119
3.19 Tribal Cultural Resources....3-120
3.19.1 Environmental Checklist....3-120
3.19.2 Setting....3-120
3.19.3 Discussion of Impacts....3-121
3.19.4 Mitigation Measures....3-122
3.20 Utilities/Service Systems....3-123
3.20.1 Environmental Checklist....3-123
3.20.2 Setting....3-123
3.20.3 Discussion of Impacts....3-124
3.20.4 Mitigation Measures....3-125
3.21 Wildfire....3-126
3.21.1 Environmental Checklist....3-126
3.21.2 Setting....3-126
3.21.3 Discussion of Impacts....3-127
3.21.4 Mitigation Measures....3-129
3.22 Mandatory Finding of Significance....3-130

4 LIST OF PREPARERS....4-1

5 REFERENCES....5-1

LIST OF TABLES

Table 2-1. 2016 NPDES Permit Waste Discharge Requirements	2-2
Table 2-2. Comparison Of MBR Effluent Quality and 2016 Permit Limitations	2-16
Table 3-1. National and California Ambient Air Quality Standards and Violation Criteria	3-16
Table 3-2. BAAQMD Attainment Status	3-18
Table 3-3. BAAQMD Air Quality CEQA Thresholds Of Significance	3-20
Table 3-4. Construction Emissions	3-23
Table 3-5. Operational Emissions	3-23
Table 3-6. PG&E-Owned Electricity Generating Sources	3-48
Table 3-7. PG&E Renewable Energy Deliveries	3-49
Table 3-8. Construction GHG Emissions	3-66
Table 3-9. Operational GHG Emissions	3-67
Table 3-10. Typical Noise Levels	3-97
Table 3-11. Summary Oof Existing Background Noise Measurement Data	3-100
Table 3-12. Federal Construction Noise Thresholds	3-101
Table 3-13. Napa County Exterior Noise Standards	3-102
Table 3-14. Napa County Noise Limits for Construction Activities	3-103
Table 3-15. Construction Equipment Noise	3-104
Table 3-16. Vibration Levels for Various Construction Equipment	3-105

LIST OF FIGURES

Figure 2-1.	Regional Location	2-3
Figure 2-2.	Site and Vicinity	2-4
Figure 2-3.	Aerial Photograph	2-5
Figure 2-4.	Current WWTRP Facility Layout	2-6
Figure 2-5.	Proposed WWTRP Facility Layout	2-11
Figure 2-6.	Process Flow Diagram for Proposed MBR Treatment System	2-12
Figure 3-1.	Project Site Photographs Depicting Visual Barriers	3-8
Figure 3-2.	FMMP Designations	3-14
Figure 3-3.	Habitat Map	3-32
Figure 3-4.	Regional Fault Map	3-55
Figure 3-5.	Soils Map	3-57
Figure 3-6.	FEMA Flood Zones	3-83
Figure 3-7.	Noise Monitoring Sites	3-99

LIST OF APPENDICES

Appendix A. Conceptual Design Report

Appendix B. Air Quality and GHG Model Runs

Appendix C. Biological Resources Assessment

Appendix D. Historic Resources Survey Report

Appendix E. Environmental Noise Assessment

Appendix F. Mitigation Monitoring and Reporting Program

1 INTRODUCTION

1.1 PROJECT SUMMARY / ENVIRONMENTAL CHECKLIST FORM

Project Title:	City of St. Helena Wastewater Treatment and Reclamation Plant (WWTRP) Phase I Upgrades Project
Lead Agency Name and Address:	City of St. Helena (City) Public Works Department 1572 Railroad Avenue St. Helena, CA 94574
Contact Person and Phone Number:	Erica Ahmann Smithies, Director of Public Works (707) 968-2629
Project Location:	The WWTRP is located at 1 Chaix/Thomann Lane in the City of St. Helena in Napa County, CA. The Project site is bounded on the northeast by the Napa River, Chaix Lane to the northwest, and agricultural fields to the southeast and southwest.
General Plan Designation:	Public & Quasi Public (PQP)
Zoning:	Public & Quasi Public (PQP); Agricultural Preserve District (AP)
Description of the Project:	The Proposed Project involves upgrades to the City's existing wastewater treatment and reclamation plant (WWTRP) that are required to comply with the Cease and Desist Order (CDO) No. R2-2016-0004 from the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB) and the 2016 National Pollutant Discharge Elimination System (NPDES) Permit No. CA0038016 (Order No. R2-2016-0003). All proposed improvements would take place within the existing development footprint of the WWTRP. A detailed description of these modifications is provided in **Section 2.4**.
Existing and Surrounding Land Uses:	The 124-acre Project site currently contains the existing WWTRP, supporting infrastructure, and irrigation spray fields. The Project site is comprised of four parcels. The two most northern Project site parcels are located within the City and are developed with the existing WWTRP and associated infrastructure. The two southern Project site parcels are

	located in unincorporated Napa County and contain no wastewater treatment infrastructure, but rather serve as irrigation spray fields for the disposal of treated effluent produced at the WWTRP. Surrounding land uses are mainly comprised of vineyards and scattered rural residential housing. A residence is located directly adjacent to the northwest boundary of the Project site and is located within unincorporated Napa County
Other Public Agencies Whose Approval may be Required:	U.S. Department of Agriculture (USDA) San Francisco Bay Regional Water Quality Control Board U.S. Environmental Protection Agency U.S. Fish & Wildlife Service California Department of Fish and Wildlife State Historic Preservation Office National Marine Fisheries Service
Consultation with California Native American Tribes	The Kletsel Dehe Band of Wintun Indians, The Federated Indians of Graton Rancheria, Middletown Rancheria of Pomo Indians, Mishewal Wappo Tribe of Alexander Valley, and Yocha Dehe Wintun Nation, have requested formal notification of proposed projects in the geographical area. On August 4th, 2020, the City sent letters to the tribes providing detailed information on the Proposed Project and describing the Assembly Bill (AB) 52 consultation process. The letter requested that the Tribes notify the City within 30 days if they would like to engage in formal consultation regarding possible significant effects that the Proposed Project may have on tribal cultural resources. To date, the only Tribe to respond has been the Federated Indians of Graton Rancheria, who declined the invitation to consult on the Proposed Project. Therefore, the requirements of Public Resources Code (PRC) § 21080.3.1 have been satisfied. Refer to the discussion in **Section 3.6** regarding outreach to Native American Tribes identified by the Native American Heritage Commission.

1.2 PURPOSE OF STUDY

The City of St. Helena (Lead Agency) has prepared this Initial Study (IS) for the City's WWTRP Phase I Upgrades Project (Proposed Project) in accordance with the California Environmental Quality Act (CEQA) of 1970 (as amended), codified in California PRC § 21000 *et seq*., and the CEQA *Guidelines* in the Code of Regulations, Title 14, Division 6, Chapter 3. Pursuant to these regulations, this IS is intended to inform

City decision-makers, responsible agencies, interested parties and the general public of the Proposed Project and its potential environmental effects. This IS is also intended to provide the CEQA-required environmental documents for all city, local and state approvals or permits that might be required to implement the Proposed Project. This IS supports a Mitigated Negative Declaration (MND) as defined under CEQA *Guidelines* § 15070.

Additionally, because the City intends to apply for the Water and Waste Disposal Loan and Grant Program, funded by the USDA, this IS has been prepared to address certain federal environmental regulations, including regulations guiding the General Conformity Rule for the Clean Air Act (CAA), the federal Endangered Species Act (FESA), and the National Historic Preservation Act (NHPA). These additional federal regulatory components are addressed in **Sections 3.3. Agriculture and Forestry Resources**; **3.4. Air Quality**; **3.5. Biological Resources**; **3.6. Cultural Resources**; **3.9. Greenhouse Gas Emissions**; **3.11. Hydrology and Water Quality**; **3.14. Noise**; and **3.15. Population and Housing**. A separate NEPA Environmental Report (ER) will be completed in accordance with § 1970.54 of the USDA Rural Development 1970-B NEPA Categorical Exclusions Environmental Policies and Procedures.

1.3 ORGANIZATION OF THE INITIAL STUDY

This document is organized into the following sections:

Section 1.0 – Introduction: Describes the purpose, contents, and organization of the document and provides a project summary. Includes the significance determination, which identifies the determination of whether impacts associated with development of the Proposed Project are significant, and what, if any, additional environmental documentation may be required.

Section 2.0 – Project Description: Includes a detailed description of the Proposed Project.

Section 3.0 – Environmental Impact Analysis: Contains the Environmental Checklist from CEQA *Guidelines* Appendix G with a discussion of potential environmental effects associated with the Proposed Project. Mitigation measures, if necessary, are noted following each impact discussion.

Section 4.0 – List of Preparers

Section 5.0 – References

Appendices – Contains information to supplement sections within the IS.

1.4 ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked below would be potentially affected by the Proposed Project, involving at least one impact requiring mitigation to bring it to a less-than-significant level. Impacts to these resources are evaluated using the checklist included in **Section 3.0**. The Proposed Project was determined to have a less-than-significant impact or no impact without mitigation on unchecked resource areas. A Mitigation Monitoring and Reporting Program, included as **Appendix F**, ensures compliance with mitigation measures during project implementation.

☐ Aesthetics	☐ Agriculture and Forest Resources	☑ Air Quality
☑ Biological Resources	☑ Cultural Resources	☐ Energy
☑ Geology and Soils	☐ Greenhouse Gas Emissions	☑ Hazards and Hazardous Materials
☑ Hydrology and Water Quality	☐ Land Use and Planning	☐ Mineral Resources
☐ Noise	☐ Population and Housing	☑ Public Services
☐ Recreation	☐ Transportation	☑ Tribal Cultural Resources
☐ Utilities and Service Systems	☐ Wildfire	☑ Mandatory Findings of Significance

1.5 CEQA DETERMINATION (TO BE COMPLETED BY THE LEAD AGECNCY)

On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☒ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier ENVIRONMENTAL IMPACT REPORT or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier ENVIRONMENTAL IMPACT REPORT or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

______________________   ______________________
                                Date

2 PROJECT DESCRIPTION

2.1 INTRODUCTION

The Proposed Project involves upgrades to the existing wastewater treatment plant that are required to comply with the CDO No. R2-2016-0004 from the SFBRWQCB (Appendix C of **Appendix A**) and the 2016 NPDES Permit No. CA0038016 (Order No. R2-2016-0003; 2016 Permit) (Appendix A of **Appendix A**). The project location, background, objectives, and components are described in more detail below.

2.2 PROJECT LOCATION

The WWTRP is located at 1 Chaix/Thomann Lane in the City of St. Helena in Napa County (County), California (**Figure 2-1**). The 124-acre WWTRP property (Project site) consists of four parcels owned by the City, with corresponding assessor's parcel numbers (APN) 030-240-013, 030-240-009, 030-240-017, and 030-250-018. The Project site is shown on **Figures 2-2** and **2-3**. Project activities would be limited to the development footprint shown in **Figure 2-3**, which excludes the irrigation spray fields southeast of the WWTRP. The parcels which comprise the development footprint are entirely within City limits; the parcels that contain the irrigation spray fields, and will not experience development, are within unincorporated Napa County. The Project site is bounded on the northeast by the Napa River, Chaix Lane to the northwest, and agricultural fields to the southeast and southwest. Regional access to the Project site is provided by State Route 29/State Route 128. Vehicular access to the Project site is provided via Chaix Lane, west of the site.

2.3 PROJECT BACKGROUND

2.3.1 EXISTING WASTEWATER TREATMENT AND DISPOSAL OPERATIONS

The WWTRP was constructed in 1966 and provides wastewater treatment services for the City, serving a population of approximately 6,000 residents. The WWTRP currently utilizes an Advanced Integrated Wastewater Pond System (AIPS), which consists of a series of five ponds that provide secondary level wastewater treatment for domestic and commercial wastewater from the City. No major improvements have been completed at the WWTRP since construction in 1966, and several areas of the plant need repair or upgrade. The location of the existing wastewater treatment plant and associated pond system is depicted on **Figure 2-4**. Influent flow is distributed between advanced facultative Ponds 1A and 1B, and then flows sequentially through each pond by gravity. Wastewater leaves Ponds 1A and 1B via a circular outlet structure located between the ponds that conveys flow to Pond 2 (high rate algal pond). Flow is conveyed from Pond 2 to Pond 3 (algal settling pond), and from Pond 3 to Pond 4 using transfer structures. Flow from Pond 4 flows by gravity to chlorine contact tanks through a 21-inch pipe located south of Pond 4 and Pond 5 under an access road. A detailed description of the AIPS system and function of each pond is provided in Section 2.1.2 of **Appendix A**. During dry weather conditions, as specified by flow parameters in the 2016 Permit, effluent is stored in Pond 5 (flow equalization storage pond) and then discharged to the irrigation spray fields located to the southeast of the WWTRP, in accordance with Water Reclamation Permit Order No. 87-090 (Appendix B of **Appendix A**). During wet weather conditions and when flow in the Napa River is high enough[1], effluent is discharged at a shallow water outfall (Discharge Point No. 001) to the Napa River in accordance with the 2016 Permit. The system is permitted under the 2016 Permit for an average dry weather flow of 0.5 million gallons per day (MGD) and a peak weather flow capacity of 2.8 MGD (see Appendix A of **Appendix A)**. The WWTRP currently has a treatment capacity of approximately 1.3 MGD.

Influent wastewater flows at the current WWTRP are dependent on the season and are highly influenced by rainfall. Influent flow increases during precipitation events and decreases rapidly after precipitation ceases. Average day daily influent wastewater flows range from 0.377 MGD to 0.816 MGD, depending on the season. Detailed wastewater analytical flow data is presented in Section 3.0 of **Appendix A**.

2.3.2 WASTE DISCHARGE REQUIREMENTS

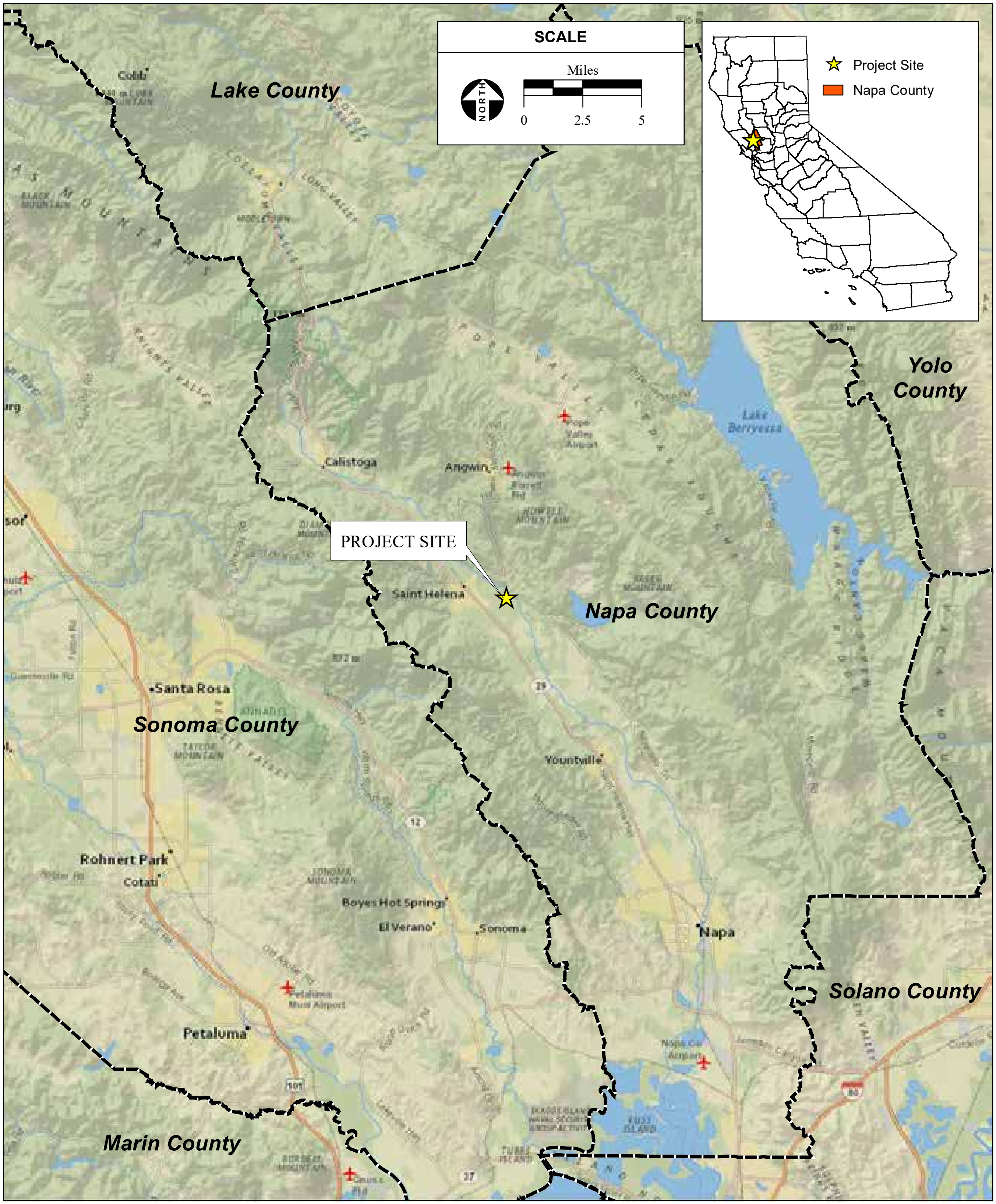
The 2016 Permit issued by the SFBRWQCB imposed new, more stringent effluent discharge limitations, referred to as waste discharge requirements (WDR), including limits for biochemical oxygen demand and total suspended solids (TSS), which are shown in **Table 2-1** below. The City's current AIPS system is not able to reliably meet the more stringent effluent discharge limitations. As a result, the SFBRWQCB issued a CDO, mandating that the WWTRP comply with the more stringent limits. Due to the October 2017 Napa Fires, the City experienced delays in its compliance progress and requested revisions to the compliance deadlines set by the SFBRWQCB in the CDO. In January 2018, the SFBRWQCB approved a request by the City to revise the compliance schedule associated with the CDO. The revised schedule (Appendix D of **Appendix A**), requires that the City achieve full compliance within the 2016 Permit by March 1, 2023.

TABLE 2-1. 2016 NPDES PERMIT WASTE DISCHARGE REQUIREMENTS

Parameter	Unit[2]	Effluent Limitations[1]				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Biochemical Oxygen Demand (5-day at 20° C)	mg/L	15	25	--	--	--
Total Suspended Solids (TSS)	mg/L	15	20	--	--	--
Oil and Grease	mg/L	10	--	20	--	--
pH	Standard units	--	--	--	6.5	8.5
Total Residual Chlorine	mg/L	--	--	--	--	0.0
Copper, Total	µg/L	8.3	--	17	--	--
Cyanide, Total	µg/L	15	--	30	--	--
Ammonia, Total	mg/L as N	16	--	39	--	--

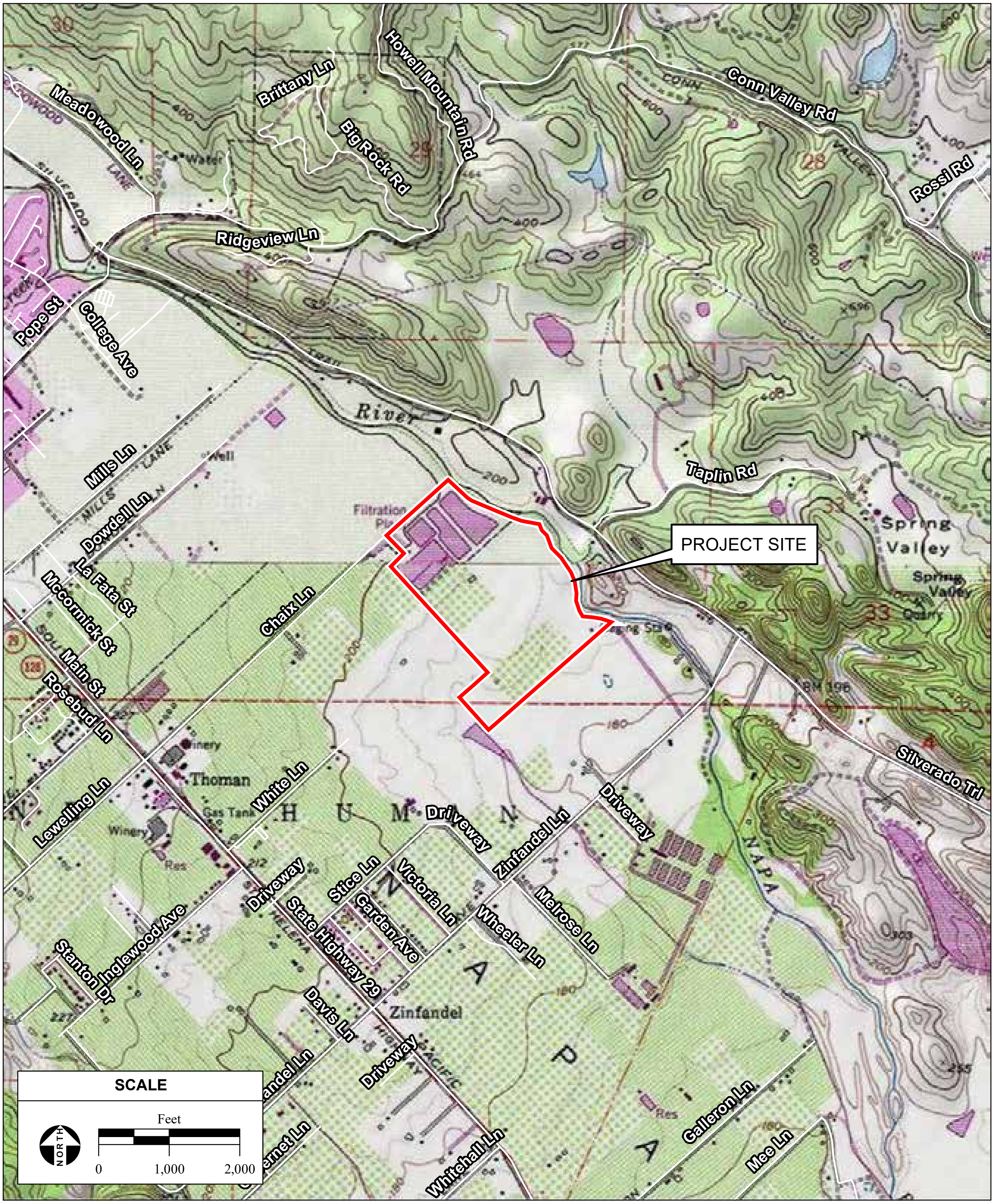
Notes: 1 Effluent limitations applicable at Discharge Point 001 only.
2 milligrams per liter (mg/L); microgram (one millionth of a gram) per liter (µg/L)
Source: 2016 NPDES Permit (Appendix A of **Appendix A**)

[1] The 2016 Permit (Appendix A of **Appendix A**) prohibits discharge to the Napa River unless the river flow-to-wastewater effluent ratio is 50:1, and prohibits discharge to the Napa River between June 1 and October 31.



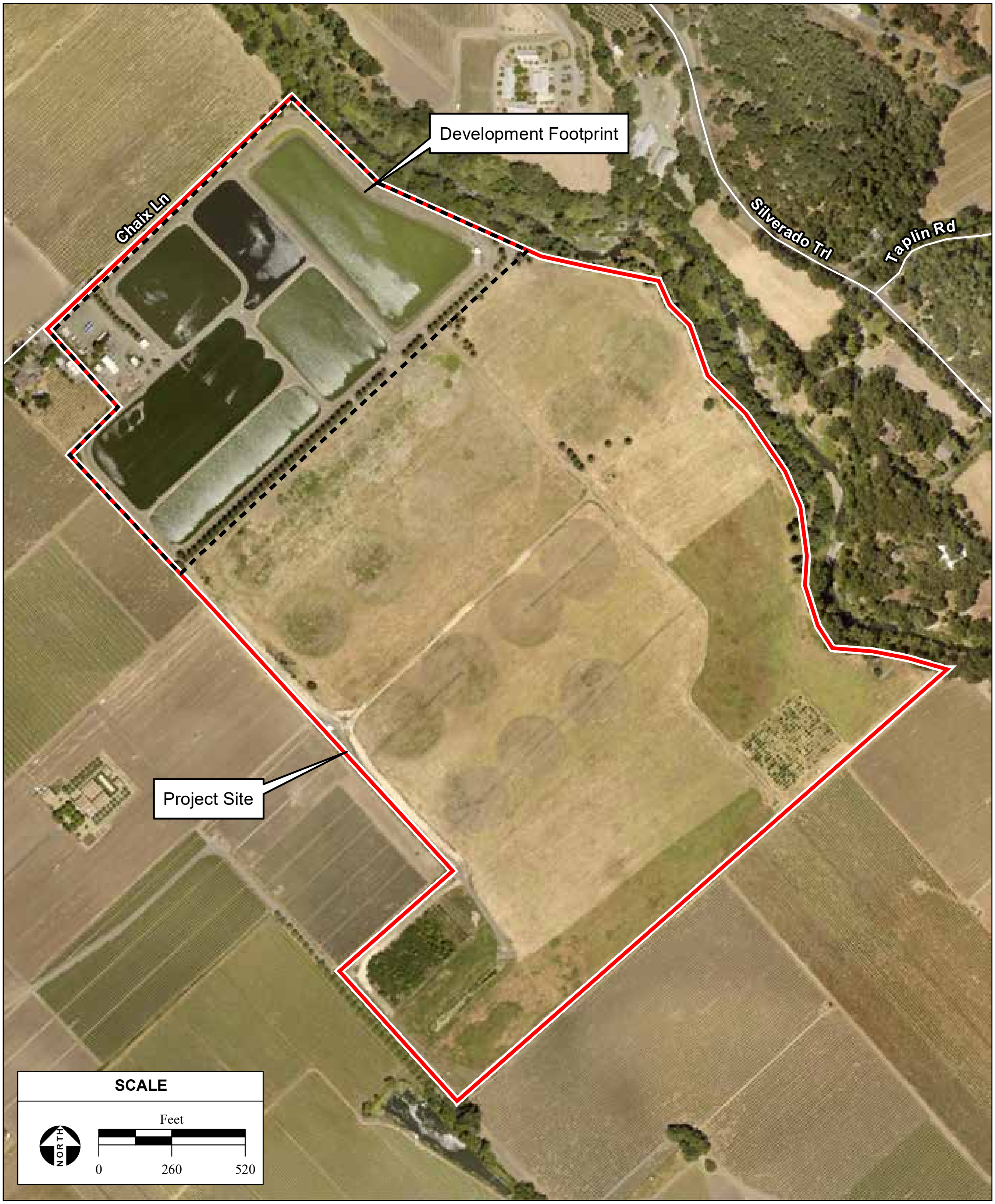
SOURCE: NatGeo 2020; AES, 7/30/2020

Figure 2-1
Regional Location



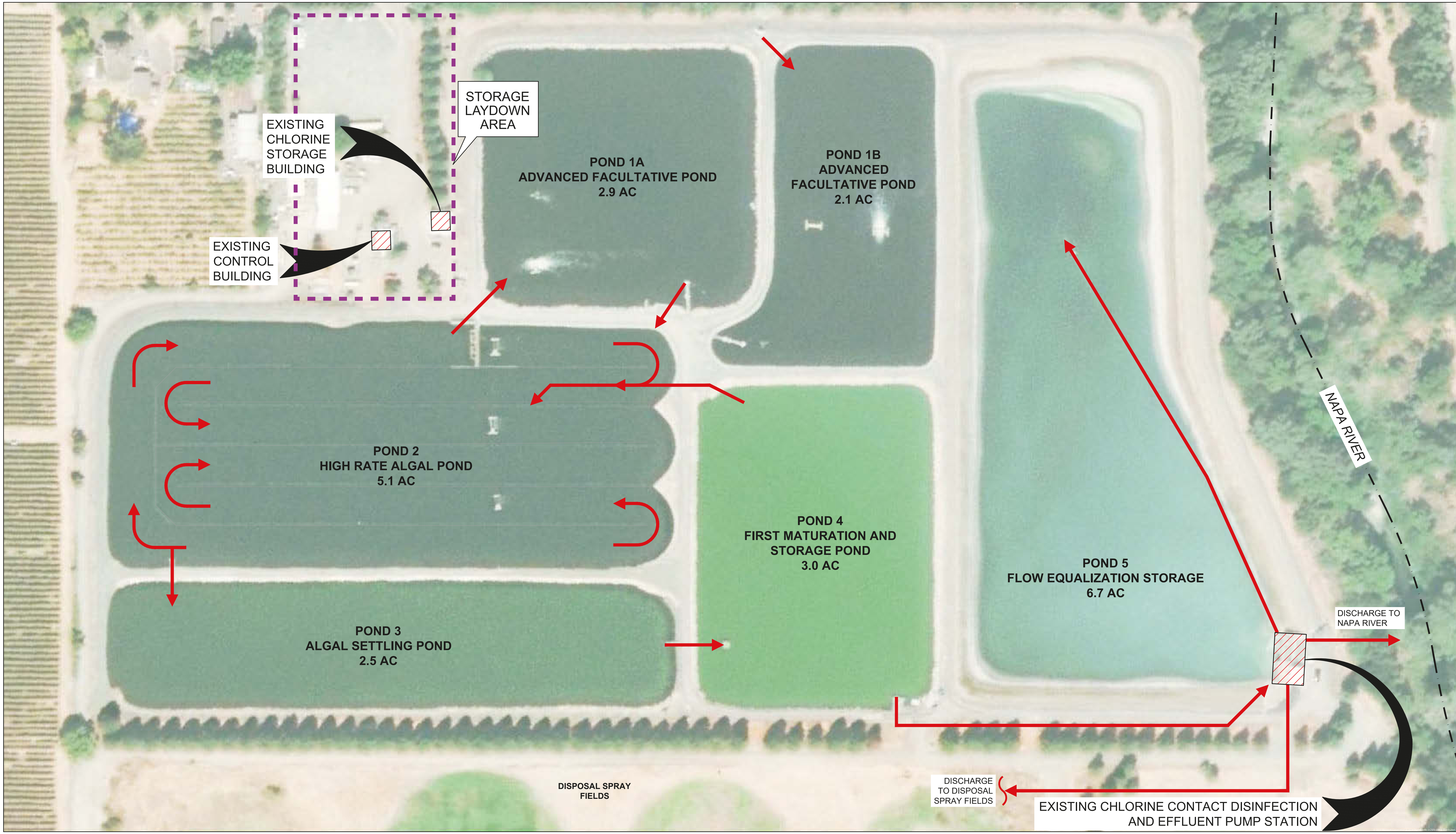
SOURCE: "St. Helena, CA" and "Rutherford, CA" USGS 7.5 MinuteTopographic Quadrangles, T4N, R4W, Unsectioned Area of Carne Humana, Mt. Diablo Baseline & Meridian; AES, 7/30/2020

Figure 2-2
Site and Vicinity



SOURCE: Napa County aerial photograph, 6/19/; AES, 8/21/2020

Figure 2-3
Aerial Photograph



SOURCE: HydroScience Engineers, 10/2019; AES, 10/19/2020

Figure 2-4
Current WWTRP Facility Layout

2.4 PROJECT DESCRIPTION

2.4.1 PROJECT OBJECTIVES

The City has identified the following objectives for the Proposed Project:

- Meet new performance requirements as specified by the 2016 Permit within the timeframe established in the revised compliance schedule (Appendix D of **Appendix A**);
- Protect water quality and public health through compliance with applicable regulations for the treatment and disposal of wastewater;
- Meet the long-term needs of the City during peak wet weather periods with low-cost technical solutions that maximize value for rate payers;
- Avoid the significant fiscal impact of fines if the improvements are not completed within the time limits specified by the SFBRWQCB;
- Improve efficiency of the wastewater treatment plant operations; and
- Implement project elements that avoid or minimize adverse environmental impacts.

2.4.2 PROJECT COMPONENTS

To comply with the 2016 Permit and CDO, the City seeks to replace its AIPS system with a packaged Membrane Bioreactor (MBR) system, as well as construct new treatment facilities and retrofit/rehabilitate aging facilities. The Proposed Project includes the following components that would be constructed within the boundaries of the existing WWTRP:

1. Installation of a packaged MBR treatment system;
2. Treatment pond retrofit for influent flow equalization and emergency storage;
3. Construction of a new influent lift station;
4. Retrofit of existing treatment pond distribution box structure and construction of mechanical screening and disposal system;
5. Construction of a sludge dewatering and disposal system;
6. Flow meter reconstruction;
7. Chlorine disinfection system upgrades;
8. Installation of an underground effluent pipeline for distribution to Pond 5 or the Napa River outfall;
9. Electrical improvements;
10. Supervisory Control and Data Acquisition (SCADA) system Integration;
11. Site improvements for WWTRP upgrades; and
12. Construction of a noise barrier wall.

A Conceptual Design Report (CDR) for the Proposed Project is included as **Appendix A**. The Proposed Project components are described in detail in **Appendix A** and are summarized below.

If wastewater influent and loading parameters increase at the WWTRP in the future, a recycled water distribution system could be installed to handle the increase. These upgrades would be addressed in a Phase II upgrades project and would be evaluated in a separate CEQA document. Potential Phase II upgrades are discussed in more detail in **Appendix A**.

Installation of a Packaged MBR Treatment System

As described in the CDR report, the proposed MBR system would provide primary, secondary, and tertiary treatment through a combination of anoxic and aerobic biological reactors and the use of submerged membranes. The system would separate solids, providing a high removal efficiency of nitrogen, phosphorus, bacteria, BOD, and TSS. The MBR system would be a packaged treatment plant, manufactured to be fully functional and ready for production of tertiary effluent upon delivery and integration. A primary and a standby fine screen would be installed to screen all influent prior to it entering in the MBR system. After wastewater is processed in the MBR, it would be distributed to a membrane filtration clearwell and an above ground 20,000-gallon effluent storage tank, and then disinfected through a closed-vessel ultraviolet (UV) disinfection system before being discharged. Treated water stored in the clearwell would be used as process water at the WWTRP for cleaning and other minor uses associated with WWTRP operations; the MBR system would therefore not require an additional water supply and may reduce overall groundwater consumption at the WWTRP. Tertiary treated effluent would be discharged to either the Napa River outfall or to the irrigation spray fields consistent with existing practices. The current Napa River outfall would not be altered under the Proposed Project.

The MBR system is proposed to be installed directly west of existing Pond 1A, in a graded area of the WWTRP that houses the existing chlorine storage building. This area also functions as a storage laydown area for the City Public Works Department and is occasionally used as a training grounds by the City's fire department. The MBR system would primarily be located in above grade stainless steel structures constructed on a concrete slab and would be approximately 18-feet in height at the tallest point of the facility. **Figure 2-5** depicts the proposed location of the MBR system and **Figure 2-6** provides a process flow diagram for the proposed MBR treatment system. The construction staging area for installation of the MBR treatment system and associated upgrades would be located on the currently paved area of the storage laydown area (refer to **Figure 2-4**). The storage laydown area is infrequently used and would not need to be relocated as part of the Proposed Project.

Treatment Pond Retrofit

Replacement of the AIPS pond treatment system with a MBR system would result in the removal of Ponds 2, 3, and 4 from the treatment process. These ponds would be repurposed for flow equalization and emergency storage. Using these ponds for storage and equalization would reduce the peak flow requirements associated with the MBR treatment process. When influent flow rates exceed the rate of 1.3 MGD, existing Ponds 1A through 3 would be able to provide the WWTRP with approximately 25.9 million gallons (MG) of flow equalization and emergency storage. Because the existing ponds are hydraulically connected via overflow structures and open channel pipes, the ponds would be designed to overflow in series. The emergency storage ponds would be allowed to fill sequentially from Ponds 1A/1B to Pond 3, as primary influent flow exceeds the treatment capacity of the Phase 1 WWTRP improvements. When influent flows decrease to below the peak wet weather flow capacity of 1.3 MGD, stored influent will be pumped from the storage ponds directly into Pond 1A for treatment and the water levels in ponds 2, 3, and 4 will be drawn down. Pond 5, which is currently designated for effluent storage and disposal equalization, would continue to operate as storage for disposal to the spray fields. The existing pipe connection between Pond 4 and 5 will be abandoned and the existing chlorine contact basin will be demobilized.

Proposed upgrades necessary for the treatment pond retrofit include:

- Construction of a pumping station to pump from Ponds 2, 3, and 4 to Pond 1A;
- Construction of concrete pads between Ponds 2 & 3; and
- Hydraulic isolation of Pond 5.

Construction of a New Influent Lift Station

The existing WWTRP headworks facility and control building is a two-story structure that combines the influent headworks, primary influent pump station, office, operations building, electrical rooms, and laboratory facilities. No changes are proposed to the WWTRP headworks facility; however, a new influent lift station would be constructed east of this facility to pump wastewater from the proposed equalization and emergency storage ponds (Ponds 1A through 4) directly to the proposed MBR system.

Proposed upgrades necessary for the construction of the new influent lift station include the following improvements:

- Construction of a slab on grade along the southwest dike of Pond 1A;
- Construction of a 1.5 MGD influent horizontal self-priming centrifugal pump station pumping from the pond to the MBR system; and
- Construction of an adjustable suction pipeline along bottom of Pond 1A with floating suction intake mechanical assembly.

Distribution Box Retrofit and Coarse Screening Installation

The existing point of entry to the AIPS pond system is from an above grade concrete structure that distributes primary influent flow between Ponds 1A and 1B. The distribution box structure was constructed in 1993 and is located at the northern junction between Pond 1A and 1B. The existing structure would be reconfigured to accommodate a coarse screening system to remove large diameter solids from the primary waste stream. The screening system is expected to protect the new influent pumping system and MBR system, which would be susceptible to clogging by rags and debris. The coarse screening system will also include individual washer compactors and a rotary screw press conveyor to deliver screenings off the structure and into a dumpster for disposal.

Proposed upgrades to retrofit the existing distribution box and install the coarse screening system are expected to include:

- Installation of a temporary bypass pumping system;
- Cast-in-place concrete channel extensions;
- Installation of coarse screening equipment;

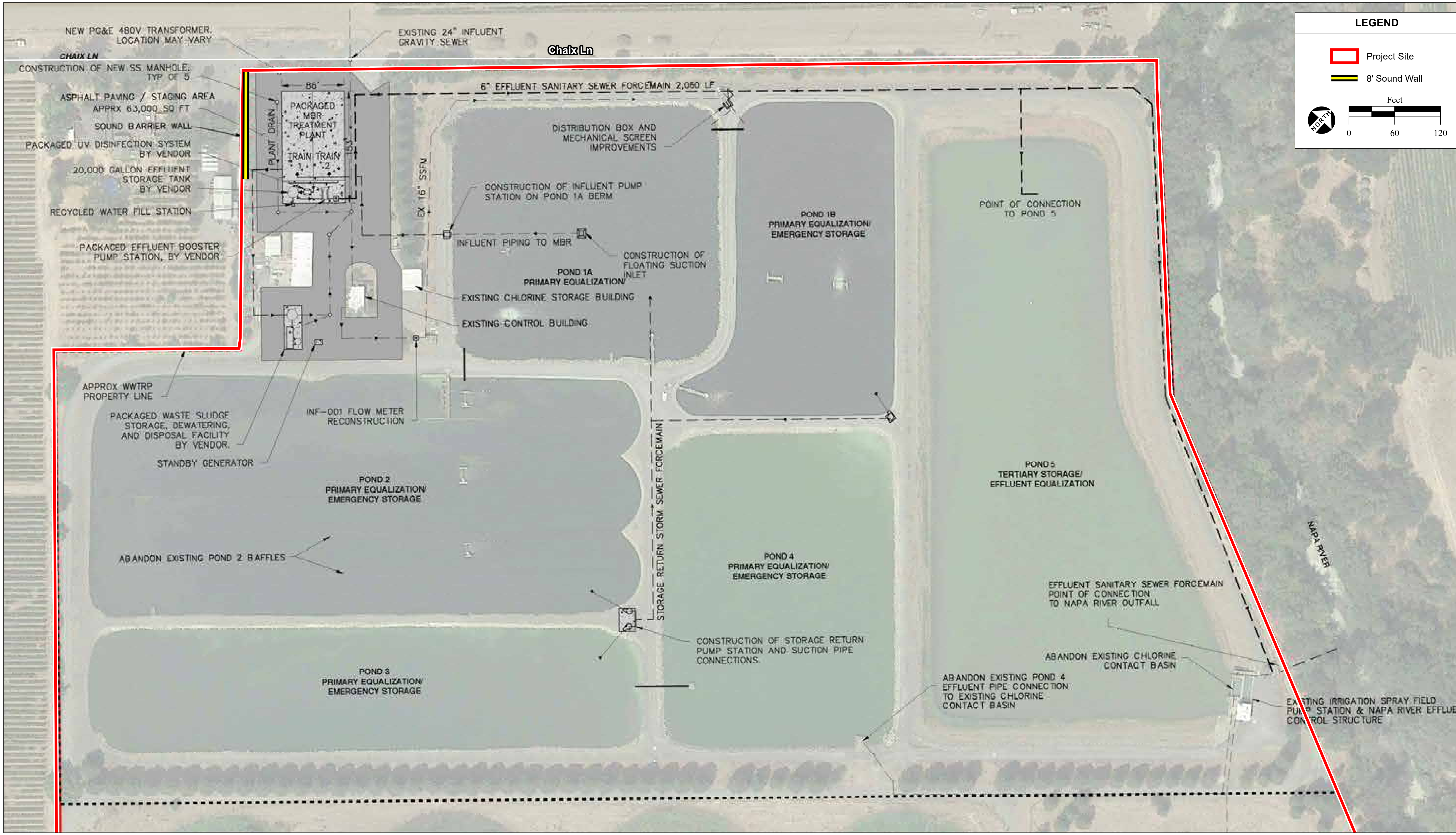
- Retrofit of existing handrailing and ladders;
- Installation of elastomeric polyurethane coating system to protect existing/new concrete;
- Cast-in-place concrete pad for dumpster; and
- Installation of protective bollards.

Construction of a Sludge Dewatering and Disposal System

A dewatering and solids handling process would be introduced to dewater waste sludge from the new MBR system. The current WWTRP does not have sludge thickening or dewatering, as it is not needed with the existing AIPS system. The objective of the solids handling process is to minimize the City's operational labor effort through automation and the construction of advanced sludge dewatering units. The sludge dewatering system would include the construction of a packaged volute dewatering press, waste activated sludge (WAS) storage tank designed to receive approximately 16,000 gallons per day (gpd) of WAS, and a sludge pumping system to pump from the MBR to the WAS storage tank, and from the WAS storage tank to the packaged volute dewatering press. The sludge dewatering and disposal system would be an aerated and enclosed structure, designed to control odor. The volute sludge dewatering press would be located directly south of the existing shop (refer to **Figure 2-4**). Dewatered sludge cake solids would fall from the press at approximately 500 dry pounds per hour to disposal via dumpsters.

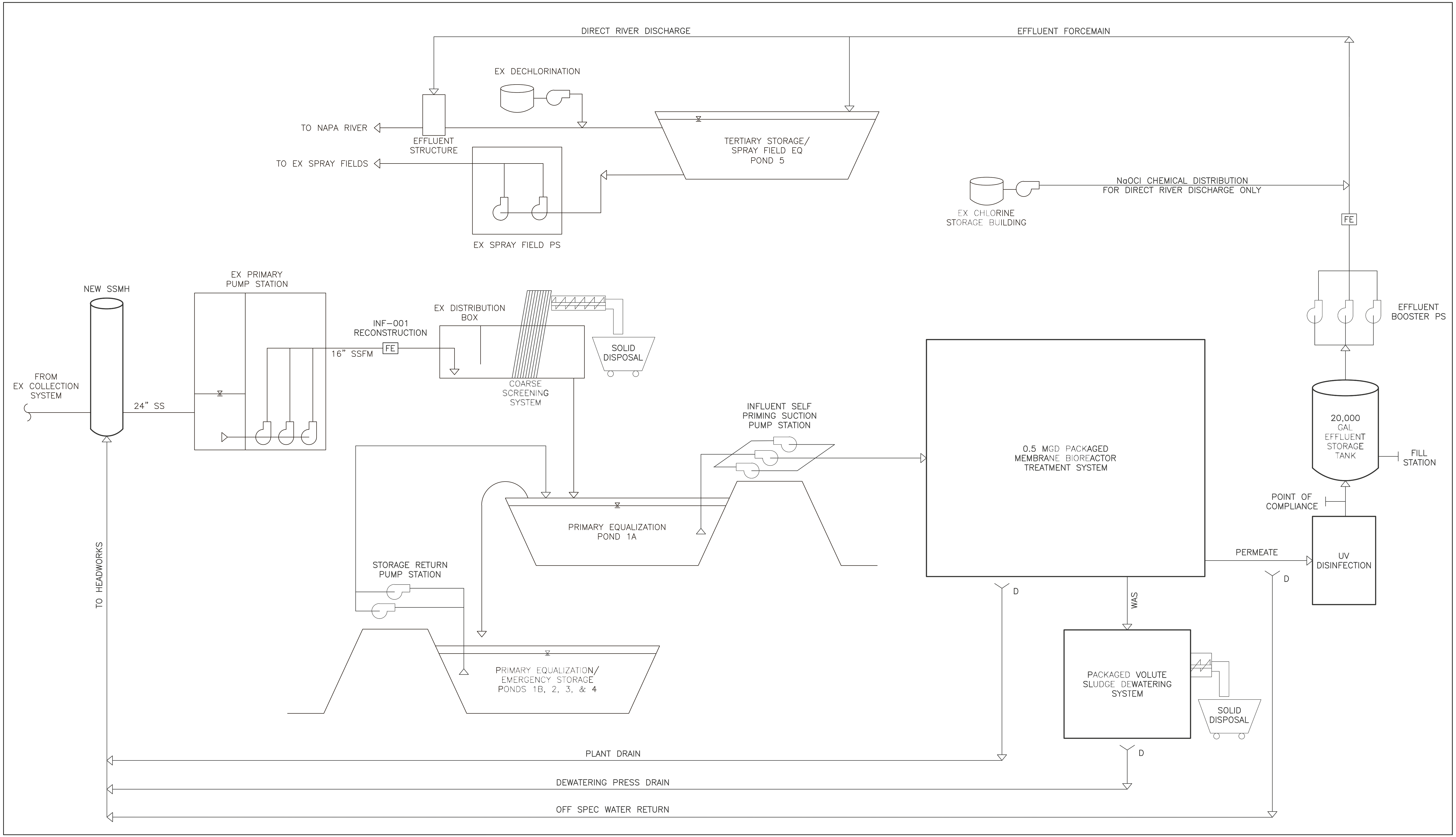
Phase I upgrades necessary for the construction of a sludge dewatering and disposal system include:

- Construction of a volute sludge dewatering packaged system;
- Construction of a polymer feed system and WAS pumping system; and
- Construction of a WAS storage tank and pumping facility.



SOURCE: HydroScience Engineers, 10/2019; Napa County aerial photograph, 6/19; AES, 9/4/2020

Figure 2-5
Proposed WWTRP Facility Layout



SOURCE: HydroScience Engineers, 10/2019; AES, 8/13/2020

Figure 2-6
Process Flow Diagram for Proposed MBR Treatment System

Flow Meter Reconstruction

The WWTRP currently operates an influent magnetic flow meter (influent monitoring location INF-001) downstream of the primary influent pump station that formally reports influent flows to the SFBRWQCB. The existing flow meter is 18 years old and was designed with insufficient straight lengths of pipe upstream and downstream of the measuring instrument, which is what reduces flow turbulence and enhances measurement accuracy. The flow meter also lacks an operational bypass to permit calibration and maintenance. As part of the Proposed Project, the influent flow meter would be replaced and reconstructed to provide the WWTRP with more accurate flow measurements. A second flow meter would also be constructed on the effluent force main after disinfection. Because the sanitary sewer force main would be reconfigured to accommodate the new WWTRP upgrades, the flow meter would need to be replaced and mechanically reconstructed.

Phase I upgrades necessary for flow meter reconstruction include:

- Replace existing INF-001 magnetic flow meter due to operational age;
- Reconstruct above grade flow meter mechanical assembly with permanent bypass to include manufacturer's recommended lengths of straight influent and effluent piping surrounding the instrument;
- Construct new concrete pad and pipe supports; and
- Redistribute electrical and control system and integrate instrumentation to the SCADA system.

Chlorine Disinfection System Improvements

The Proposed Project would reconfigure the WWTRP's existing disinfection process. Currently, treated wastewater is continuously distributed via gravity to the plant's chlorine contact basin from treatment Pond 4. Disinfected wastewater is then pumped to the north end of Pond 5 for equalization storage prior to effluent discharge to the irrigation spray fields or the Napa River outfall. Sodium hypochlorite is currently stored in a chemical storage building located east of the plant's existing control building. The location of these structures is labeled on **Figure 2-4**. A newly constructed chemical monitoring and distribution pumping system located in the chemical storage building distributes sodium hypochlorite solution to the chlorine contact basin located in the southeast corner of Pond 5. Disinfected effluent discharged to the Napa River is dechlorinated with ascorbic acid using an automated chemical monitoring and distribution system located in the effluent pump station maintenance room. Because a new UV disinfection system would be constructed as part of the Phase I upgrades, the existing chlorine contact basin would no longer operate as the primary means of effluent disinfection and the existing sodium hypochlorite solution piping would remain in operation for the purpose of redundant disinfection prior to spray field disposal. New sodium hypochlorite injection facilities would be constructed for disinfection prior to effluent storage in Pond 5. The dechlorination system would be maintained in the event that disinfected effluent stored in Pond 5 can be discharged to the Napa River.

Proposed upgrades necessary for the chlorine disinfection system improvements include:

- Construct new sodium hypochlorite solution piping for injection to the tertiary effluent force main piping prior to storage for disinfection residual;

- Automate the chlorine injection system using continuous flow paced methods and based upon free ammonia concentrations entering Pond 5;
- Demolish chlorine contact basin baffles;
- Perform comprehensive condition assessment on existing irrigation spray field pumps and force main system; and
- Perform comprehensive condition assessment on Pond 5 chlorine contact basin discharge vertical turbine pumps.

Effluent Pipeline Improvements

The WWTRP improvements will include an effluent pump station designed to distribute tertiary effluent to the Napa River outfall or directly into Pond 5. Effluent discharge is permitted for the Napa River under the discharge requirements summarized in NPDES No. CA0038016 and the spray field reclamation requirements summarized in Order No. 87-090. The WWTRP will maintain current discharge strategies after implementation of WWTRP improvements, however, Napa River discharge will no longer be required to travel through Pond 5 and require dechlorination. A new underground effluent force main will traverse the north and east boundaries of the WWTRP to establish a new point of supply to Pond 5 and a direct effluent point of connection to the underground Napa River outfall structure. The outfall pipe connection will allow the City to discharge disinfected tertiary effluent to the Napa River without chlorination/dechlorination.

Proposed upgrades necessary for the effluent pipeline and discharge improvements include:

- Construct approximately 1,900 linear feet of below grade PVC piping;
- Connect discharge piping to Pond 5 and existing Napa River outfall structure;
- Backfill and replace existing fill in kind; and
- Install pipeline appurtenances, as necessary.

Electrical Improvements

A new electrical system would be designed to meet the most current design criteria adopted by the City and County, and would satisfy the requirements of the Electrical Safety Order of the California Code of Regulations (CCR) and National Fire Protection Association No.70, the National Electrical Code.

The Proposed Project would include installation of a new 480-volt transformer, with electricity provided by Pacific Gas & Electric. Power requirements would be tailored to the needs of the packaged MBR system and associated processes. The existing WWTRP service connection would remain intact to prevent operational disruption during construction. Telephone service and fiber optics would be supplied to the site by local communications utility service providers. Electrical distribution throughout the WWTRP would include site lighting at each of the various treatment train facilities for security and emergency maintenance. Pole mounted light fixtures would serve as task lights to allow staff to work on the treatment equipment or for access to local control boxes. The pole mounted light fixtures would be equipped with individual manual on/off switches as well as “night light” operators using photocell control. These light fixtures would be on at dusk and off at dawn. Security measures would be limited to magnetic contacts at each door of the operations, electrical, and maintenance buildings. These magnetic contacts would be tied into the programmable logic controllers (PLC) for alarming purposes only and directly report back to City SCADA and emergency response services. Video surveillance and perimeter security measures would be incorporated into the site improvements at the City's discretion.

Install New SCADA System

The WWTRP has a SCADA system, which monitors and controls various automated processes within the WWTRP. A comprehensive condition assessment of the existing SCADA system was performed, which identified several deficiencies. The WWTRP proposed upgrades would result in the construction of a new SCADA system.

Phase I upgrades necessary for the installation of a new SCADA system include:

- Replace existing iFIX HMI Software with new software package suited for Phase 1 upgrades and existing SCADA components;
- Integrate all new Phase 1 WWTRP upgrades into SCADA for full automation, monitoring and control;
- Replace Win 911 and refurbish the SCADA autodialer emergency alarm system;
- Reprogram and upgrade all existing PLCs; and
- Perform condition assessment on existing pump station MCCs, control cabinets, VFDs, and RTUs to determine improvement priority.

Site Improvements

The proposed WWTRP improvements would primarily occur in the northwest corner of the Project site, in an area that currently contains the chemical storage building, control building, and a shop, as seen on **Figure 2-4**. This area is used as a storage laydown area for the City Public Works Department and has sparse vegetation and redwood trees. Site improvements would include paving, striping, and installation of curbs and gutters. Stormwater catch basins would be installed to gravity drain to the primary influent pump station. The existing shop, as seen on **Figure 2-4**, would remain and pavement would be extended to create a shop entrance. Approximately 63,000 square feet of new asphalt would be placed around the WWTRP to provide vehicular access to all sides of the treatment facilities, control building, and shop. Protective bollards would be installed surrounding new electrical and wastewater treatment equipment to protect against traffic. The existing WWTRP facility entrance via Chaix Lane would remain; however, the gate would be upgraded to include an automatic operator. A new 6-foot chain link fence would be constructed to enclose the property to enhance security.

Sound Barrier Wall

An approximately 150-foot long, 8-foot high, concrete sound barrier wall would be constructed along the western border of the storage laydown area to provide sound reduction from operation of the proposed MBR system (see **Figure 2-5**) in accordance with the recommendations of the Environmental Noise Assessment provided in **Appendix E**. It is anticipated that up to four olive trees along the western property boundary would need to be removed to accommodate the sound barrier wall. The remaining trees located on the western property boundary would be protected to maintain the visual barrier between the WWTRP and surrounding residential and commercial buildings. The sound barrier wall would reduce noise experienced by the nearest sensitive receptor, a residence approximately 200 feet southwest of the proposed MBR system, to a level which is consistent with County and City noise regulations (see pages 18 through 22 of **Appendix E**).

2.4.3 TREATMENT CAPACITY AND EFFLUENT QUALITY

The Proposed Project would enable the WWTRP to reliably meet the more stringent effluent limitations specified in the 2016 Permit. The expected effluent quality for the proposed MBR system would produce a monthly average of 5 milligrams per liter (mg/L) or less BOD and 1 mg/L or less TSS, which would be below the 2016 Permit limits of 15 mg/L for both BOD and TSS. **Table 2-2** compares the projected effluent quality of the proposed MBR system with the 2016 Permit effluent limitations.

TABLE 2-2. COMPARISON OF MBR EFFLUENT QUALITY AND 2016 PERMIT LIMITATIONS

Parameter	Anticipated MBR Effluent Quality[2]	2016 NPDES Permit Effluent Limitations
Biochemical Oxygen Demand	≤ 5 mg/L	≤ 15 mg/L
Total Suspended Solids (TSS)	≤ 1 mg/L	≤ 15 mg/L
Ammonia	≤ 10 mg/L	≤ 16 mg/L
Total Coliform	< 2.2 MPN/100 mL	< 23 MPN/100 mL

Notes: 1. Expected effluent quality based on expected process effectiveness for a typical MBR treatment system.
2. mg/L = milligram per liter; MPN/mL = most probable number per milliliter

Source: **Appendix A**.

As explained in **Section 2.3**, the existing WWTRP has a treatment capacity of 1.3 MGD and is permitted for an average dry weather flow of 0.5 MGD and a peak weather flow capacity of 2.8 MGD. Average day daily influent wastewater flows range from 0.377 MGD to 0.816 MGD, depending on the season. Utilizing the WWTRP's current Ponds 1A through 3 for seasonal storage and flow equalization would provide approximately 25.9 MG of additional storage capacity, reducing the peak flow treatment requirements of the WWTRP. With implementation of the Proposed Project, the WWTRP would be able to meet wastewater capacity needs and flow parameters outlined in the 2016 Permit, supporting an average dry weather flow of 0.5 MGD and a maximum peak flow of 1.3 MGD.

2.4.4 CONSTRUCTION ACTIVITIES

Project components would be designed and constructed in accordance with applicable codes and industry recognized standards, including provisions of the American Water Works Association Standards, Uniform Plumbing Code, California State Building Code (CBC), and the International Building Code (IBC). Components of the Proposed Project would require general construction activities, and would include grading, trenching, and import and export of materials. Construction of project components would occur over the course of 12 to 16 months. It is anticipated that construction of the WWTRP Phase I upgrades would begin in spring of 2021 and completed in 2022. As required by the City of St. Helena Municipal Code Section 8.24.010, construction activities shall be limited to between the daytime hours of 8:00 A.M. and 5:00 P.M Monday through Saturday. No construction activities shall take place on Sundays or Federal and local holidays.

Construction Equipment

Energy efficient construction equipment would be utilized to the extent feasible. The following equipment may be utilized occasionally during construction of the Proposed Project:

- Front-end loader
- Crane
- Water truck
- Air compressor
- Concrete trucks
- Flat-back delivery truck
- Trencher/Excavator
- Backhoe/Loader
- Welding truck
- Dump truck

2.4.5 OPERATION AND MAINTENANCE ACTIVITIES

Periodic maintenance of the WWTRP components, storage tanks, pumps, and appurtenant structures would be required after the Proposed Project is operational. Pumps, piping, valves, and appurtenant structures would be checked and maintained regularly and replaced as necessary. The membranes would need to be periodically backwashed with chemicals that require on-site storage and containment. City staff would inspect components of the Proposed Project regularly and replace equipment that reaches the end of its lifetime or fails during use.

The WWTRP currently employs a Grade III operator, and no additional employees beyond those needed to maintain the current WWTRP would be needed to serve the Proposed Project.

2.5 REGULATORY REQUIREMENTS, PERMITS, AND APPROVALS

Permits and approvals that may be necessary for construction and operation of the Proposed Project are identified below.

2.5.1 CITY OF ST. HELENA APPROVALS

- Adoption of this IS/MND under the requirements of CEQA.
- Adoption of a Mitigation Monitoring and Reporting Plan that incorporates the mitigation measures identified in this document.

2.5.2 U.S. DEPARTMENT OF AGRICULTURE

- Approval of grant funding to facilitate the Proposed Project.
- Approval of the Environmental Report for compliance with the National Environmental Policy Act (NEPA), and approval of Conceptual Design Report (**Appendix A**).

2.5.3 SAN FRANCISCO BAY REGIONAL WATER QUALITY CONTROL BOARD

- Determination that the project qualifies for coverage under the Clean Water Act (CWA) NPDES Construction General Permit for the protection of surface waters from construction and other land-disturbing activity.

- Enforce the waste discharge requirements of the 2016 NPDES Permit for the discharge of effluent treated at the WWTRP to Napa River. The City must submit various reports to the SFBRWQCB to demonstrate that operation of the Proposed Project would comply with the 2016 NPDES Permit.

2.5.4 STATE HISTORIC PRESERVATION OFFICE

- Consultation pursuant to Section 106 of the NHPA regarding (joint consultation with Indian tribes) potential impacts to cultural resources resulting from the Proposed Project.

3 ENVIRONMENTAL ANALYSIS (CHECKLIST)

3.1 EVALUATION OF ENVIRONMENTAL IMPACTS

Pursuant to CEQA *Guidelines* §15063, an IS should provide the lead agency with sufficient information to determine whether to prepare an environmental impact report (EIR) or negative declaration for a proposed project. The CEQA *Guidelines* state that an IS may identify environmental impacts by use of a checklist, matrix, or other method, provided that conclusions are briefly explained and supported by relevant evidence.

If it is determined that a particular physical impact to the environment could occur, then the checklist must indicate whether the impact is Potentially Significant, Less Than Significant with Mitigation, or Less Than Significant. Findings of No Impact for issues that can be demonstrated not to apply to a proposed project do not require further discussion.

3.1.1 EVALUATION TERMINOLOGY

The following sections contain the environmental checklist form presented in Appendix G of the CEQA *Guidelines*. The checklist form is used to describe the impacts of a proposed project. For this checklist, the following designations are used:

- **Potentially Significant Impact**: An impact that could be significant, and for which no mitigation has been identified. If any potentially significant impacts are identified and no mitigation is available to reduce the impact to a less-than-significant level, an EIR must be prepared.
- **Less-than-Significant Impact with Mitigation Incorporated**: Impacts that would be reduced to a less-than-significant level by feasible mitigation measures identified in this checklist.
- **Less-than-Significant Impact**: Any impact that would not be considered significant under CEQA relative to existing standards.
- **No Impact**: The Proposed Project would have no impact.

3.1.2 CUMULATIVE IMPACT ANALYSIS

As defined in Section 15355 of the CEQA *Guidelines*, a cumulative impact consists of an impact that is created as a result of the combination of a proposed project together with other closely related past, present, and reasonably foreseeable future projects that cause related impacts. As noted in Section 15064(h)(4) of the CEQA *Guidelines*, the mere existence of significant cumulative impacts caused by other projects alone shall not constitute substantial evidence that the proposed project’s incremental effects are cumulatively considerable. Further, Section 15130(b) of the CEQA *Guidelines* states:

> *The discussion of cumulative impacts shall reflect the severity of the impacts and their likelihood of occurrence, but the discussion need not provide as great detail as is provided for the effects attributable to the project alone. The discussion should be guided by the standards of practicality and reasonableness, and should focus on the cumulative impact to which the identified other projects contribute rather than the attributes of other projects which do not contribute to the cumulative impact.*

Growth associated with build-out projections in the City's and County's General Plans and proposed and current development projects within the City were considered in determining whether the impacts of the Proposed Project would be cumulatively considerable in accordance with Section 15064(h) of the CEQA *Guidelines*.

The City tracks proposed, current, and completed development/planning projects on their website. There are no pending development applications near the Project site and only minor projects are anticipated to occur in the City, including design review, lot line adjustments, use permits, and various capital projects to improve local parks and sidewalks (City of St. Helena, 2020f).

According to the City's General Plan, St. Helena aims to contain development and preserve agricultural lands in and adjacent to the City. This is partly done through establishing an Urban Limit Line—a parcel-specific boundary that marks the limit of where urban development is permitted within the incorporated area of the City. The intent of the Urban Limit Line is to discourage urban sprawl by containing urban development within designated areas during the planning period. The Project site and immediate vicinity is outside the Urban Limit Line and is composed mainly of vineyards; this area is not anticipated to experience significant amounts of growth or new development.

The Napa County General plan contains growth management policies (e.g., Policy AG/LU-119) that regulate development of new housing units, so as to not exceed target annual population growth rates. The County General Plan also identifies the location of future priority housing development sites, none of which are located in the City of St. Helena.

3.2 AESTHETICS

3.2.1 ENVIRONMENTAL CHECKLIST

AESTHETICS	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
Except as provided in Public Resources Code Section 21099, would the project:				
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☒	☐
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☒	☐
c) In nonurbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	☐	☐	☒	☐
d) Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?	☐	☐	☒	☐

3.2.2 SETTING

Regulatory Context

California Scenic Highway Program

The California Scenic Highway Program, administered by the California Department of Transportation (Caltrans), intends to preserve and protect scenic highway corridors from change that would diminish the aesthetic value of lands adjacent to scenic highways. The State Scenic Highway System includes a list of highways that are either eligible for designation as scenic highways or have been designated. Cities and counties can nominate eligible scenic highways for official designation by identifying and defining the scenic corridor of the highway. The municipality must also adopt ordinances to preserve the scenic quality of the corridor or document such regulations that already exist in various portions of local codes.

City of St. Helena General Plan Update 2040

Applicable City General Plan goals, policies, and objectives include:

CD5.B Adopt a dark sky ordinance to preserve the City's rural character by limiting the negative effects of light pollution on wildlife and community aesthetics. Develop lighting design guidelines for new development that mitigate light pollution while ensuring adequate nighttime security.

CD5.C New development shall not result in significant light, glare, and noise that could affect residents, visitors, and wildlife. Lighting shall be shielded to reduce glare and shall be cast downwards. Outdoor lighting shall occur primarily for the purpose of security and safety. Upcast lighting shall be discouraged to minimize impacts on wildlife and to retain the agricultural ambience of St. Helena. All lighting shall conform to the Lighting Zone 2 requirements of Title 24 of the California Building Code.

City of St. Helena Municipal Code

Applicable City zoning ordinances include:

Chapter 17.68 Public and Quasi-Public (PQP) District: All public and quasi-public uses in the PQP district shall require a use permit, public hearing and review. Requirements for landscaping and screening are also incorporated into the PQP district. Pursuant to Chapter 17.164 all signs, new structures or buildings, or exterior revisions of any existing structures or buildings for both permitted and conditional uses shall require design review.

Napa County Code of Ordinances

County zoning ordinances that are applicable to parcels surrounding the Project site include:

Chapter 18.16 Agricultural Preserve (AP) District: the AP district classification is intended to be applied in the fertile valley and foothill areas of Napa County in which agriculture is and should continue to be the predominant land use, where uses incompatible to agriculture should be precluded and where the development of urban-type uses would be detrimental to the continuance of agriculture and the maintenance of open space which are economic and aesthetic attributes and assets of the county.

Napa County General Plan (2008)

County goals, policies, and objectives would be relevant when analyzing cumulative impacts of the Proposed Project, as the Proposed Project may cause cumulative impacts beyond City limits. County General Plan goals, policies, and objectives relevant to the cumulative setting include:

Goal CC-1 Preserve, improve, and provide visual access to the beauty of Napa

Policy CC-6 Preserve and enhance the night environment of the County's rural areas and prevent excessive light and glare.

Policy CC-8 Scenic roadways which shall be subject to the Viewshed Protection Program are those shown in Figure CC-3, or designated by the Board of Supervisors in the future.

Policy CC-33 The design of buildings visible from the County's designated scenic roadways shall avoid the use of reflective surfaces which could cause glare.

Environmental Setting

As described in **Section 2.0**, the existing WWTRP is located on an approximately 124-acre site in the City of St. Helena, in Napa County. The Project site is bounded on the northeast by the Napa River, Chaix Lane to the northwest, and agricultural fields to the southeast and southwest. The topography of the Project site is relatively flat, with elevations ranging from 175 to 195 feet above mean sea level (amsl).

The visual characteristics of the northern portion of the Project site consist of the existing WWTRP, including the pond treatment system and laydown storage yard. The laydown storage yard is a gravel lot containing storage containers and the existing chlorine storage building and control building (**Figure 2-3**). The visual characteristic of the southern portion of the Project site consists of an irrigation spray field containing primarily non-native annual grasses.

The area surrounding the Project site consists generally of agricultural land and vineyards, with the Napa River running along the eastern border of the Project site. Rural residences and winery operations are dispersed around the vicinity of the Project site. A parcel is located directly west of the storage laydown area, which contains a residence, vineyard, and industrial structures most likely used for storage. Vegetation along the boundary between the existing WWTRP and this neighboring parcel provides a partial visual barrier.

Views of the Project site from residences and business north of the Napa River are fully shielded by the riparian vegetation along the banks of Napa River. The closest structures to the development footprint, other than the neighboring parcel, includes a residence approximately 0.5 miles southeast of the development footprint, a winery building for Robbins Vineyards approximately 0.15 miles southwest of the development footprint, a residence approximately 0.5 miles northwest of the development footprint, and a residence along the Napa River approximately 0.55 miles southeast of the development footprint. No other existing residences or business are expected to have views of the proposed development area.

Scenic Resources

There is no comprehensive list of specific features that automatically qualify as scenic resources; however, certain characteristics can be identified which contribute to the determination. The following is a partial list of visual qualities and conditions that if present, may indicate the presence of a scenic resource:

- A tree that displays outstanding features of form or age.
- A landmark tree or a group of distinctive trees accented in a setting as a focus of attention.
- An unusual planting that has historical value.
- A unique, massive rock formation.
- An historic building that is a rare example of its period, style, or design, or which has special architectural features and details of importance.

- A feature specifically identified in applicable planning documents as having a special scenic value.
- A unique focus or a feature integrated with its surroundings or overlapping other scenic elements to form a panorama.
- A vegetative or structural feature that has local, regional, or statewide importance.

The Napa River to the east of the Project site and surrounding vineyards would be considered scenic resources. Although no roads in Napa County are designated as Scenic Highways by the State of California, segments of State Route 29, which is located approximately 0.85 miles west of the Project site is listed as “eligible” for scenic highway designation (Caltrans, 2018) and Napa County considers State Route 29 a County-designated scenic roadway (Napa County, 2008). However, the Project site cannot be viewed by travelers on State Route 29.

Nighttime Lighting Conditions

Current nighttime lighting conditions in the City are directly correlated with existing development. The City is primarily developed with high and medium density residential housing near the city center, commercial areas running along State Route 29/State Route 128, and agricultural lands surrounding the City. The business district, located along State Route 29/State Route 128, approximately 0.85 miles west of the Project site, generally has low ambient nighttime light levels, with residential and outlying areas of the City consisting of even lower ambient light levels.

The most notable lighting in the near vicinity of the Project site is from the existing WWTRP, which generates a minimal amount of artificial lighting during the night, as operation continues 24 hours per day. Although there are few buildings on the site, there is existing lighting that illuminates processing facilities for security, safety, and task specific needs.

3.2.3 DISCUSSION OF IMPACTS

Question A and B

Would the project: Have a substantial adverse effect on a scenic vista; or substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

Less than Significant. As described above, the Project site is not located near a designated State scenic highway or other designated scenic corridor. State Route 29/State Route 128 is a County-designated scenic roadway; however, the Project site is located approximately 0.85 miles east of State Route 29/State Route 128 and is not easily visible from that distance. Although the Project site is adjacent to the Napa River and surrounded by scenic vineyards, the industrial visual character of the WWTRP after implementation of the Proposed Project would not drastically differ from existing conditions. Therefore, impacts to these scenic resources would be less than significant.

Question C

Would the project: In nonurbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly *accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?*

Less than Significant. The development of the Proposed Project would involve the addition of a new MBR system, lift station, and sludge dewatering system, but would not change the general visual character of the Project site. The MBR system would be approximately 10 feet high, with the highest point on the apparatus approximately 18 feet above grade. The height of the proposed MBR system would be similar to existing buildings on site and would not substantially change the existing visual character or public views of the site. All proposed improvements would take place within the existing development footprint of the WWTRP and would not change the visual character of the Project site.

The closest sensitive receptor to the Project site is a residence directly southwest of the WWTRP that shares a parcel boundary with the Project site. The residence is approximately 160 feet from the WWTRP property boundary. The parcel also contains structures directly adjacent to the WWTRP boundary line, which appear industrial in nature and may be used for storage (see Figure C of **Figure 3-1**). Currently, views of the Project site from this residence are partially shielded by a row of olive trees along the western edge of the storage laydown area (see Figures A and B of **Figure 3-1**), as well as by the industrial structures and trees located southwest of the WWTRP on the neighboring parcel (see Figure C of **Figure 3-1**). Views of the Project site are also shielded by the riparian corridor located along the banks of Napa River, east of the Project site (see Figure D of **Figure 3-1**). As stated in **Section 2.4.2**, a sound barrier wall would be installed along the western property boundary, as shown in **Figure 2-5**, which would partially block views of the proposed MBR system from the neighboring residence. It is anticipated that up to four olive trees would need to be removed to accommodate the wall. The remaining trees located on the western property boundary would be protected to maintain the visual barrier between the WWTRP and surrounding residential and commercial buildings. Impacts to the visual character and quality of the Project site and vicinity would be considered less than significant.

Figure A: View from the project site facing southwest, showing vegetation providing a visual barrier between the neighboring parcel.

Figure B: View from the project site facing southeast, showing vegetation providing a visual barrier between the neighboring parcel.

Figure C: View from Chaix Lane facing southeast at the neighboring parcel, showing an industrial structure and trees, which provide a visual barrier.

Figure D: View from the project site facing northwest, showing a riparian corridor along the Napa River, which provides a visual barrier.

SOURCE: AES, 9/10/2020

Figure 3-1
Project Site Photographs Depicting Visual Barriers

Question D

Would the project: Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?

Less than Significant. The Project site currently contains the existing WWTRP, which is minimally illuminated for safety, security, and to support task areas. The Proposed Project would introduce new sources of light on the property for the same purposes, including site and building lighting. As described in **Section 2.4**, electrical distribution upgrades throughout the WWTRP would include site lighting at each of the various treatment train facilities for security and emergency maintenance. Pole mounted light fixtures would serve as task lights to allow staff to work on the treatment equipment or for access to local control boxes. The pole mounted light fixtures would be equipped with individual manual on/off switches as well as “night light” operators using photocell control. These light fixtures would be on at dusk and off at dawn. However, consistent with the City’s General Plan Update, Community Design Action CD5.C, any new exterior lighting would be designed to not result in significant light or glare. Lighting would be shielded and cast downwards to reduce glare, and outdoor lighting would primarily be for the purposed of security and safety. The proposed MBR system would be primarily constructed out of a stainless-steel material; none of the surfaces or building materials proposed for the project are reflective or would produce glare. Potential impacts to day and nighttime views associated with lighting on the Project site would be considered less than significant.

Cumulative Impacts

Less than Significant. Potential cumulative projects in the vicinity of the Project site include growth within the City and County limits according to the build out projections in the City’s and County’s General Plans. According to the City’s General Plan, St. Helena aims to contain development and preserve agricultural lands in and adjacent to the City. This is partly done through establishing an Urban Limit Line—a parcel-specific boundary that marks the limit of where urban development is permitted within the incorporated area of the City. The intent of the Urban Limit Line is to discourage urban sprawl by containing urban development within designated areas during the planning period. The Project site and immediate vicinity is outside the Urban Limit Line and is composed mainly of vineyards; this area is not anticipated to experience significant amounts of growth or new development that would result in cumulative changes to the visual setting or increases in nighttime lighting levels. The Proposed Project would not change the general visual character of the Project site and new project-related light sources would not negatively affect the ambient light in the project area due to light reduction strategies that would be implemented consistent with the City’s General Plan and Municipal Code. Therefore, the Proposed Project’s contribution to aesthetic impacts, including new light sources, would not be cumulatively considerable.

3.2.4 MITIGATION MEASURES

None required.

3.3 AGRICULTURE/FORESTRY RESOURCES

3.3.1 ENVIRONMENTAL CHECKLIST

AGRICULTURE/FORESTRY RESOURCES	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒

3.3.2 SETTING

Regulatory Context

Federal

Farmland Protection Policy Act

The Farmland Protection Policy Act (FPPA) is intended to minimize the impact federal programs have on the unnecessary and irreversible conversion of farmland to nonagricultural uses. It assures that federal programs are administered in a matter that is compatible with state and local units of government, and private programs and policies to protect farmland (7 United States Code [USC] § 4201).

The Natural Resources Conservation Service (NRCS), responsible for the implementation of the FPPA, categorizes farmland in a number of ways. These categories include: prime farmland, farmland of statewide importance, and unique farmland. Prime farmland is considered to have the best possible features to sustain long-term productivity.

Farmland of statewide importance includes farmland similar to prime farmland but with minor shortcomings, such as greater slopes or less ability to store soil moisture. Unique farmland is characterized by inferior soils and generally needs irrigation depending on climate. The Land Evaluation and Site Assessment is a numeric rating system used by the NRCS to evaluate the relative agricultural importance of farmlands.

State

California Farmland Mapping and Monitoring Program

The Farmland Mapping and Monitoring Program (FMMP), which monitors the conversion of the State's farmland to and from agricultural use, was established by the California Department of Conservation (DOC), under the Division of Land Resource Protection. The program maintains an inventory of state agricultural land and updates its "Important Farmland Series Maps" every two years.

The FMMP is an informational service only and does not constitute state regulation of local land use decisions. The four categories of farmland, which include Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance, are considered valuable and any conversion of land within these categories is typically considered to be an adverse impact (DOC, 2020a).

Williamson Act

The Williamson Act is a State program that was implemented to preserve agricultural land. Under the provisions of the Williamson Act (California Land Conservation Act 1965, Section 51200), landowners contract with the county to maintain agricultural or open space use of their lands in return for reduced property tax assessments. Participating counties and cities are required to establish their own rules and regulations regarding implementation of the Williamson Act within their jurisdiction including, but not limited to, enrollment guidelines, acreage minimums, enforcement procedures, allowable uses, and compatible uses. (DOC, 2020b).

Environmental Setting

Regional Setting

The DOC defines Prime Farmland as “farmland with the best combination of physical and chemical features able to sustain long term production of agricultural crops.” (DOC, 2020c). This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. As of 2012, the total acreage of important farmland in the County is 76,142 acres, including 31,379 acres of prime farmland (41 percent of County total). According the DOC FMMP, a total of 242 acres of important farmland in the County was converted to other uses between the years 2010 and 2012 (DOC, 2012).

According to the 2019 Napa County Agricultural Crop Report, the total production value of agricultural and livestock production for the County was approximately $943,552,800, with agricultural production and livestock production accounting for $939,745,800 and $3,807,000, respectively (Napa County, 2019a). The majority of the agriculture production value was from fruit and nut crops ($938,490,700) and floral and nursery crops ($650,300). The remaining agriculture production in the County comes from field crops and vegetable crops (Napa County, 2019a).

Project Site Setting

According to the FMMP, Napa, 2016 map, shown in **Figure 3-2**, the southeastern Project site parcels (APNs 030-240-017 and 030-250-018), which are currently utilized as irrigation spray fields, are classified as Prime Farmland. These parcels are located within unincorporated Napa County and are designated as “AP” for Agricultural Preserve. According to the Napa County Conservation Division, this classification is eligible for qualification under the Williamson Act (Napa County, 2020b) and both parcels are covered by Williamson Act Contract #554/88A (Barrella, Don, 2020). The northwestern parcels which comprise the development footprint (APNs 030-240-013 and 030-240-009) are classified as Urban and Built-Up Land (DOC, 2020d).

3.3.3 DISCUSSION OF IMPACTS

Questions A, D, and E

Would the project: Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use; Result in the loss of forest land or conversion of forest land to non-forest use; Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?

No Impact. Construction of the MBR facility and associated upgrades would only occur in the development footprint (northwestern parcels), which are not classified as Farmland of Statewide Importance, as seen in **Figure 3-2**. The southeastern Project site parcels (APNs 030-240-017 and 030-250-018) would continue to be utilized for the disposal of treated wastewater via spray field irrigation and would not be developed or converted to non-agricultural use. The Proposed Project would improve the quality of effluent discharged at the WWTRP; this could have a beneficial impact on groundwater quality as an irrigation source for surrounding agricultural uses. Additionally, the Project site does not contain forestry lands and would not result in the conversion of forest land to non-forest use. Therefore, the Proposed Project would have no impacts on agricultural or forestry resources.

Questions B and C

Would the project: Conflict with existing zoning for agricultural use, or a Williamson Act contract; Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g))?

No Impact. The northern portion of the Project site that encompasses the development footprint is currently zoned by the City as Public & Quasi Public, and the southern portion of the Project site utilized as sprayfields is designated by Napa County as Agricultural Preserve. Construction and operation of the proposed WWTRP improvements within the development area would be consistent with the existing City zoning designation and would not conflict with zoning for agricultural, forest, or timberland use. Although the southeastern parcels of the Project site (APNs 030-240-017 and 030-250-018) are Williamson Act contracted lands, no development would occur in these areas and there would be no alteration in preexisting land use or zoning. Both parcels would continue to be utilized for the disposal of treated effluent via spray field irrigation consistent with existing practices, which would not conflict with zoning for agricultural, forest, or timberland use. Therefore, no impacts would occur.

Cumulative Impacts

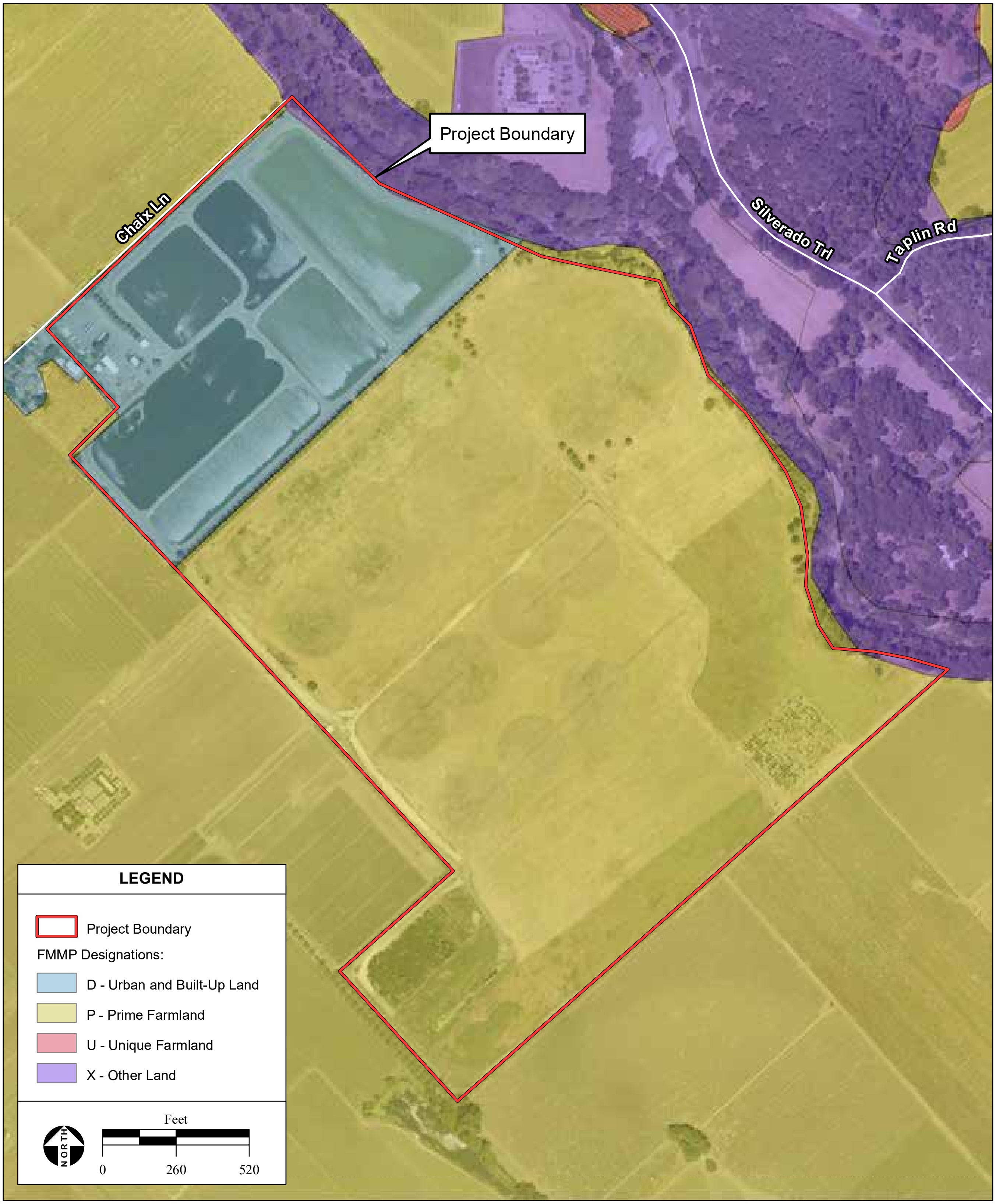
No Impact. The Proposed Project would not result in the conversion of agriculture or forest land; therefore, it would not contribute to cumulative impacts to agricultural resources.

Compliance with Federal Environmental Laws and Regulations

As discussed above, the southeastern parcels of the Project site are zoned for Agricultural Preserve within unincorporated Napa County. Under the Proposed Project, these parcels would continue to be utilized for the disposal of treated effluent via spray field irrigation consistent with existing practices, and there would be no alteration of the current land use. Therefore, the Proposed Project would not result in direct or indirect impacts to federally protected farmland. The Proposed Project would comply with all federal regulations relating to agricultural resources, including the FPPA.

3.3.4 MITIGATION MEASURES

None required.



SOURCE: FMMP, 2016; Napa County aerial photograph, 6/19/; AES, 8/24/2020

Figure 3-2
FMMP Designations

3.4 AIR QUALITY

3.4.1 ENVIRONMENTAL CHECKLIST

AIR QUALITY	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☒	☐	☐
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?	☐	☒	☐	☐
c) Expose sensitive receptors to substantial pollutant concentrations?	☐	☒	☐	☐
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	☐	☐	☒	☐

3.4.2 SETTING

Regulatory Context

Ambient Air Quality Standards

The U.S. Environmental Protection Agency (USEPA), under the CAA establishes maximum ambient concentrations for the six criteria air pollutants (CAP), known as the National Ambient Air Quality Standards (NAAQS). The six CAPs are ozone (O_3), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), carbon monoxide (CO), lead (Pb), and particulate matter 10 and 2.5 microns in size and smaller (PM_{10} and $PM_{2.5}$, respectively).

Concentrations above these time-averaged limits are anticipated to cause adverse health effects to sensitive receptors. The USEPA has established violation criteria for each CAP. For example, in order to constitute a violation, the NAAQS for O_3 must be exceeded on more than three days in three consecutive years. On the other hand, if the NAAQS for CO is exceeded on more than one day in any given year, a violation occurred.

The California CAA (CCAA) establishes maximum concentrations for the six CAPs, as well as four additional air pollutants in California (visibility reducing particles, sulfates, hydrogen sulfide, and vinyl chloride). These maximum concentrations for the State are known as the California Ambient Air Quality Standards (CAAQS). Concentrations above these time-averaged limits are anticipated to cause adverse health effects to sensitive receptors.

The California Air Resources Board (CARB) is part of the California EPA (CalEPA) and has jurisdiction over local air districts and has established their own standards and violation criteria for each CAP under the CAAQS. Refer to **Table 3-1** for the standards and violation criteria for the various averaging times for criteria pollutants of concern in the Bay Area Air Quality Management District (BAAQMD) under the NAAQS and CAAQS.

NAAQS and CAAQS Attainment Designations

As shown in **Table 3-2**, the San Francisco Air Basin (SFBAAB) has been designated "marginal" nonattainment under the federal 8-hour O_3 standard. The SFBAAB has also been designated nonattainment for eight- and one-hour O_3, PM_{10}, and $PM_{2.5}$ under the CAAQS. The SFBAAB either meets the federal and California standards or is unclassifiable for all other CAPs.

TABLE 3-1. NATIONAL AND CALIFORNIA AMBIENT AIR QUALITY STANDARDS AND VIOLATION CRITERIA

Pollutant	Averaging Time	Standard (parts per million)		Standard (microgram per cubic meter)		Violation Criteria	
		CAAQS	NAAQS	CAAQS	NAAQS	CAAQS	NAAQS
O_3	1 hour	0.09	N/A	180	N/A	If exceeded	N/A
	8 hours	0.070	0.070	137	137	N/A	If exceeded on more than 3 days in 3 years
CO	8 hours	9	9	10,000	10,000	If exceeded	If exceeded on more than 1 day per year
	1 hour	20	35	23,000	40,000	If exceeded	If exceeded on more than 1 day per year
NO_2	Annual arithmetic mean	0.030	0.053	57	100	N/A	If exceeded
	1 hour	0.18	0.100	470	188	If exceeded	N/A
SO_2	Annual arithmetic mean	N/A	0.030	N/A	N/A	N/A	If exceeded
	24 hours	0.04	0.14	105	N/A	If exceeded	If exceeded on more than 1 day per year
	1 hour (primary)	0.25	0.075	655	196	N/A	N/A
	3 hours (secondary)	N/A	0.5	N/A	N/A		If exceeded on more than 1 day per year
PM_{10}	Annual arithmetic mean	N/A	N/A	20	N/A	If exceeded	If exceeded

Pollutant	Averaging Time	Standard (parts per million)		Standard (microgram per cubic meter)		Violation Criteria	
		CAAQS	NAAQS	CAAQS	NAAQS	CAAQS	NAAQS
	24 hours	N/A	N/A	50	150	If exceeded	If exceeded on more than 1 day per year
$PM_{2.5}$	Annual arithmetic mean (primary)	N/A	N/A	12	12	If exceeded	If exceeded
	Annual arithmetic mean (secondary)	N/A	N/A	N/A	15	If exceeded	If exceeded
	24 hours	N/A	N/A	N/A	35	If exceeded	If exceeded on more than 1 day per year
Pb	30 day Average	N/A	N/A	1.5	N/A	If equaled or exceeded	N/A
	Rolling 3-month Average	N/A	N/A	N/A	0.15	N/A	If exceeded

Note: CAAQS = California Ambient Air Quality Standards
Source: California Air Resources Board, 2016.

Federal General Conformity

The General Conformity Rule of the federal CAA implements Section 176(c) of the CAA, and establishes minimum thresholds for volatile organic compounds and nitrous oxides (NOx; ozone precursors), PM_{10}, and other regulated constituents for non-attainment and maintenance areas.

Title 40 Part 93 of the Code of Federal Regulations (CFR) was promulgated in order to determine conformity of federal actions to the State Implementation Plan (SIP). A lead agency must make a determination that a federal action conforms to the applicable SIP before the action is taken. A conformity determination is required for each pollutant where a total of direct and indirect emissions in a nonattainment or maintenance area caused by the federal action are greater than *de minimis* thresholds as listed in CFR Section 93.153(b).

These thresholds provide simple and direct guidance for federal agencies to ensure that they comply with an approved SIP. The general conformity rule includes a procedure for determining whether the rule is applicable to the actions of a federal agency.

There are two phases to assessing the general conformity of a federal action:

- The **Conformity Review** process entailing a review of each analyzed alternative to assess whether a full conformity determination is necessary; and
- The **Conformity Determination** process, which demonstrates how an action would conform to the applicable SIP.

The first step compares emissions estimates for the project to the appropriate general conformity *de minimis* threshold based on nonattainment type. If the emission estimates from step one are below the thresholds, then a general conformity determination is not necessary, step two is not required, and the proposed project is considered to conform to the appropriate SIP.

TABLE 3-2. BAAQMD ATTAINMENT STATUS

Pollutant	Averaging Time	CAAQS	NAAQS
Ozone (O3)	8 hour	**Nonattainment**	**Nonattainment (marginal)**
	1 hour	**Nonattainment**	Not Applicable
Carbon Monoxide (CO)	8 hour	Attainment	Attainment
	1 hour	Attainment	Attainment
Respirable Particulate Matter (PM_{10})	Annual Arithmetic Mean	**Nonattainment**	Unclassifiable/Attainment
	24 Hour		
Fine Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean	**Nonattainment**	**Nonattainment (moderate)**
	24 Hour		
Nitrogen Dioxide (NO_2)	1 hour	Attainment	Unclassifiable/Attainment
	Annual Arithmetic Mean	Not Applicable	Attainment
Sulfur Dioxide (SO_2)	24 Hour	Attainment	Unclassifiable/Attainment
	1 Hour	Attainment	Unclassifiable/Attainment
Lead (Pb)	30 Day Average	Not Applicable	Attainment
	Calendar Quarter	Not Applicable	Attainment
Source: BAAQMD 2017c.			

California State Implementation Plan

California's SIP is comprised of the State's overall air quality attainment plans to meet the NAAQS, as well as the individual air quality attainment plans of each Air Quality Management District (AQMD) and Air Pollution Control District (APCD). The items included in the California SIP are listed in 40 CFR Chapter I, Part 52, Subpart F §52.220. The California SIP is a compilation of new and previously submitted plans, programs (such as monitoring, modeling, permitting, etc.), AQMD and APCD rules, State regulations, and federal controls for each air basin and California's overall air quality.

Many of the items within the California SIP rely on the same control strategies, such as emissions standards for cars and heavy trucks, fuel regulations, and limitations on emissions from consumer products. AQMDs and APCDs, as well other agencies such as the Bureau of Automotive Repair, prepare draft California SIP elements and submit them to CARB for review and approval. The CCAA identifies CARB as the lead agency for compiling items for incorporation into the California SIP, and submitting the items to the USEPA for approval.

Federal Class I Areas

Title 1, Part C of the CAA was established, in part, to preserve, protect, and enhance the air quality in national parks, national wilderness areas, national monuments, national seashores, and other areas of special national or regional natural, recreational, scenic, or historic value. The CAA designates all international parks, national wilderness areas, and memorial parks larger than 5,000 acres and national parks larger than 6,000 acres as "Class I areas."

Any major source of emissions within 100 kilometers (km) (62.1 miles) from a federal Class I area is required to conduct a pre-construction review of air quality impacts on the area(s). The nearest federal Class I area to the Project site is Point Reyes National Seashore, which is approximately 35 miles southwest of the Project site.

Toxic Air Contaminants

In addition to the above-listed California CAPs, Toxic Air Contaminants (TAC) are another group of pollutants regulated under the CCAA. TACs are less pervasive in the urban atmosphere than the CAPs, but are linked to short-term (acute) or long-term (chronic or carcinogenic) adverse human health effects. There are 244 chemicals listed by the State as TACs with varying degrees of toxicity.

Sources of TACs include industrial processes, commercial operations (e.g., gasoline stations and dry cleaners), grading (asbestos), and diesel motor vehicle exhaust. Public exposure to TACs can result from emissions from normal operations, as well as accidental releases. Health effects of TACs include cancer, birth defects, neurological damage, and death.

Ambient air quality standards have not been set for TACs. Instead, these pollutants are typically regulated through a technology-based approach for reducing TACs. This approach requires facilities to install Maximum Achievable Control Technology on emission sources.

Bay Area Air Quality Management District 2017 Clean Air Plan

The 2017 Clean Air Plan for the San Francisco Bay Area (Bay Area) is prepared with the cooperation of the BAAQMD, the Metropolitan Transportation Commission, and the Association of Bay Area Governments (ABAG). On April 19, 2017, the BAAQMD adopted the most recent revision to the Clean Air Plan, the Bay Area 2017 Clean Air Plan (BAAQMD, 2017a). The Bay Area 2017 Clean Air Plan serves to:

- Update the most recent Bay Area ozone plan, the 2010 Clean Air Plan, pursuant to air quality planning requirements defined in the California Health & Safety Code;
- Include all feasible measures to reduce emissions of ozone precursors (reactive organic gas [ROG] and NOx) and reduce transport of ozone and its precursors to neighboring air basins; and
- Build upon and enhance the BAAQMD's efforts to reduce emissions of fine particulate matter and toxic air contaminants.

The Bay Area 2017 Clean Air Plan includes a wide range of proposed "control measures," or actions to reduce combustion-related activities, decrease fossil fuel combustion, improve energy efficiency, and decrease emissions of potent greenhouse gases (GHG). Numerous measures reduce multiple pollutants simultaneously: for example, O_3, particulate matter, air toxics, and GHGs. Others focus on a single type of pollutant, such as "super GHGs" – defined as those GHGs with very high global warming potential such as methane – or are progressive actions to remove harmful particles in the air (BAAQMD, 2017a).

BAAQMD CEQA Guidelines

On June 2, 2010, the BAAQMD Board of Directors unanimously adopted thresholds of significance to assist in the review of projects under CEQA. These thresholds are designed to establish the level at which the BAAQMD believed air pollution emissions would cause significant environmental impacts under CEQA. The current BAAQMD CEQA guidelines were approved and adopted in May 2017. While the BAAQMD is currently working on updating the CEQA *Guidelines* and thresholds of significance, no drafts have been released and therefore the 2017 version of the guidelines are the most recent available. Refer to **Table 3-3** for a summary of BAAQMD Air Quality CEQA Thresholds.

TABLE 3-3. BAAQMD AIR QUALITY CEQA THRESHOLDS OF SIGNIFICANCE

Pollutant	Construction-Related	Operations-Related	
Criteria Air Pollutants and Precursors (Regional)	**Average Daily Emissions (lb/day)**	**Average Daily Emissions (lb/day)**	**Maximum Annual Emissions (tpy)**
ROG	54	54	10
NO_X	54	54	10
PM_{10}	82 (exhaust)	82	15
$PM_{2.5}$	54 (exhaust)	54	10
PM_{10}/$PM_{2.5}$ (fugitive dust)	Best Management Practices	None	
Local CO	None	9.0 ppm (8-hour average), 20.0 ppm (1-hour average)	
Accidental Release of Acutely Hazardous Air Pollutants*	None	Storage or use of acutely hazardous materials locating near receptors or new receptors locating near stored or used acutely hazardous materials considered significant	
Odors	None	5 confirmed complaints per year averaged over three years	

Notes:
lb/day = pounds per day
ppm = parts per million
tpy = tons per year
Source: BAAQMD, 2017b.

Environmental Setting

The City of St. Helena is located at the northern end of the SFBAAB, within the jurisdiction of the BAAQMD. The Project site is located in the northcentral portion of the Napa Valley, between the Mayacamas Mountains to the west and Howell Mountain to the east. These mountains are effective barriers to the prevailing northwesterly winds with an average ridge line height of about 2,000 feet. Some peaks approach 3,000 feet and over 4,000 feet in height. The Napa Valley is 31 miles long with the cities of Napa and Calistoga defining its southern and northern ends, respectively (BAAQMD, 1998). Upvalley wind frequently develops during warm summer afternoons drawing from air flowing through the San Pablo Bay. Summer and fall prevailing winds can transport non-local and locally generated ozone precursors northward where the valley narrows, thus trapping and concentrating the pollutants under stable conditions. The local upslope and down slope flow setup by the surrounding mountains may also recirculate pollutants adding to the total burden. Also, the high frequency of light winds and associated stable conditions during the late fall and winter, contributes to the buildup of particulates and carbon monoxide from automobiles, agricultural burning, and fireplace burning (BAAQMD, 1998).

Sensitive Receptors

Schools, hospitals, and convalescent homes are considered to be relatively sensitive to poor air quality because children, elderly people, and the infirm are more susceptible to respiratory distress and other air quality related health problems. Residential areas are considered sensitive to poor air quality, because people usually stay home for extended periods of time increasing the potential exposure to ambient air quality. Recreational uses are also considered sensitive due to the greater exposure to ambient air quality conditions because vigorous exercise associated with recreation places a high demand on the human respiratory system.

The land surrounding the project alignments is primarily residential and agricultural land uses. The nearest residence is located immediately southwest of the Project site, approximately 160 feet from the WWTRP property boundary. St. Helena Montessori School is located approximately one mile northwest of the Project site. There are no hospitals in the vicinity of the Proposed Project.

3.4.3 DISCUSSION OF IMPACTS

Methodology

The California Emissions Estimator Model (CalEEMod) was used to estimate emissions from all construction-related sources.

CalEEMod provides default values when site-specific inputs are not available. The default values are provided in **Appendix B**. The following site-specific inputs and assumptions were used for the purposes of air quality modeling:

- Emissions from construction were calculated based on all construction related activities, including but not limited to grading, use of construction equipment, material hauling, building, trenching, and site preparation.
- Construction would occur over a period of 12 months, starting April 2021 and ending April 2022.
- It is estimated that 4 material haul trips per day would occur during the building phase of construction.
- Trenching would occur between January of 2022 and April of 2022 and would require the use of a trencher.
- It is conservatively estimated that 10 worker vehicle trips per day would occur during the grading and site preparation phase of construction and 50 worker vehicle trips per day would occur during the building phase of construction (this assumes all building would occur simultaneously). Six worker trips would occur during the trenching phase of construction.

The results of the CalEEMod modeling are discussed below and output files are provided in **Appendix B**. Resulting emission estimates are compared to applicable BAAQMD thresholds and federal general conformity *de minimis* levels to evaluate the effects of construction activities on regional air quality.

Questions A and B

Would the project: Conflict with or obstruct implementation of the applicable air quality plan; Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard;

Construction

Less than Significant with Mitigation. Emissions generated from grading and building construction activities resulting from the Proposed Project would be short-term, intermittent, and temporary in nature. Grading and construction activities associated with the Proposed Project would result in the generation of ROG, NOx, and PM_{10} emissions. PM_{10} is generally the direct result of site grading, excavation, road paving, and exhaust associated with construction equipment. PM_{10} emissions are largely dependent on the amount of ground disturbance associated with site preparation activities. Emissions of NOx and ROG are generally associated with employee vehicle trips, delivery of materials, and construction equipment exhaust.

Table 3-4 shows emissions from construction activities and compares these to BAAQMD thresholds to determine if the construction emissions of the Proposed Project would have a significant impact on regional air quality. As shown in **Table 3-4,** the Proposed Project would be well below the BAAQMD construction thresholds, and would not exceed the conformity *de minimis* levels.

The BAAQMD's approach to analysis of construction-related particulate impacts is to emphasize implementation of effective and comprehensive dust control measures rather than detailed quantification of emissions. The BAAQMD considers construction-related fugitive dust impacts of projects to be less than significant if a suite of recommended dust-control measures are implemented. Dust control measures are required by the BAAQMD for compliance with their Clean Air Plan. The absence of dust control measures during construction would conflict with the BAAQMD's Clean Air Plan, which would be a potentially significant impact. Therefore, BAAQMD-identified Best Management Practices (BMP) for control of fugitive dust are included as **Mitigation Measures AQ-1** and **AQ-2**. With **Mitigation Measures AQ-1** and **AQ-2**, dust control measures and vehicle idling time reductions would be implemented and the Proposed Project would not obstruct the implementation of an applicable air quality plan. Furthermore, construction of the Proposed Project would not result in a cumulatively considerable net increase of any CAP for which the Proposed Project region is nonattainment under an applicable federal or State ambient air quality standard. Construction of the Proposed Project would not exceed the conformity *de minimis* levels and would therefore not conflict with the California SIP. Therefore, construction of the Proposed Project would have a less than significant impact on regional air quality.

TABLE 3-4. CONSTRUCTION EMISSIONS

Year	Pollutants of Concern			
	ROG	NOx	PM_{10}	$PM_{2.5}$
2021 (lb/day)	2.00	17.44	0.77	0.70
2022 (lb/day)	1.82	12.61	0.59	0.57
Highest Emission Year (lb/day)	**2.00**	**17.44**	**0.77**	**0.70**
BAAQMD Thresholds (lb/day)	*54*	*54*	*82*	*54*
Exceed BAAQMD Threshold	No	No	No	No
Highest Emission Year (tons/yr)	**0.17**	**1.45**	**0.07**	**0.06**
Conformity de minimis Levels (tons/yr)	*100*	*100*	*NA*	*100*
Exceed Conformity *de minimis* Levels	No	No	NA	No
Source: **Appendix B**.				

Operation

Less than Significant. The Proposed Project would not require the need for additional employees at the WWTRP, therefore, there would be no increase in vehicle traffic emissions. The Proposed Project would not increase the effective treatment capacity of the WWTRP. Therefore, operation of the Proposed Project would not increase emissions of ROG, NOx, and PM_{10}, because the WWTRP operates wastewater transport system on electricity. The Proposed Project would require installation of an additional diesel-powered emergency generator to provide back-up power to the proposed facilities. It is estimated that the emergency generator would be operated for no more than 30 hours per year for maintenance and testing, based on industry standard recommendations. As shown in **Table 3-5**, operation of the emergency generator would not exceed the BAAQMD operational thresholds, and would not exceed the conformity *de minimis* levels. Therefore, operation of the Proposed Project would have a less than significant impact on regional air quality.

TABLE 3-5. OPERATIONAL EMISSIONS

Source	Pollutants of Concern			
	ROG	NOx	PM_{10}	$PM_{2.5}$
	(tons/yr)			
Emergency Generator	0.02	0.11	0.004	0.004
Total	**0.02**	**0.11**	**0.004**	**0.004**
BAAQMD Thresholds	*10*	*10*	*15*	*10*
Conformity de minimis Levels	*100*	*100*	*NA*	*100*
Exceed BAAQMD Threshold	No	No	No	No
Exceed Conformity *de Mmnimis* Levels	No	No	NA	No
Source: **Appendix B**.				

Question C

Would the project: Expose sensitive receptors to substantial pollutant concentrations?

Less-than-Significant with Mitigation. Diesel particulate matter (DPM) is the main TAC of concern during construction of the Proposed Project. Construction would include grading, paving, and building activities. These activities utilize heavy equipment, which use diesel fuel and emit DPM. DPM emissions during operation would also be emitted from diesel vehicles used by employees and deliveries.

The nearest sensitive receptors are residences located immediately west of where construction activities would occur. DPM generally dissipates rapidly from its original concentration; however, due to the close distance of the nearest sensitive receptor, construction of the Proposed Project has the potential to expose sensitive receptors to substantial concentrations of DPM. **Mitigation Measure AQ-2** would reduce DPM emissions from construction activities by limiting idling times for construction equipment. Further, as discussed above, CAP emissions would be well below the applicable BAAQMD thresholds. Therefore, with mitigation, construction and operation of the Proposed Project would not expose sensitive receptors to substantial pollutant concentrations.

Question D

Would the project: Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

Less than Significant Construction activities that have the potential to emit odors and similar emissions include operation of diesel equipment, generation of fugitive dust, and paving (asphalt). Odors and similar emissions from construction are intermittent and temporary, and are not anticipated to extend beyond the construction area. Therefore, construction of the Proposed Project would not result in odors adversely affecting a substantial number of people and impacts from odors would be less than significant.

As discussed above, operation of the Proposed Project would not increase the effective treatment capacity of the WWTRP. As described in **Section 2.4**, the Proposed Project would continue to use ponds for influent storage, however a coarse screening system would be installed upstream of the ponds to provide initial filtration, reducing odor. With implementation of the Proposed Project, influent would be stored in less ponds and for a shorter amount of time; therefore, odors associated with the WWTRP would be reduced compared to current conditions. The Proposed Project would process the bulk of wastewater in an enclosed MBR system, rather than the existing pond system, which would reduce odors associated with the treatment process. Additionally, the proposed sludge dewatering and disposal system would be an aerated and enclosed structure, designed to control odor. Therefore, operation of the Proposed Project would not significantly increase odors compared to current operations or result in odors adversely affecting a substantial number of people.

Cumulative Impacts

Less than Significant*.* Past, present, and future development projects contribute to a region's air quality conditions on a cumulative basis; therefore by its very nature, air pollution is largely a cumulative impact. If a project's individual emissions contribute toward exceedance of the NAAQS or the CAAQS, then the project's cumulative impact on air quality would be significant. In developing attainment designations for criteria pollutants, the USEPA considers the region's past, present, and future emission levels.

AQMDs determine suitable significance thresholds based on an area's designated nonattainment status. These thresholds provide a tool by which the districts can achieve attainment for a particular criteria pollutant that is designated as nonattainment. Therefore, the BAAQMD's significance thresholds consider the region's past, present, and future emissions levels.

Implementation of the Proposed Project combined with future development within the project area could lead to cumulative impacts to air quality. Construction of the Proposed Project would result in the generation of criteria air pollutants that when combined with future growth within the project area could lead to cumulative impacts to air quality. As discussed in detail above, emissions resulting from the Proposed Project would not exceed the BAAQMD's thresholds or the conformity *de minimis* levels and construction would be in conformance with the applicable SIP developed to address cumulative emissions of criteria air pollutants in the SFBAAB. Therefore, the Proposed Project would have a less-than-significant cumulative impact on local and regional air quality. **Mitigation Measures AQ-1** and **AQ-2** would further reduce the Proposed Project's contribution to cumulative effects to air quality.

Compliance with Federal Environmental Laws and Regulations

As discussed above, the Proposed Project would not exceed the *de minimis* thresholds; therefore, no conformity determination is required for this project. Due to the limited duration of construction activities, the infrequent use of heavy equipment, and no significant increase in long-term operational activities, the Proposed Project would not emit a significant amount of CAPs or hazardous air pollutants. Therefore, the Proposed Project would not constitute a major source of CAP emissions. Because the Proposed Project would not be a major source of CAP emissions, project emissions would not impact federal Class I areas. The Proposed Project would not exceed the USEPA's general conformity *de minimis* threshold or hinder the attainment of air quality objectives in the local air basin. The Proposed Project would comply with all federal regulations relating to air quality, including the CAA.

3.4.4 MITIGATION MEASURES

AQ-1

The following BMPs shall be implemented during construction.

a. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.

b. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.

c. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.

d. All vehicle speeds on unpaved roads shall be limited to 15 miles per hour (mph).

e. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be installed as soon as possible after grading unless seeding or soil binders are used.

f. A publicly visible sign with the telephone number and person to contact at the lead agency regarding dust complaints shall be posted. This person shall respond and take corrective action within 48 hours. The Air District‘s phone number shall also be visible to ensure compliance with applicable regulations.

AQ-2

The following BMPs shall be implemented during construction.

a. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of CCR). Clear signage shall be provided for construction workers at all access points.

b. All construction equipment shall be maintained and properly tuned in accordance with manufacturer‘s specifications. All equipment shall be checked by a certified visible emissions evaluator.

3.5 BIOLOGICAL RESOURCES

Information in this section is summarized from the Biological Resources Assessment (BRA), dated August 2020 (**Appendix C**).

3.5.1 ENVIRONMENTAL CHECKLIST

BIOLOGICAL RESOURCES	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☒	☐	☐
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☒	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☒	☐	☐
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

3.5.2 SETTING

Regulatory Context

Wetlands and Waters

The U.S. Army Corps of Engineers (USACE) has primary federal responsibility for administering regulations that concern waters of the U.S. (including wetlands), under Section 404 of the CWA. Section 404 of the CWA regulates the discharge of dredged or fill material into waters of the U.S. The USACE requires that a permit be obtained if a project proposes the placement of structures within, over, or under navigable waters and/or discharging dredged or fill material into waters below the ordinary high water mark. The USACE has established a series of nationwide permits that authorize certain activities in waters of the U.S.

Projects impacting waters of the state that require a CWA Section 404 permit additionally require a CWA Section 401 Water Quality Certification Permit. A Section 401 Water Quality Certification Permit is required in order to comply with CWA Sections 301, 302, 303, 306, and 307. Authority to issue a Section 401 permit has been delegated by the USEPA to the Regional Water Quality Control Board (RWQCB). Under the CWA, beneficial uses lost from impacts due to a project must be replaced by a mitigation project of at least equal function, value, and area.

Projects that impact waters of the state that do not meet the definition of waters of the U.S. require a Waste Discharge Requirement Permit from the RWQCB. Waste Discharge Requirements Permits are required pursuant to California Water Code Section 13260 for any persons discharging or proposing to discharge waste, including dredge or fill, that could affect the quality of the waters of the state. The RWQCB addresses both the federal and State requirements in the issuance of a discharge permit.

Federal Endangered Species Act

The U.S. Fish & Wildlife Service (USFWS) and the National Marine Fisheries Service implement the FESA of 1973 (16 USC § 1531 et seq.). Under FESA, threatened and endangered species on the federal list (50 CFR Subsection 17.11, 17.12) are protected from “take” (i.e., activities that harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect) as well as any attempt to engage in any such conduct, unless a Section 10 Permit is granted to an individual or a Section 7 consultation and a Biological Opinion with incidental take provisions are rendered from the lead federal agency.

Pursuant to the requirements of the FESA, an agency reviewing a Proposed Project within its jurisdiction must determine whether any federally listed species may be present within a Project site and vicinity and whether the Proposed Project will have a potentially significant impact upon such species. Under the FESA, habitat loss is considered to be an impact to a species. The agency is required to determine whether the project is likely to jeopardize the continued existence of a species listed or proposed to be listed under the FESA or result in the destruction or adverse modification of critical habitat proposed to be designated for such species (16 USC § 1536[3], [4]). Therefore, project-related impacts to these species, or their habitats, would be considered significant and require mitigation.

Under the FESA, critical habitat may be designated by the Secretary of the Interior for any listed species. The term "critical habitat" for a threatened or endangered species refers to specific areas within the geographical range of the species at the time it is listed that contain suitable habitat for the species, which may require special management considerations or protection. Critical habitat may also include areas outside the geographical range of the species at the time it is listed that contain suitable habitat for the species and is determined to be essential for the conservation of the species.

Migratory Bird Treaty Act

Most bird species, especially those that are breeding, migrating, or of limited distribution, are protected under federal and/or State regulations. Under the Migratory Bird Treaty Act of 1918 (16 USC Subsection 703-712), migratory bird species, their nests, and their eggs are protected from injury, death, or project-related disturbances during the nesting cycle. As such, project-related disturbances must be reduced or eliminated during the nesting cycle.

California Fish and Game Code Sections 1600-1616

California Fish and Game Code §§ 1600-1616 regulate impacts to State waters and stream and lake beds. Section 1602 requires notification before beginning any activity that may obstruct or divert the natural flow of a river, stream, or lake; change or use any material from the bed, channel, or bank of a river, stream, or lake; or deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into a river, stream, or lake. California Fish and Game Code § 1602 applies to all perennial, intermittent, and ephemeral rivers, streams, and lakes in the State.

California Endangered Species Act

The California Endangered Species Act (CESA) prohibits the take of State-listed threatened and endangered species. Under CESA, state agencies are required to consult with the California Department of Fish and Wildlife (CDFW) when preparing CEQA documents. Under CESA, the CDFW is responsible for maintaining a list of rare, threatened, and endangered species designated under state law (California Fish and Game Code §§ 2070-2079). Project-Related impacts to species listed or proposed for listing on the CESA's rare, threatened, and endangered list would be considered significant and require mitigation. The CDFW can authorize take if an incidental take permit is issued by the Secretary of the Interior of Commerce in compliance with the FESA, or if the director of the CDFW issues a permit under Section 2080 in those cases where it is demonstrated that the impacts are minimized and mitigated.

City of St Helena General Plan Update (2040)

The City of St Helena General Plan (General Plan) seeks to conserve and manage significant fish, wildlife and vegetation resources in addition to preserving soil health and surface and groundwater resource quality.

The following General Plan guiding and implementation policies associated with biological resources are applicable to the Proposed Project.

Guiding Policies

OS1.1 Preserve and enhance St. Helena's riparian corridors for their value in providing wildlife habitat, biodiversity, natural drainage, and visual amenity.

OS1.2 Prohibit development, alteration, and/or removal of native vegetation from riparian areas. Disallow invasive species that degrade habitat quality

OS1.3 Protect and enhance contiguous corridors of riparian vegetation along the Napa River and its tributaries in order to support regional wildlife movement and enhance aquatic habitat.

OS1.4 Protect natural habitats that have the potential to support rare, endangered, or special-status wildlife and plant species. Control invasive species that degrade habitat quality.

OS1.6 Manage invasive species that degrade habitat quality, especially along the Napa River and its tributaries

OS3.1 Promote stormwater management techniques that minimize surface water runoff in public and private developments. Utilize low impact development techniques to best manage stormwater through conservation, on-site filtration and water recycling, and ensure compliance with the NPDES permit.

OS3.2 Reduce stormwater runoff in developed areas to protect water quality in creeks. Incorporate sustainable low impact design features in the design of infrastructure.

Environmental Setting

Special-Status Species

For the purposes of this assessment, special-status has been defined to include those species that are:

- Listed as endangered or threatened under the FESA (or formally proposed for, or candidates for, listing);
- Listed as endangered or threatened under the CESA (or proposed for listing);
- Designated as endangered or rare, pursuant to California Fish and Game Code (§ 1901);
- Designated as fully protected, pursuant to California Fish and Game Code (§ 3511, § 4700, or § 5050);
- Designated as species of concern by the CDFW (CEQA *Guidelines* § 15380); or,
- Defined as rare or endangered under CEQA.

Methodology

A biological resources survey was conducted on the Project site on July 21, 2020. Survey goals consisted of identifying habitat types, sensitive habitats, wetlands and waters of the U.S., and special-status species. The survey was conducted by walking transects throughout the entirety of the Project site. Binoculars were used to assist in surveying efforts, such as identifying birds in flight. Additional focus was applied to the development footprint, as labeled on **Figure 3-3**, where work will commence, as well as sensitive habitat areas such as the riparian corridor. Sensitive habitats include those that are designated as sensitive by CDFW, considered by local experts to be communities of limited distribution, or likely to be waters of the U.S. or State by the appropriate regulatory agencies. Data was collected via a Trimble Geo XH hand-held GPS receiver. Habitat requirements of special-status species were compared to habitats on the Project site.

Prior to conducting the survey, biological information was obtained from the following sources:

- Aerial photographs of the Project site and surrounding area;

- USFWS Information for Planning and Conservation (IPaC) list of species listed or proposed for listing under FESA that occur in the vicinity of the Project site, updated July 10, 2020 (Attachment A of **Appendix C**);
- California Natural Diversity Database (CNDDB) list of species that have been observed in the vicinity of the Project site, updated July 10, 2020 (Attachment A of **Appendix C**);
- California Native Plant Society (CNPS) list of plants that have been observed in the vicinity of the Project site, updated July 10, 2020 (Attachment A of **Appendix C**);
- USFWS National Wetlands Inventory (NWI) map of wetland features, updated May 1, 2020 (USFWS, 2020); and
- NRCS custom soils report, updated July 10, 2020 (Attachment B of **Appendix C**).

Standard references used for the biology and taxonomy of plants include: Abrams (1951, 1960), CNPS (2014), CDFW (2009, 2014), Hickman, ed. (1993), Mason (1957), Munz (1959), and Sawyer and Keeler-Wolf (2009). Standard references used for the biology and taxonomy of wildlife include CDFW (2005), Cornell Lab of Ornithology (2005), Ehrlich et al. (1988), Jennings and Hayes (1994), Peterson (1990), Sibley (2003), and Stebbins (2003).

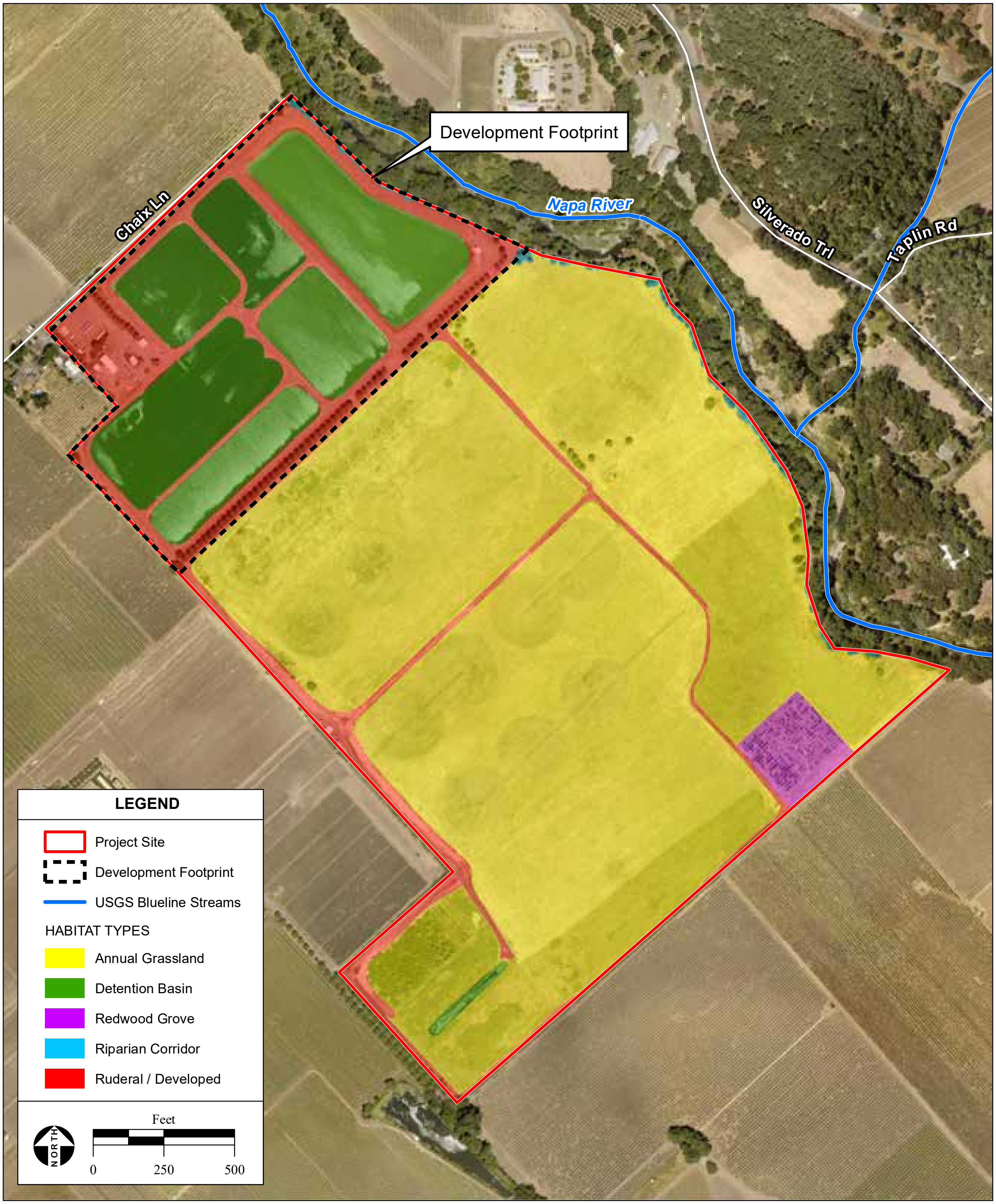
Habitats

The Project site is composed of the following terrestrial habitat types: ruderal/developed; riparian; redwood stand, and annual grassland. Aquatic habitats within the Project site consist of the six manmade water treatment basins and a stock pond for vector control mosquito fish. Habitat types are shown in **Figure 3-3** and are discussed in more detail in the BRA included as **Appendix C**. The Napa River flows in a northwest to southeast direction, adjacent to the northeastern Project site boundary. The NWI classifies the Napa River as palustrine, forested, shrub-scrub, and seasonally flooded.

The California Invasive Plant Council (Cal-IPC) is an organization that lists known invasive plants throughout California and designates each species with a rating of “high,” “moderate,” or “limited” based on an invasive plant’s prevalence and ability to spread (Cal-IPC, 2017). Five “moderate” species and six “limited” species were identified on the Project site.

Floodplain

Portions of the Project site occur within the regulatory floodway of the Napa River, as well as the 100-year floodplain (floodzone AE; defined as 1-percent-annual-chance flood hazard), and the 500-year floodplain (flood zone X; defined as 0.2-percent-annual-chance flood hazard) (FEMA, 2020) (refer to **Section 3.11**, **Figure 3-6**). A “Regulatory Floodway” is defined by FEMA as the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height (FEMA, 2019). Communities must regulate development in these floodways to ensure that there are no increases in upstream flood elevations (FEMA, 2019).



SOURCE: "Napa County aerial photograph, 6/19/; AES, 8/24/2020

Figure 3-3
Habitat Types

Special-Status Species

The BRA, included as **Appendix C**, summarizes the regionally occurring special-status species identified in the USFWS, CNPS, and the CNDDB lists (Table 1 of **Appendix C**) and provides an analysis of the potential for these species to occur within the Project site based on the presence or absence of suitable habitat.

Data review and special-status species searches list 20 special-status plant species and 17 special-status wildlife species with the potential to occur in the region of the Project site (Attachment A of **Appendix C**). The name, regulatory status, distribution, habitat requirements, period of identification, and potential to occur on the Project site for each species are listed in Table 1 of **Appendix C**.

Based on the site-specific habitats and special-status species habitat requirements for each species that may occur within the vicinity of the Project site, as shown in Table 1 of **Appendix C**, the Project site contains suitable habitat to potentially support two special-status plant species (Baker's navarretia and Napa bluecurls) and two special-status animal species (Swainson's hawk and purple martin). Regionally occurring species with no potential to occur on the Project site were ruled out based on lack of suitable habitat, soils, elevation, necessary substrate, and negative results during the survey if it coincided with the identifiable bloom period for plant species. Special-Status species were not observed during the survey.

Critical and Essential Fish Habitat

No designated Critical Habitat occurs on the Project site (Attachment A of **Appendix C**). However, the adjacent Napa River is designated Critical Habitat for a distinct population segment of the Central California Coast steelhead (NOAA, 2016). It is also Essential Fish Habitat for coho and chinook salmon (NOAA, 2016).

3.5.3 DISCUSSION OF IMPACTS

Question A

Would the project: Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

Special-Status Species and Critical and Essential Fish Habitat

Less than Significant with Mitigation. The development footprint associated with potential impacts to biological resources consists of ruderal/developed habitat and manmade water treatment basins (**Appendix C**). These habitats are highly disturbed, and do not provide suitable habitat to support special-status plant or animal species.

The adjacent off-site Napa River is designated Critical Habitat for steelhead (NOAA, 2016), Essential Fish Habitat for coho and chinook salmon (NOAA, 2016), and provides suitable habitat for California red-legged frog and foothill yellow-legged frog. Additionally, the riparian habitat in this area may provide suitable habitat for the special-status Swainson's hawk and purple martin. The Proposed Project would not result in direct impacts to the Napa River, and the existing Napa River outfall would not be altered.

The Proposed Project would not increase the quantity of water discharged and would increase the quality of treated water discharged into the Napa River compared to existing discharge. While operation of the Proposed Project would not adversely impact the Napa River, construction of the Proposed Project may result in impaired runoff or accidental release of harmful chemicals. The potential discharge of impaired runoff during construction activities into the Napa River could degrade the quality of this habitat and generate a significant impact to special-status fish and wildlife species that rely on this habitat. **Mitigation Measures HAZ-1** through **HAZ-3** in **Section 3.10.4** include proper handling requirements for hazardous materials, development of an accidental spill prevention and response plan, and a 100-foot construction equipment staging buffer from the river. Additionally, **Mitigation Measure HYD-1** identified in **Section 3.11.4** requires compliance with the appropriate NPDES General Permit, and implementation of a Stormwater Pollution Prevention Plan (SWPPP) prior to ground disturbance. The SWPPP would require BMPs and installation of protective measures to ensure that water leaving the Project site does not exceed water quality thresholds. Implementation of **Mitigation Measure HAZ-1** through **HAZ-3,** and **HYD-1** would protect water quality in the Napa River by minimizing the risk of hazardous materials spills and preventing runoff of impaired water offsite. There would be a less-than-significant impact with mitigation.

Nesting Migratory Birds

Less than Significant with Mitigation. Birds and their nests are protected from "take" by the Migratory Bird Treaty Act (16 USC §§ 703-711) as well as California Fish and Game Code. The Audubon Society has designated 145 sites as "Important Bird Areas" within California to protect biologically diverse areas that support sensitive bird populations, and the Western Shorebird Reserve Network (WSHRN) has mapped Critical Habitats for preserving the ecological integrity of shorebirds throughout the country. The development footprint is outside the Audubon Society's designated Important Bird Areas and WSHRN designated Critical Habitats (Audubon Society, 2020; WSHRN, 2020).

Suitable habitat for nesting migratory birds and raptors, including Swainson's hawk and purple martin, occurs within the riparian habitat and 500 feet of the development footprint. Nesting migratory birds and raptors could be affected if vegetation removal or loud noise-producing activities associated with construction commence during the general nesting season (February 15 through September 15). Disturbance of an active nest would constitute a significant impact. **Mitigation Measure BIO-1** requires a pre-construction nesting bird survey to identify active nests should construction commence during the general nesting season. **Mitigation Measure BIO-1** would require a disturbance-free construction buffer around active nests. This would reduce potential impacts to nesting birds to a less-than-significant level.

Question B

Would the project: Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

Less than Significant with Mitigation. The development footprint consists of ruderal/developed habitat and manmade basins. Habitats within the development footprint are not considered sensitive. Therefore, the Proposed Project would not result in direct impacts to sensitive habitats. As stated above, the adjacent riparian habitat and the Napa River have the potential to be impacted during construction through accidental release of harmful chemicals, or runoff of impaired water offsite. These habitats are considered sensitive, and indirect impacts would be considered significant. Implementation of **Mitigation Measures HAZ-1** through **HAZ-3**, and **HYD-1** would protect off-site habitat by minimizing the risk of hazardous materials spills and preventing runoff of impaired water off-site. There would be a less-than-significant impact with mitigation.

Additionally, no highly invasive plants catalogued by Cal-IPC were observed on the Project site, and the Proposed Project does not include activities that would spread or introduce invasive pants on the Project site.

With implementation of **Mitigation Measures HAZ-1** through **HAZ-3**, and **HYD-1**, the Proposed Project would not adversely affect riparian habitat or other sensitive natural communities.

Question C

Would the project: Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

Less than Significant with Mitigation. The development footprint consists of ruderal/developed habitat and the manmade basins, and does not contain federally protected wetlands. However, the Napa River flows off-site of the Project site adjacent to the northeastern boundary, and is classified by the NWI as palustrine, forested, shrub-scrub, and seasonally flooded. As stated under Question A, the adjacent riparian habitat and the Napa River have the potential to be indirectly impacted during construction through accidental release of harmful chemicals, or runoff of impaired water offsite. The Napa River is considered a water of the U.S., and supporting riparian vegetation may also be considered jurisdictional habitat. Impacts to the Napa River and associated riparian habitat would be potentially significant. As discussed above, implementation of **Mitigation Measures HAZ-1** through **HAZ-3**, and **HYD-1** would protect off-site habitat by minimizing the risk of hazardous materials spills and preventing runoff of impaired water off-site. There would be a less-than-significant impact with mitigation.

Question D

Would the project: Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

Less-than-significant. The development footprint consists of ruderal/developed habitat and the manmade basins. Habitats within the development footprint provide low quality habitat to wildlife due to disturbance and development. Undeveloped, high quality habitat would not be impacted, and habitat fragmentation would not occur due to the Proposed Project. Native resident or migratory fish or wildlife species, established native resident or migratory wildlife corridors, and native wildlife nursery sites would not be significantly affected. This would be a less-than-significant impact.

Question E

Would the project: Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

Less than Significant with Mitigation. The City of St. Helena General Plan has policies in place for the protection of natural resources and habitats. Policies facilitate the preservation of habitat for fish and wildlife, the Napa River and its tributaries, riparian areas, wetlands, migratory corridors, and open space. While the Proposed Project would not directly impact these habitats, construction of the Proposed Project has the potential to indirectly impact adjacent riparian habitat as well as the Napa River, as discussed under Question A. Activities that would impact the quality and amount of these habitats would be in conflict with the General Plan and would constitute a significant impact. **Mitigation Measures HAZ-1** through **HAZ-3**, and **HYD-1** would minimize impacts to biological resources identified as priorities for protection within the General Plan, thus ensuring that the Proposed Project would not conflict with local policies or ordinances. There would be a less-than-significant impact following implementation of mitigation.

Question F

Would the project: Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

No Impact. No habitat conservation plans, natural community conservation plans or similar plans apply to the Proposed Project. The Proposed Project would not result in impacts to any adopted habitat conservation plans or natural community conservation plans. There would be no impact.

Cumulative Impacts

Less than Significant with Mitigation. The context for determining cumulative impacts considers past, present, and reasonably foreseeable projects in the vicinity of the Proposed Project. Past development in the vicinity of the Project site is largely agricultural, with supporting infrastructure and residences. Denser residential development with associated industrial and commercial development also occur within the region. Future development is guided by the County General Plan and City General Plan. These guiding documents largely anticipate and promote preservation of existing agricultural lands beyond the City boundary, and infill residential development within City limits. Preservation of existing land uses would not generate impacts to biological resources, and urban infill typically impacts areas that have little value to biological resources.

Construction of the Proposed Project would not contribute to a loss of regional sensitive habitats of jurisdictional habitats, as no sensitive habitats or jurisdictional habitats would be converted as part of the Proposed Project.

Mitigation Measures HAZ-1 through **HAZ-3**, and **HYD-1** would prevent indirect impacts to riparian habitat and the Napa River, therefore avoiding the Proposed Project's potential to impact these habitats and the special-status species that have the potential to occur. The Proposed Project would therefore not contribute to cumulative projects impacting these resources.

Similarly, **Mitigation Measure BIO-1** would avoid the Proposed Project's potential to impact nesting birds, this eliminating the Proposed Project's contribution to cumulatively considered projects that may result in disturbance to nesting birds.

Overall, the Proposed Project would not contribute a significant level of cumulative, direct, or indirect impacts to sensitive habitats, special-status species and their habitat, or migratory birds. Additionally, the Proposed Project would not conflict with local plans or policies protecting biological resources. Other cumulatively considerable projects would be required to implement measures to project biological resources consistent with federal, state, and local policies. Therefore, the Proposed Project's contribution to cumulative regional impacts associated with biological resources would be less than significant with implementation of **Mitigation Measures HAZ-1** through **HAZ-3**, **HYD-1**, and **BIO-1**.

Compliance with Federal Environmental Laws and Regulations

Construction activities would be limited to previously developed and disturbed areas. As discussed above, the development footprint lacks suitable habitat for special-status species and does not contain Critical Habitat or Essential Fish Habitat. Take of special-status species would therefore not occur. Through impact avoidance measures **HAZ-1** through **HAZ-3**, and **HYD-1**, the Proposed Project would not result in degradation of the adjacent Napa River, which is designated as both Critical Habitat and Essential Fish Habitat. Additionally, federally protected migratory birds and raptors would not be impacted with implementation of **Mitigation Measure BIO-1.** The Proposed Project is not likely to adversely affect federally listed species. Because the Proposed Project is not likely to adversely affect federally listed species and would not alter Critical Habitat or Essential Fish Habitat, consultation under Section 7 of the FESA is not necessary.

Additionally, federally protected wetlands and waters of the U.S. would not be impacted by the Proposed Project, and therefore permitting in accordance with the CWA is not necessary. The Proposed Project would comply with federal regulations relating to biological resources.

3.5.4 MITIGATION MEASURES

BIO-1

The following measures shall be implemented to avoid or minimize adverse impacts to nest sites for migratory birds and other birds of prey during construction activities associated with the Proposed Project:

- If construction activities (e.g., building, grading, ground disturbance, removal of vegetation) are scheduled to occur during the general nesting season (February 15–September 15), a pre-construction nesting bird survey shall be conducted by a qualified biologist throughout accessible areas of suitable habitat within 500 feet of proposed construction activity. The survey shall occur no more than 7 days prior to the scheduled onset of construction. If construction is delayed or halted for more than 7 days, another pre-construction survey for nesting bird species shall be conducted. If no nesting birds are detected during the pre-construction survey, no additional surveys or mitigation measures are required.
- If nesting bird species are observed within 500 feet of construction areas during the survey, appropriate "no construction" buffers shall be established. The size and scale of nesting bird buffers shall be determined by a qualified biologist and shall be dependent upon the species observed and the location of the nest. Buffers shall be established around active nest locations. The nesting bird buffers shall be completely avoided during construction activities. The buffers may be removed when the qualified wildlife biologist confirms that the nest(s) is/are no longer occupied and all birds have fledged.

3.6 CULTURAL RESOURCES

Information in this section is summarized from a Historic Property Identification Report prepared for the Proposed Project (**Appendix D**). The Historic Property Identification Report is being used for consultation between the USEPA and the State Historic Preservation Officer pursuant to the requirements of Section 106 of the NHPA; refer to **Section 1.0** of this IS for a discussion of federal requirements related to the Water and Waste Disposal Loan and Grant Program funded by the USDA). The Area of Potential Effects (APE) analyzed in the Historic Resources Survey is congruent with the Development Footprint shown in **Figure 2-3**, and encompasses all areas of ground disturbance related to the Proposed Project, including equipment and materials staging areas.

3.6.1 ENVIRONMENTAL CHECKLIST

CULTURAL RESOURCES	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource pursuant to § 15064.5?	☐	☐	☐	☒
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5?	☐	☒	☐	☐
c) Disturb any human remains, including those interred outside of dedicated cemeteries?	☐	☒	☐	☐

3.6.2 SETTING

Cultural Context

Prehistoric Setting

Fredrickson (1973) proposed a sequence of cultural manifestations or patterns for the central districts of the North Coast Ranges of California, placing them in a framework of cultural periods he believed were applicable to California as a whole. It is generally recognized that Native American occupation of the Napa region began at least 5,000 years ago. The following is a summary of these temporal periods with descriptions of the associated cultural patterns.

The Paleo-Indian Period (10,000 B.C. to 6000 B.C.) saw the first demonstrated entry and spread of humans into California with most known sites situated along lakeshores. A developed milling tool technology may have been present at this time. Characteristic artifacts noted in the lithic assemblages include fluted projectile points and flaked crescents.

During the Lower Archaic Period (6000 B.C. to 3000 B.C.), subsistence appears to have been focused more on plant foods. The earliest Lower Archaic archaeological assemblages identified in the Napa Valley represent a late component of the Borax Lake Pattern. Artifacts include stylistically unique obsidian drills, keeled obsidian tools, concave based projectile points, thick lanceolate projectile points, milling slabs, and handstones.

In the Middle Archaic Period (3000 B.C. to 1000 B.C.), economic systems were more diversified and likely included acorn processing. Hunting remained important but reliance on plant foods dominated the subsistence system. Sedentism was fully developed and there was growth in population and a general expansion in land use. Artifacts include the bowl mortar and pestle and the continued use of large projectile points.

A marked expansion of sociopolitical complexity is found in the Upper Archaic Period (1000 B.C. to A.D. 500), with the development of status distinctions based on material wealth. Shell beads gained in significance as possible indicators of personal status and as important trade items.

The Emergent Period (A.D. 500 to 1800) is distinguished by the advent of several technological and social changes. The bow and arrow were introduced and territorial boundaries between groups became well established. The clamshell disk bead became a monetary unit of exchange and increasing quantities of goods were transported over greater distances. The mortar and pestle were the predominant milling implements and small arrow points replaced the larger projectile point forms. At the end of this period, extensive contact with Euro-Americans resulted in the rapid loss of traditional lifeways.

Ethnography

The Project site lies in ethnographic territory associated with the Southern Wappo Indians. The Southern Wappo are members of the Yuki linguistic family, with territory extending south through the Napa Valley, north to Middletown, and west to Lytton, as well as the Mount Konocti area. The Wappo language included five dialects distributed across two major territorial divisions (Sawyer, 1978). The smaller area included lands on the southern edge of Clear Lake; the larger ranged from just north of Napa and Sonoma up to Cloverdale and Middletown. The Wappo were known to readily adopt words from other languages spoken in their vicinity and gave at least one village a name which is still in use, *cho*nóma*, meaning “abandoned camp” (Sawyer, 1978). Seasonal travel to Clear Lake, the Russian River, the Pacific coast, and Napa Glass Mountain was common.

The Wappo lived in villages usually located on a creek or other water source. Villages included one or two sweathouses as well as houses of varying size. Village chiefs may have been elected or appointed based on the organization of the individual village. Some villages even had multiple chiefs, each with different spheres of influence (Sawyer, 1978).

The Wappo were generally considered to be a relatively peaceful group, culturally influenced by the groups surrounding them. Some were drafted for labor; others went to the Sonoma Mission between

1823 and 1834. By 1850, it was estimated that no more than 500 were left in the Napa Valley. In the 1910 census of the area, 73 individuals claimed Wappo membership.

History

Spanish occupation of what became California began in 1769 with the establishment of the Mission San Diego de Alcalá and the San Diego Presidio. Ultimately, a total of 21 Franciscan missions were established, the last and most northerly being the Mission San Francisco Solano de Sonoma, founded in southern Sonoma County in 1823. While Spanish colonization was confined to the coastal and San Francisco Bay areas, there was interest in establishing control in the interior, and several expeditions were mounted to extend the Spanish sphere of influence (Hoover et al., 2002). In 1848, the Treaty of Guadalupe Hidalgo ended the Mexican-American War and ceded vast lands of the Southwest, including California, to the United States. With the discovery of gold that same year, a flood of prospectors descended on the gold fields, and California quickly became a state in 1850. While thousands came to California seeking prosperity directly through gold, most ended up finding their fortunes other ways, including viticulture in the Napa Valley.

Record Search

A records search was conducted at the Northwest Information Center (NWIC) of the California Historical Resources Information System by NWIC staff, on July 15, 2020 (NWIC File No.: 20-0043). The NWIC, an affiliate of the State of California Office of Historic Preservation, is the official state repository of archaeological and historic records and reports for a 15-county area that includes Napa County, and is housed at Sonoma State University. Additional research was conducted using the files and literature maintained at Analytical Environmental Services (AES).

The records search revealed that four prehistoric cultural resources (two lithic scatters and two disturbed midden sites) have been recorded within the spray fields associated with the WWTRP, however none are located in areas that will be affected by the Proposed Project. Another 19 cultural resources, a combination of prehistoric and historic resources, have been recorded within a 0.5-mile radius of the Proposed Project. (**Appendix D**).

Native American Heritage Consultation

On July 7, 2020, the State of California Native American Heritage Commission (NAHC) was asked to review the Sacred Lands file for information concerning significant Native American cultural resources within the Development Footprint. On July 8, 2020, the NAHC responded stating that their search was positive and provided a list of individuals and groups for further consultation. Letters to these individuals and groups were sent on July 9, 2020 and follow up phone calls were placed on July 22, 2020. The only response received to date was a letter dated July 20, 2020 from Yocha Dehe stating that the Proposed Project is not within the aboriginal territories of the Yocha Dehe Wintun Nation.

Field Survey

On July 21, 2020, Charlane Gross, M.A., RPA, conducted a pedestrian survey of the Development Footprint. The survey used transects spaced no more than 10 meters apart and examined the entire Development Footprint, with closer transects in the proximity of the Napa River. The storage laydown area where the MBR system and associated upgrades is proposed to be located, consists of a graveled parking area with storage containers, cars, brush, weeds, and trees around the edges. Changes to WWTRP ponds would be located within artificial raised berms surrounding the ponds. Ground surface visibility approached 100 percent in all surveyed areas, but all elements of the Proposed Project would be located in disturbed areas. Four obsidian flakes were found in a narrow (circa 2 meters wide by 15 meters long) corridor between the base of the northern-most WWTRP pond and a row of decorative oleander bushes. Because of the large-scale disturbance represented by pond/berm construction and planting the oleanders, it is presumed that the flakes do not represent an intact, *in situ* cultural resource. They may be a surface manifestation of a buried resource, but there are no ground-disturbing activities associated with the Proposed Project that would affect that location.

Ms. Gross also surveyed the area surrounding the closest of the archaeological sites to ensure that it did not encroach upon Proposed Project construction. That site, lithic scatter CA-NAP-356, is one of the disturbed midden sites located on the west bank of the Napa River adjacent to the spray fields and appears to be a minimum of 40 meters from any of the disturbances associated with the Proposed Project. No other prehistoric or historic-period cultural resources were identified as a result of the field survey (**Appendix D**).

Regulatory Context

Section 106 of the National Historic Preservation Act

Section 106 of the NHPA, as amended, and its implementing regulations found at 36 CFR Part 800, require federal agencies to identify cultural resources that may be affected by actions involving federal lands, funds, or permitting actions. The City is applying for federal grant funding for the Proposed Project through the Waste Disposal Loan and Grant Program, which is funded by the USDA; therefore, the Proposed Project is subject to Section 106 review.

The significance of the resources must be evaluated using established criteria outlined at 36 CFR 60.4, as described below. If a resource is determined to be a *historic property*, Section 106 of the NHPA requires that effects of the undertaking on the resource be determined. A historic property is:

> *…any prehistoric or historic district, site, building, structure or object included in, or eligible for inclusion in the National Register of Historic Places, including artifacts, records, and material remains related to such a property…(NHPA Sec. 301[5])*

Section 106 of the NHPA prescribes specific criteria for determining whether an undertaking would adversely affect an historic property, as defined in 36 CFR 800.5. An impact is significant when the following occurs to prehistoric or historic archaeological sites, structures, or objects that are National Register of Historic Places (NRHP) listed, or eligible for NRHP listing:

- physical destruction or damage to all or part of the property;
- alteration of a property;
- removal of the property from its historic location;
- change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance;

- introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features; and
- neglect of a property that causes its deterioration; and the transfer, lease, or sale of the property.

If it is determined that a historic property will be adversely affected by implementation of a proposed action, prudent and feasible measures to avoid or reduce adverse impacts must be taken. The State Historic Preservation Officer (SHPO) must be provided an opportunity to review and comment on these measures prior to implementation of the proposed action.

National Register of Historic Places

The eligibility of a resource for listing in the NRHP is determined by evaluating the resource using criteria defined in 36 CFR 60.4 as follows:

> *The quality of significance in American history, architecture, archaeology, and culture is present in districts, sites, buildings, structures, and objects of state and local importance that possess integrity of location, design, setting, materials, workmanship, feeling, association, and:*
>
> A. That are associated with events that have made a significant contribution to the broad patterns of our history;
>
> B. That are associated with the lives of persons significant in our past;
>
> C. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
>
> D. That has yielded, or may be likely to yield, information important to prehistory or history.

Sites younger than 50 years, unless of exceptional importance, are not eligible for listing in the NRHP. In addition to meeting at least one of the criteria outlined above, the property must also retain enough integrity to enable it to convey its historic significance. The National Register recognizes seven aspects or qualities that, in various combinations, define integrity (National Park Service, 1990). These seven elements of integrity are location, design, setting, materials, workmanship, feeling, and association. To retain integrity a property will always possess several, and usually most, of these aspects.

While most historic buildings and many historic archaeological properties are significant because of their association with important events, people, or styles (Criteria A, B, and C), the significance of most prehistoric and historic-period archaeological properties is usually assessed under Criterion D. This criterion stresses the importance of the information contained in an archaeological site, rather than its intrinsic value as a surviving example of a type or its historical association with an important person or event. It places importance not on physical appearance, but rather on information potential.

California Environmental Quality Act

CEQA requires that, for projects financed by or requiring the discretionary approval of public agencies in California, the effects that a project has on historical and unique archaeological resources be considered (PRC § 21083.2). Historical resources are defined as buildings, sites, structures, or objects, each of which may have historical, architectural, archaeological, cultural, or scientific importance (PRC § 50201). The CEQA *Guideline*s (§ 15064.5) define three cases in which a property may qualify as a historical resource for the purpose of CEQA review:

- The resource is listed in or determined eligible for listing in the California Register of Historical Resources (CRHR).
- The resource is included in a local register of historic resources, as defined in section 5020.1(k) of the PRC, or is identified as significant in a historical resources survey that meets the requirements of section 5024.1(g) of the PRC (unless the preponderance of evidence demonstrates that the resource is not historically or culturally significant).
- The lead agency determines that the resource may be a historical resource as defined in PRC §§ 5020.1(j), 5024.1, or significant as supported by substantial evidence in light of the whole record. Section 5024.1 defines eligibility requirements and states that a resource may be eligible for inclusion in the CRHR if it:
    1. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
    2. Is associated with the lives of persons important in our past;
    3. Embodies the distinctive characteristics of a type, period, region, or method of construction, represents the work of an important creative individual, or possesses high artistic values; or
    4. Has yielded, or may be likely to yield, information important in prehistory or history.

Resources must retain integrity to be eligible for listing on the CRHR. Resources that are listed in or eligible for listing in the NRHP are considered eligible for listing in the CRHR, and thus are significant historical resources for the purposes of CEQA (PRC § 5024.1(d)(1)).

PRC § 21083.2 governs the treatment of a unique archaeological resource, which is defined as "an archaeological artifact, object, or site about which it can be clearly demonstrated" that it meets any of the following criteria:

- It contains information needed to answer important scientific research questions, and there is a demonstrable public interest in that information.
- It has a special and particular quality such as being the oldest of its type or the best example of its type.
- It is directly associated with a scientifically recognized important prehistoric or historic event or person.

3.6.3 DISCUSSION OF IMPACTS

Question A

Would the project: Cause a substantial adverse change in the significance of a historical resource pursuant to § 15064.5?

No Impact. As described above, the records search revealed that four prehistoric cultural resources (two lithic scatters and two disturbed midden sites) have been recorded within the spray fields associated with the WWTRP, however none are located in areas that will be affected by the Proposed Project. No resources were identified by the NWIC that would be affected by Proposed Project construction. Based on the results of the records search, literature review, Native American consultation, and field survey, the potential for NRHP/CRHR-eligible resources within the Proposed Project area is considered to be low.

Questions B and C

Would the project: Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5; Disturb any human remains, including those interred outside of dedicated cemeteries?

Less than Significant with Mitigation. There is always the potential, however remote, that previously unknown archaeological resources and/or human remains could be encountered during subsurface construction activities. This is a potentially significant impact. Implementation of **Mitigation Measures CR-1** and **CR-2** presented in **Section 3.6.4** would ensure that inadvertently discovered resources that may be eligible for the NHRP or CRHR would be investigated and evaluated for eligibility to the NRHP and CRHR. Moreover, implementation of **Mitigation Measures CR-1** and **CR-2** would provide for the appropriate treatment of human remains. These actions would reduce potential impacts to previously unidentified archaeological resources or human remains to a less-than-significant level.

Cumulative Impacts

Less than Significant with Mitigation. Potential cumulative projects in the vicinity of the project area have the potential to impact cultural resources. Archaeological and historic resources are afforded special legal protections designed to reduce the cumulative effects of development. Potential cumulative projects and the Proposed Project would be subject to the protection of cultural resources afforded by the CEQA *Guidelines* Section 15064.5 and related provisions of the PRC. In addition, projects with federal involvement would be subject to Section 106 of the NHPA. Given the non-renewable nature of cultural resources, any impact to protected sites could be considered cumulatively considerable. As discussed above, no known protected archaeological or historic resources were identified within the Proposed Project's Development Footprint. **Mitigation Measures CR-1** and **CR-2** provide for the protection of unanticipated finds made during ground disturbing activities. With the implementation of these mitigation measures, the Proposed Project's incremental contribution to cumulative impacts to cultural resources is considered to be less than significant.

Compliance with Federal Environmental Laws and Regulations

The cultural resources APE for the Proposed Project in congruent with the Development Footprint shown in **Figure 2-3**, and encompasses the WWTRP, gravel area of the storage laydown area, and the existing wastewater pond system, but not the irrigation spray fields as there will be no Proposed Project ground-disturbing activities within the spray fields. As discussed previously, the APE is composed of existing developed and disturbed areas which have been thoroughly surveyed via the pedestrian surveys conducted by AES on July 21, 2020. No resources were identified that would be potentially eligible for protection under the NHPA during the survey of the APE. The State Water Resources Control Board (SWRCB) will consult with and seek concurrence from the California SHPO on a finding of no historic properties affected for the Proposed Action. Once consultation has been completed, the Proposed Project would comply with federal regulations relating to cultural resources, including the NHPA.

3.6.4 MITIGATION MEASURES

CR-1

In the event of any inadvertent discovery of archaeological or paleontological resources, all such finds shall be subject to PRC 21083.2 and CEQA *Guidelines* § 15064.5. Procedures for inadvertent discovery include the following:

- All work within 50 feet of the find shall be halted until a professional archaeologist or paleontologist if the find is of a paleontological nature, can evaluate the significance of the find in accordance with NRHP and CRHR criteria.
- If any find is determined to be significant by the archaeologist, or paleontologist as appropriate, then representatives of the City shall meet with the archaeologist or paleontologist to determine the appropriate course of action. If necessary, a Treatment Plan shall be prepared by an archeologist (or paleontologist) outlining recovery of the resource, analysis, and reporting of the find. The Treatment Plan shall be submitted to the City for review and approval prior to resuming construction.
- All significant cultural or paleontological materials recovered shall be subject to scientific analysis, professional curation, and a report prepared by the professional archaeologist or paleontologist according to current professional standards.

CR-2

In the event that human remains are encountered during construction activities, the City shall comply with Section 15064.5 (e) (1) of the CEQA Guidelines and Health and Safety Code Section 7050.5. All project-related ground disturbance within 100 feet of the find shall be halted until the county coroner has been notified. If the coroner determines that the remains are Native American, the coroner will notify the NAHC to identify the most likely descendants of the deceased Native Americans. Project-Related ground disturbance in the vicinity of the find shall not resume until the process detailed in Section 15064.5 (e) has been completed.

3.7 ENERGY

3.7.1 ENVIRONMENTAL CHECKLIST

ENERGY	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
Would the project:				
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	☐	☐	☒	☐
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	☐	☐	☒	☐

3.7.2 SETTING

Regulatory Context

Warren-Alquist Act

The 1974 Warren-Alquist Act (PRC § 25000 et seq.) established the California Energy Commission (CEC) and created a State policy to reduce wasteful, uneconomical, and unnecessary uses of energy by employing a range of measures. The California Legislature continues to amend the Act to address pressing energy needs and issues, and the CEC publishes an updated version of the Act each year. The 2019 edition of the Warren-Alquist Act was published in February of 2019.

State of California Integrated Energy Policy Report

Senate Bill (SB) 1389 requires the CEC to adopt an Integrated Energy Policy Report (IEPR) every two years. The IEPR contains an assessment of major energy trends and issues facing the electricity, natural gas, and transportation fuel sectors within California. The Report provides policy recommendations to conserve resources; protect the environment; ensure reliable, secure, and diverse energy supplies; enhance the economy of California; and protect public health and safety.

The IEPR calls for the State to assist in the transformation of the transportation system to improve air quality, reduce congestion, and increase the efficient use of fuel supplies with the least environmental and energy costs. To further this policy, the IEPR identifies a number of strategies, including assistance to public agencies and fleet operators in implementing incentive programs for Zero Emission Vehicles and their infrastructure needs, and encouragement of urban designs that reduce vehicle miles traveled and accommodate pedestrian and bicycle access.

The Draft 2019 IEPR was submitted for public comment on November 8, 2019 and covers a broad range of topics including decarbonizing buildings, integrating renewables, energy efficiency, energy equity, electricity reliability, climate adaptation activities for the energy sector, a natural gas assessment, a transportation energy demand forecast, and the California Energy Demand Forecast. The 2019 IEPR provides the results of the CEC assessments on a variety of energy issues facing California. Many of these issues will require action if the State is to meet its climate, clean energy, air quality, and other environmental goals while maintaining reliability and controlling costs.

California Energy Efficiency Standards

The Energy Efficiency Standards for Residential and Non Residential Buildings (California Building Energy Efficiency Standards) specified in Title 24, Part 6 of the CCR was established in 1978 in response to a legislative mandate to reduce energy consumption in California. The standards are updated periodically to allow for consideration and possible incorporation of new energy efficiency technologies and methods. The most recent standards were adopted in 2019 and took effect on January 1, 2020 (for building permit applications submitted on or after that date). These standards are updated every three years. The new standards require better windows, insulation, lighting, ventilation systems, and other features that reduce energy consumption in homes and businesses. Non-Residential buildings are expected to use about 30 percent less energy compared to the 2016 Energy Efficiency Standards, primarily due to lighting upgrades.

California Green Building Standards Code

The California Green Building Standards Code (CALGreen), specified in CCR, Title 24, Part 11, is a State wide regulatory code for all buildings, residential and commercial included. The regulations are intended to encourage more sustainable and environmentally friendly building practices, require low-pollution emitting substances that cause less harm to the environment, conserve natural resources, and promote the use of energy-efficient materials and equipment. The standards require that all new residential and non-residential development implement various energy conservation measures, including ceiling, wall, and concrete slab insulation; weather stripping on doors and windows; closeable doors on fireplaces; insulated heating and cooling ducts; water heater insulation blankets; and certified energy efficient appliances. CALGreen is updated periodically and the latest update, CALGreen 2019, became effective on January 1, 2020.

Renewables Portfolio Standard Program

The California Renewables Portfolio Standard (RPS) program was established in 2002 by SB 1078 and requires retail sellers of electricity, including investor-owned utilities and community choice aggregators, to provide a certain percentage of their supply from renewable sources. The initial requirement was that at least 20 percent of electricity retail sales had to be served by renewable resources by 2017. The RPS program was accelerated in 2015 with SB 350 that mandated a 50 percent RPS by 2030. In 2018, SB 100 was signed into law, increasing the RPS to 60 percent by 2030 and requiring all electricity in California to come from carbon-free resources by 2045.

Assembly Bill 1007 (Pavley)-Alternative Fuel Standards

AB 1007, (Pavley, Chapter 371, Statutes of 2005) required the CEC to prepare a State plan to increase the use of alternative fuels in California; therefore, the CEC prepared the State Alternative Fuels Plan in partnership with CARB and in consultation with other local, State, and federal agencies. The final State Alternative Fuels Plan, published in December 2007, attempts to achieve an 80 percent reduction in GHG emissions associated with personal transportation, even as the population of California increases.

Environmental Setting

The Project site is located within the city limits of St. Helena and is surrounded by farmland and rural residential use. Energy would be supplied to the Project site by Pacific Gas and Electric (PG&E).

PG&E Electric Utility Operations

PG&E provides “bundled” services (i.e., electricity, transmission, and distribution services) to most of the six million customers in its service territory, including residential, commercial, industrial, and agricultural consumers. Customers also can obtain electricity from alternative providers such as municipalities or Customer Choice Aggregators, as well as from self-generation resources like rooftop solar installations. In 2018, PG&E generated and/or procured a total of 48,832 gigawatt hours of electricity. Of this total, PG&E owns 7,686 megawatts (MW) of generating capacity (**Table 3-6**). The remaining electrical power is purchased from other sources in and outside of California.

TABLE 3-6. PG&E-OWNED ELECTRICITY GENERATING SOURCES

Source	Generating Capacity (MW)
Nuclear	2,240
Hydroelectric	3,891
Fossil Fuel-Fired	1,400
Fuel Cell	3
Photovoltaic	152
Total	**7,686**

Source: PG&E, 2018.

Renewable Energy Resources

California law requires load-serving entities, such as PG&E, to gradually increase the amount of renewable energy they deliver to their customers. SB 350 became effective on January 1, 2016, increasing the amount of renewable energy that must be delivered by most load-serving entities, such as PG&E, to their customers from 33 percent of their total annual retail sales by the end of the 2017-2020 compliance period to 50 percent of their total annual retail sales by the end of the 2028-2030 compliance period. In September 2018, the California Governor signed SB 100 into law, increasing the California electricity portfolio that must come from renewables from 50 percent to 60 percent by 2030; and establishing a State policy that 100 percent of all retail electricity sales must come from RPS-eligible or carbon-free resources by 2045.

Renewable generation resources, for the purposes of the RPS program, include bioenergy such as biogas and biomass, certain hydroelectric facilities (30 MW or less), wind, solar, and geothermal energy. During 2018, 38.9 percent of energy deliveries from PG&E were from renewable energy sources, exceeding the annual RPS target of 28 percent (**Table 3-7**).

TABLE 3-7. PG&E RENEWABLE ENERGY DELIVERIES

Source	Percent of Total Energy Portfolio
Biopower	4.4
Geothermal	3.7
Wind	10
RPS-Eligible Hydroelectric	2.7
Solar	18.1
Total	**38.9**
Source: PG&E, 2018.	

Electricity Transmission

As of December 31, 2018, PG&E owned approximately 18,000 circuit miles of interconnected transmission lines operating at voltages ranging from 60 kilovolts (kV) to 500 kV. PG&E also operated 84 electric transmission substations with a capacity of approximately 65,000 megavolt amperes (MVA). The PG&E electric transmission system is interconnected with electric power systems in the Western Electricity Coordinating Council, which includes many western U.S states; Alberta and British Columbia, Canada; and parts of Mexico.

Electricity Distribution

The PG&E electric distribution network consists of approximately 107,000 circuit miles of distribution lines (approximately 20 percent underground and 80 percent overhead), 50 transmission switching substations, and 769 distribution substations, with a capacity of approximately 32,000 MVA.

These distribution substations serve as the central hubs of the PG&E electric distribution network. Emanating from each substation are primary and secondary distribution lines connected to local transformers and switching equipment that link distribution lines and provide delivery to end users. In some cases, PG&E sells electricity from its distribution facilities to entities, such as municipal and other utilities, that resell the electricity. PG&E operates electric distribution control center facilities in Concord, Rocklin, and Fresno, CA; these control centers are a key component of the PG&E effort to create a smarter, more resilient grid.

3.7.3 DISCUSSION OF IMPACTS

Questions A and B

Would the project: Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation? Would the project: Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

Construction

Less than Significant. Construction of the Proposed Project would consume energy primarily from fuel consumed by construction vehicles and equipment. Fossil fuels used for construction vehicles and other equipment would be used during site clearing, grading, paving, and building. Fuel consumed during construction would be temporary in nature and would not represent a significant demand on available fuel. There are no unusual characteristics that would necessitate the use of construction equipment that would be less energy efficient than at comparable construction sites in the region or State.

Additionally, project-related design features and mitigation measures would provide fuel and energy reduction during construction. Overall fuel and energy reductions are difficult to quantify; however, certain air quality emission reduction measures would also reduce fuel and electricity use during construction of the Proposed Project. **Mitigation Measure AQ-2** would reduce energy consumption by requiring the contractor to minimize equipment idling time. Additionally, all diesel-fueled construction vehicles would be required to meet the latest emissions standards. These measures would further reduce fuel and energy use during all stages of construction and avoid the wasteful, inefficient, or unnecessary consumption of fuel energy. Therefore, construction of the Proposed Project would not result in inefficient, wasteful, or unnecessary consumption of fuel energy as it would comply with relevant standards.

Operation

Less than Significant. As part of the Proposed Project, the electrical system at the WWTRP would be upgraded to meet the most current design criteria adopted by the City. This would include the installation of a 480-volt transformer along the northern boundary of the Project site along Chaix Lane, with electricity supplied by PG&E. It is estimated that the operation of the Proposed Project would result in an increase in annual power consumption of 1.5 MWhs (**Appendix A**). Although energy demands of the Proposed Project would be greater than the current conditions of the Project site, which rely on primarily passive treatment methods, the increase in energy demand would not cause a significant environmental impact (refer to **Sections 3.4 – Air Quality** and **3.9 – Greenhouse Gas Emissions**). Further the proposed WWTRP upgrades and resulting increase in energy usage are necessary to comply with the 2016 Permit. Accordingly, the Proposed Project would not conflict with a State or local plan for renewable energy or energy efficiency, and would not result in the wasteful, inefficient, or unnecessary consumption of energy resources. Therefore, this impact would be less than significant.

Cumulative Impacts

Less than Significant. With regard to energy usage, the California Public Utilities Commissions' Long Term Procurement Plan (LTPP) proceedings were established to ensure a safe, reliable, and cost-effective electricity supply in California. A major component of the LTPP proceeding addresses the overall long-term need for new system reliability resources, including the adoption of system resource plans. These resource plans will allow the California Public Utilities Commission to comprehensively assess the impacts of state energy policies on the need for new resources. As discussed above, several aspects of the Proposed Project would help manage the amount and efficiency of energy consumption and would ensure that the related consumption is not inefficient, wasteful or unnecessary or place a significant demand on regional energy supplies. The project components would help reduce the project's overall energy demand and the project would result in less-than-significant individual impacts. Therefore, impacts to energy resources resulting from the Proposed Project, combined with other past, present, or reasonably foreseeable future projects, would not result in a cumulative impact to which the proposed project would have a cumulatively considerable contribution.

3.7.4 MITIGATION MEASURES

None required.

3.8 GEOLOGY/SOILS

3.8.1 ENVIRONMENTAL CHECKLIST

GEOLOGY/SOILS	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
Would the project:				
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving: i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map, issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42. ii) Strong seismic ground shaking? iii) Seismic-related ground failure, including liquefaction? iv) Landslides?	☐	☐	☒	☐
b) Result in substantial soil erosion or the loss of topsoil?	☐	☒	☐	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☐	☒
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?	☐	☐	☐	☒
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☒
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☒	☐	☐

3.8.2 SETTING

Regulatory Context

Federal Earthquake Hazards Reduction Act

In October 1997, the U.S. Congress passed the National Earthquake Hazards Reduction (NEHR) Act to "reduce the risks to life and property from future earthquakes in the United States through the establishment and maintenance of an effective earthquake hazards and reduction program." To accomplish this, the act established the National Earthquake Hazards Reduction Program (NEHRP). This program was significantly amended in November 1990 by the NEHR Act, which refined the description of agency responsibilities, program goals, and objectives.

NEHRP's mission includes improved understanding, characterization, and prediction of hazards and vulnerabilities; improvement of building codes and land use practices; risk reduction through post-earthquake investigations and education; development and improvement of design and construction techniques; improvement of mitigation capacity; and accelerated application of research results. The NEHR Act designates the FEMA as the lead agency of the program and assigns it several planning, coordinating, and reporting responsibilities. Other NEHR Act agencies include the National Institute of Standards and Technology, National Science Foundation, and the U.S. Geological Survey (USGS).

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act was passed by the California Legislature to mitigate the hazard of surface faulting to structures. The act's main purpose is to prevent the construction of buildings used for human occupancy on the surface trace of active faults. The act addresses only the hazard of surface fault rupture and is not directed toward other earthquake hazards. Local agencies must regulate most development in fault zones established by the State Geologist. Before a project can be permitted in a designated Alquist-Priolo Fault Study Zone, cities and counties must require a geologic investigation to demonstrate that proposed buildings would not be constructed across active faults.

California Seismic Hazards Mapping Act

The California Seismic Hazards Mapping Act of 1990 (PRC §§ 2690–2699.6) addresses seismic hazards other than surface rupture, such as liquefaction and induced landslides. The Seismic Hazards Mapping Act specifies that the lead agency for a project may withhold development permits until geologic or soils investigations are conducted for specific sites and mitigation measures are incorporated into plans to reduce hazards associated with seismicity and unstable soils.

National Pollutant Discharge Elimination System Permit

The SWRCB administers regulations and permitting for the USEPA (55 CFR 47990) for pollution generated from stormwater under the NPDES. There are nine RWQCBs that implement the SWRCB's jurisdiction and require that an operator of any construction activities with ground disturbances of 1.0 acre or more obtain a General Permit through the NPDES Stormwater Program. The Project site is within the jurisdiction of the SFBRWQCB. The Construction General Permit requires that the implementations of BMPs be employed to reduce sedimentation into surface waters and control erosion. The preparation of a SWPPP addresses control of water pollution that includes the effects of sediments in the water during construction activities. These elements are further explained within **Section 3.11**, **Hydrology and Water Quality**.

California Building Standards Code

The State of California provides minimum standards for building design through the CBC (CCR Title 24). Where no other building codes apply, Chapter 29 regulates excavation, foundations, and retaining walls. The CBC also applies to building design and construction in the state and is based on the IBC used widely throughout the country (generally adopted on a state-by-state or district-by-district basis). The CBC has been modified for California conditions with numerous more detailed and/or more stringent regulations.

Environmental Setting

Regional Geology

The Project site is located near the eastern boundary of the Northern Coast Ranges geomorphic province (Province) of California, near the margin of the Great Valley Province (California Geological Survey [CGS], 2002). The Province lies between the Pacific Ocean and the Great Valley of California and stretches from the Oregon border to the north and continues south to the Santa Ynez River near Santa Barbara. The northern and southern portions of the province are divided by a depression containing the Bay. Much of the Coast Range province is characterized by northwest trending mountain ranges, ridges, and valleys composed of the Franciscan Complex, which forms the bedrock of the Project site. The Calistoga and St. Helena Napa Valley Floor Subareas include the northern portion of the Napa Valley Subbasin (WICC of Napa County, 2005).

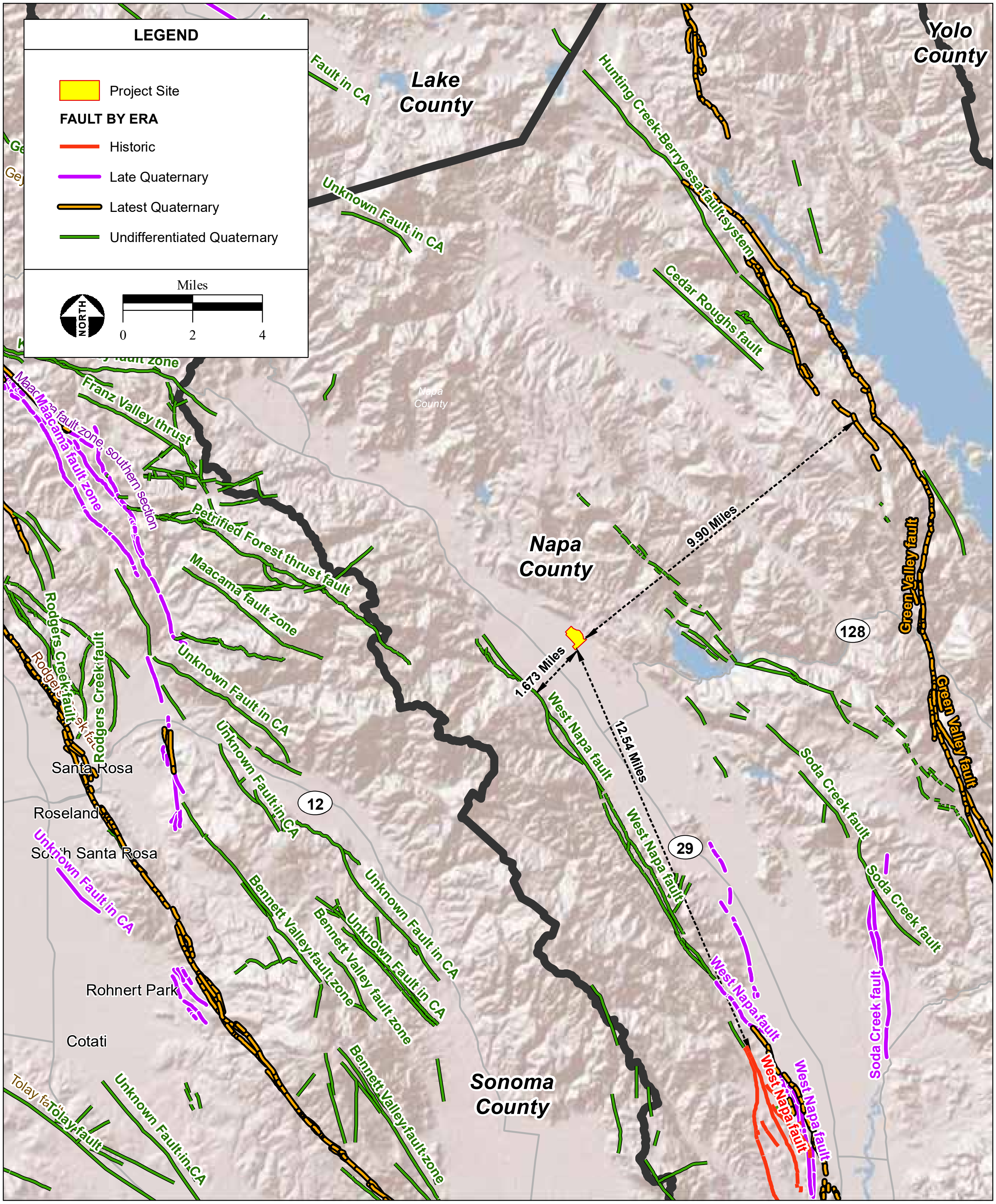
According to CGS's Geologic Map of California, the dominant rock type in the project vicinity is Type Q, which is a Pleistocene-Holocene period type characterized by alluvium, lake, playa, and terrace deposits (CGS, 2015).

Site Topography

The Project site was originally graded in 1966 during the construction of the existing WWTRP. Due to the grading and maintenance of the site for the existing WWTRP operations, the topography of the Project site is relatively flat, with elevations ranging from 175 to 195 feet amsl. There are no mapped landslides or landslide features on the Project site (CGS, 2015b).

Regional Seismicity and Fault Zones

Napa County is a seismically active region with many active or potentially active faults (CGS, 2015c). The City is located in a high seismic hazard area (USGS, 2018). The Alquist-Priolo Act defines active faults as those that have shown seismic activity during the Holocene period, approximately the past 11,000 years, while potentially active faults are those that have shown activity within the Quaternary period, or the past 1.8 million years (CGS, 2019). As shown in **Figure 3-4**, the largest known faults in the vicinity of the Project site are the Green Valley Fault approximately 9.90 miles away from the Project site and the West Napa Fault, approximately 1.67 miles away from the Project site.



SOURCE: USGS Quaternary Fault and Fold Database of the U.S., 2018; California Geologic Survey, 2010; AES, 8/24/2020

Figure 3-4
Regional Fault Map

Seismic Shaking Intensity

The most likely faults to produce strong ground shaking in Napa County include the Northern Hayward/Rodgers Creek in the west, the Maacama in the northwest, the Hunting Creek-Berryessa in the north, the Green Valley in the southeast and the West Napa in the south central (ABAG, 2015). The Concord Green Valley and the West Napa Fault are the only two major faults that pass through County boundaries.

The combined probability of a major quake on one of these major faults is 63 percent over the next 24 years. Therefore, future seismic shaking is anticipated at the Project site. Ground shaking severity at the Project site would depend on the distance from the fault rupture, the magnitude of the earthquake, and the site-specific soil conditions. Most of Napa County's resources and population are in the Napa Valley floor, which consists of alluvial soils, which can create a heightened risk of ground shaking.

Soils

Soil types on the Project site primarily consist of Pleasanton Loam and Yolo Loam, which are soil types typical of areas with low slopes and are well-drained (**Figure 3-6**; NRCS, 2020). A soil type's potential to induce electrochemical or chemical action that corrodes or weakens concrete is known as "risk of corrosion." The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Both soil types on the Project site have a low corrosion rating. The Project site is considered prime farmland if irrigated.

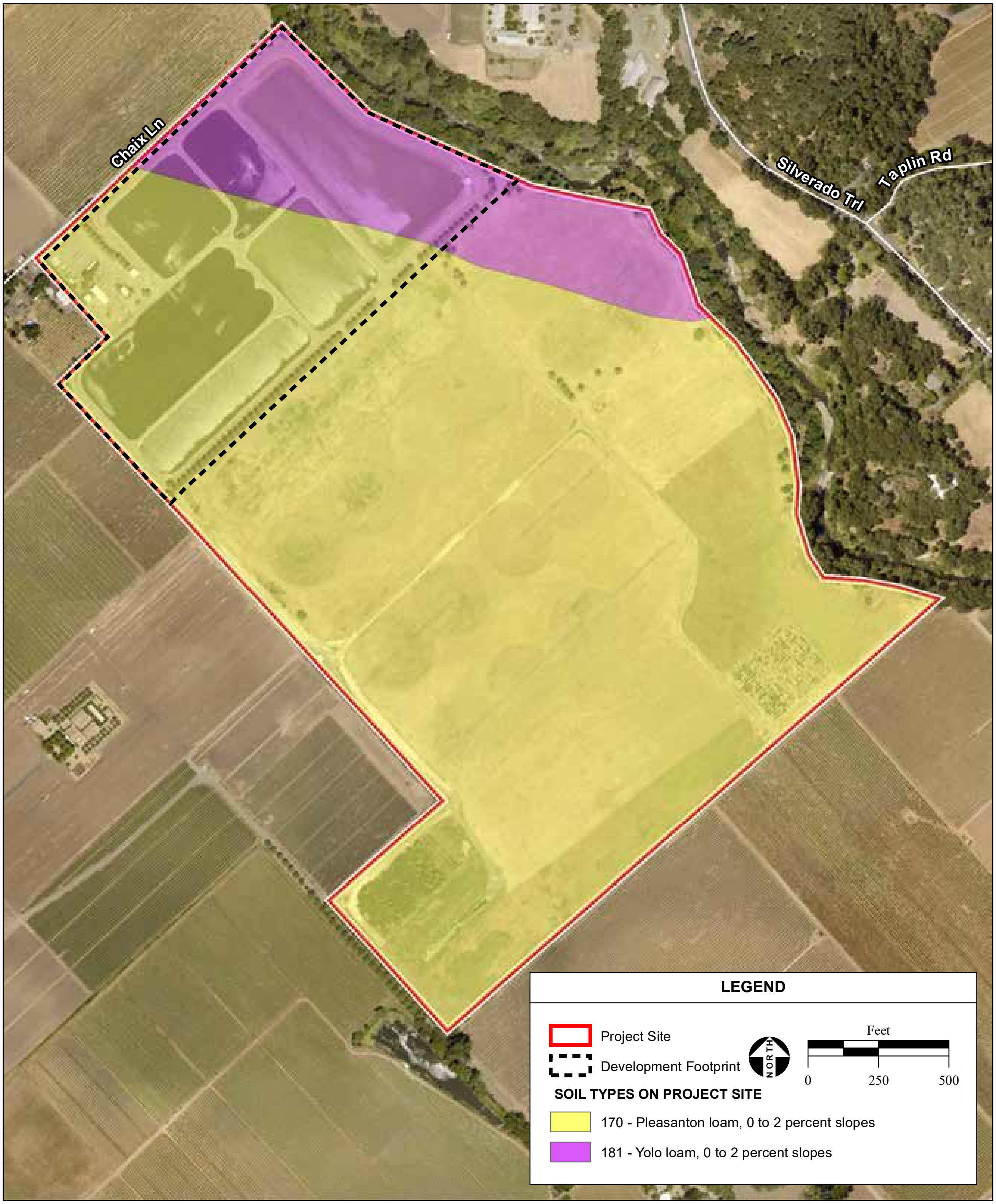
Liquefaction is the sudden loss of soil strength caused by seismic forces acting on water-saturated, granular soil, leading to a "quicksand" condition generating various types of ground failure. Soils comprised of sand and sandy loams that are in areas with high groundwater tables or high rainfall are subject to liquefaction. The soils on the Project site are well drained and the groundwater table is deep; therefore, there is a low risk of liquefaction at the Project site (NRCS, 2020b). The soil on the Project site has a plasticity index between thirteen and fourteen percent, which suggests that the soil is not expansive (NRCS, 2020b).

3.8.3 DISCUSSION OF IMPACTS

Question A

Would the project: Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving ((i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map, issued by the State Geologist for the area or based on other substantial evidence of a known fault. Refer to Division of Mines and Geology Special Publication 42; ii) Strong seismic ground shaking; iii) Seismic-related ground failure, including liquefaction; iv) Landslides?

Less than Significant. Although the Project site is located in an area that may be subject to seismic ground shaking in the future, there are no mapped surface faults on the Project site that would have the potential to rupture and the Project site is not near a designated Alquist-Priolo earthquake fault. Although potential damage to people or structures from seismic ground shaking could occur, compliance with the CBC would require the seismic-design response spectrum to be established and incorporated into the design of all new structures. Any new structures and utilities would be designed to withstand seismic



SOURCE: Napa County aerial photograph, 6/19; USDA SSURGO Soils Surveys of Napa County, 9/16/2019; AES, 8/24/2020

Figure 3-5
Soil Types

forces per CBC requirements. Therefore, these construction standards would reduce potential seismic ground shaking effects on developed structures to a less-than-significant level.

Question B

Would the project: Result in substantial soil erosion or the loss of topsoil?

Less than Significant with Mitigation. Construction of the Proposed Project would involve grading and earth moving activities, as well as installation of project components. Construction would result in the temporary disturbance of soil and would expose disturbed areas to potential storm events, which could generate accelerated runoff, localized erosion, and sedimentation. Construction activities could exacerbate soil erosion and result in the loss of topsoil; this is a potentially significant impact. Implementation of **Mitigation Measure HYD-1** would require construction activities to comply with the California NPDES General Permit, as discussed in **Section 3.11**. This includes limiting ground disturbance areas, restoring disturbed areas to pre-construction contours, erosion control measures, and revegetation. Implementation of **Mitigation Measure HYD-1** would ensure that potential impacts resulting from soil erosion or the loss of topsoil would be reduced to a less-than-significant level.

Questions C – D

Would the project: Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse; Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?

No Impact. As described above, the soils on the Project site are well-drained and the groundwater table is deep; therefore, there is a low risk of liquefaction at the Project site (NRCS, 2020b; CalOES, 2015). The Project site is not located on an unstable geologic unit or soil (NRCS, 2020). No project components would be located on expansive soils. Therefore, the Proposed Project would not expose people or structures to substantial adverse effects from liquefaction, landslides, unstable geologic units or soils, or expansive soils.

Question E

Would the project: Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?

No Impact. Soil types on the Project site primarily consist of Pleasanton Loam and Yolo Loam, which are soil types typical of areas with low slopes and are well-drained (NRCS, 2020). Loamy soils are typically suitable for on-site wastewater disposal systems. However, because no new onsite wastewater disposal system is being proposed, there would be no impact.

Question F

Would the project: Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Less than Significant with Mitigation. As described in **Section 3.6.3**, no known paleontological resources have been identified within the Project site. However, there is always the potential, however remote, that previously unknown unique paleontological resources or sites could be encountered during subsurface construction activities. This is a potentially significant impact. In the event that paleontological resources or sites are found, **Mitigation Measures CR-1** and **CR-2**, as described in **Section 3.6.4** would ensure that the Proposed Project would not directly or indirectly destroy a unique paleontological resource or site. Furthermore, no unique geological features are present on the Project site. After implementation of **Mitigation Measures CR-1** and **CR-2**, impacts to paleontological resources would be less than significant.

Cumulative Impacts

Less than Significant with Mitigation. Implementation of the Proposed Project and other potential cumulative projects in the region, including growth resulting from build-out of the City and County General Plans could result in increased erosion and soil hazards, expose additional structures and people to seismic hazards, and potentially damage unique paleontological resources or sites. These impacts are mitigable with implementation of construction-period erosion control programs, standard seismic safety measures incorporated in building design, and procedures for inadvertent paleontological discoveries. The Proposed Project would incorporate **Mitigation Measures HYD-1**, **CR-1**, and **CR-2** to ensure a less than significant effect; therefore, the Proposed Project's contribution to potential cumulative impacts be less than significant.

3.8.4 MITIGATION MEASURES

With implementation of **Mitigation Measures HYD-1**, **CR-1**, and **CR-2**, no other mitigation is necessary.

3.9 GREENHOUSE GAS EMISSIONS

3.9.1 ENVIRONMENTAL CHECKLIST

Greenhouse Gas Emissions	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☒	☐

3.9.2 SETTING

Regulatory Setting

The following regulatory background gives context to the issues of climate change and importance to reducing GHGs in California:

Federal

On June 21, 2019, the Council on Environmental Quality (CEQ) published draft guidance on how NEPA analysis and documentation should address GHG emissions.

The draft guidance directs agencies to attempt to quantify a proposed action’s projected direct and reasonably foreseeable indirect GHG emissions when the amount of those emissions is substantial enough to warrant quantification, and when it is practicable to quantify them using available data and GHG quantification tools. Additionally, the draft guidance establishes criteria for cumulative effects analysis of GHGs under NEPA. Where GHG inventory or regional emissions information is available to provide context for understanding the relative magnitude of a proposed action’s GHG emissions, a qualitative summary discussion of the effects of GHG emissions, based on an appropriate literature review, is adequate to meet NEPA requirements and no separate cumulative effects analysis is required. The draft guidance also notes that, while NEPA does not require agencies to adopt mitigation measures, comparing alternatives based on potential effects due to GHG emissions, along with other potential effects and economic and technical considerations, can help agencies differentiate among alternatives.

State and Local

Assembly Bill 1493

Signed by the California Governor in 2002, AB 1493 requires that CARB adopt regulations requiring a reduction in GHG emissions emitted by cars in the State. AB 1493 is intended to apply to 2009 and newer vehicles. On June 30, 2009, the USEPA granted a necessary CAA waiver for California to implement AB 1493.

Executive Order S-3-05

Executive Order (EO) S-3-05 was signed by the California Governor on June 1, 2005 and established the following statewide emission reduction targets:

- Reduce GHG emissions to 2000 levels by 2010,
- Reduce GHG emissions to 1990 levels by 2020, and
- Reduce GHG emissions to 80 percent below 1990 levels by 2050.

EO S-3-05 created a Climate Action Team (CAT) headed by the California Environmental Protection Agency that included several other State agencies. The CAT is tasked by EO S-3-05 with outlining the effects of climate change on California and recommending an adaptation plan, as well as creating a strategy to meet the emission reduction targets.

California Global Warming Solutions Act of 2006 (AB-32)

Signed by the California Governor on September 27, 2006, AB 32 codifies a key requirement of EO S-3-05, specifically the requirement to reduce GHG emissions in California to 1990 levels by 2020. AB 32 tasks CARB with monitoring State sources of GHGs and designing emission reduction measures to comply with emission reduction requirements. However, AB 32 also continues the efforts of the CAT to meet the requirements of EO S-3-05 and states that the CAT should coordinate overall State climate policy.

To accelerate the implementation of emission reduction strategies, AB 32 requires that CARB identify a list of discrete early action measures that can be implemented relatively quickly. In October 2007, CARB published a list of early action measures that it estimated could be implemented and would serve to meet about 25 percent of the required 2020 emissions reductions (CARB, 2007). To assist CARB in identifying early action measures, the CAT published a report in April 2007 that updated their 2006 report and identified strategies for reducing GHG emissions (CAT, 2007). In its October 2007 report, CARB cited the CAT strategies and other existing strategies that can be utilized to achieve the remainder of the emissions reductions (CARB, 2007). AB 32 requires that CARB prepare a comprehensive “scoping plan” that identifies all strategies necessary to fully achieve the required 2020 emissions reductions. Consequently, in December 2008, CARB released its scoping plan to the public; the plan was approved by CARB on December 12, 2008. An update to the Climate Change Scoping Plan occurred on May 22, 2014, and included new strategies and recommendations to ensure reduction goals of near-term 2020 are met with consideration of current climate science.

A second update to the Climate Change Scoping Plan was adopted on December 14, 2017. The 2017 Scoping Plan Update addresses the 2030 target established by SB 32, as discussed below, and establishes a proposed framework of action for California to meet a 40 percent reduction in GHG by 2030 compared to 1990 levels. The key programs that the 2017 Scoping Plan Update builds on include the Cap-and-Trade Regulation, the Low Carbon Fuel Standard, an increase in the use of renewable energy in the State, and a reduction of methane emissions from agricultural and other wastes (CARB, 2017).

Executive Order S-01-07

EO S-01-07 was signed by the California Governor on January 18, 2007. It mandates a State-wide goal to reduce the carbon intensity of transportation fuels by at least 10 percent by 2020. This target reduction was identified by CARB as one of the AB 32 early action measures in the October 2007 report (CARB, 2007).

Senate Bill 375

SB 375 was approved by the California Governor on September 30, 2008. SB 375 provides for the creation of a new regional planning document called a “Sustainable Communities Strategy” (SCS). An SCS is a blueprint for regional transportation infrastructure and development that is designed to reduce GHG emissions from cars and light trucks to target levels set by CARB for 18 regions throughout California. Each of the various metropolitan planning organizations must prepare an SCS that is included in their respective regional transportation plan. An SCS influences transportation, housing, and land use planning. CARB then determines whether the SCS will achieve regional GHG emissions reduction goals.

Senate Bill 605

On September 21, 2014, the California Governor signed SB 605 that requires CARB to complete a comprehensive strategy to reduce emissions of short-lived climate pollutants in the State no later than January 1, 2016. As defined in the statute, short-lived climate pollutant means "an agent that has a relatively short lifetime in the atmosphere, from a few days to a few decades, and a warming influence on the climate that is more potent than that of carbon dioxide." SB 605, however, does not prescribe specific compounds as short-lived climate pollutants or add to the list of GHGs regulated under AB 32. In developing the strategy, CARB completed an inventory of sources and emissions of short-lived climate pollutants in the State based on available data, identified research needs to address any data gaps, identified existing and potential new control measures to reduce emissions, and prioritized the development of new measures for short-lived climate pollutants that offer co-benefits by improving water quality or reducing other air pollutants that impact community health and benefit disadvantaged communities.

The final strategy released by CARB in March 2017 focuses on CH4, black carbon, and fluorinated gases, particularly HFCs, as important short-lived climate pollutants. The final strategy recognizes emission reduction efforts implemented under AB 32 (e.g., refrigerant management programs) and other regulatory programs (e.g., in-use diesel engines, solid waste diversion). The measures identified in the final strategy and their expected emission reductions will feed into the update to the CARB Scoping Plan.

Executive Order B-30-15

EO B-30-15 was signed by the California Governor on April 29, 2015. It sets interim GHG targets of 40 percent below 1990 by 2030, to ensure California will meet its 2050 targets set by EO S-3-05. It also directs the CARB to update the Climate Change Scoping Plan. The 2030 Target Scoping Plan Concept Paper was released on June 17, 2016.

Senate Bill 350

SB 350 codifies the GHG targets for 2030 set by EO B-30-15. To meet these goals, SB 350 also raises the California RPS from 33 percent renewable generation by 2020 to 50 percent renewable generation by December 31, 2030.

Senate Bill 32

Additionally, SB 32, signed in 2016, further strengthens AB 32 with goals of reducing GHG emissions to 40 percent below 1990 levels by 2030. Based on GHG emissions inventory data compiled by CARB through 2017 and the emission limit of 431 million metric tons (MT) of carbon dioxide equivalents (CO_2e) established in the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report, California emission reduction goals for near-term 2020 will be met.

California Renewable Portfolio Standards - SB 1078, SB 350, and SB 100

The California RPS program was established in 2002 by SB 1078 and requires retail sellers of electricity, including investor-owned utilities and community choice aggregators, to provide a certain percentage of their supply from renewable sources. The initial requirement was for at least 20 percent of electricity retail sales to be served by renewable resources by 2017. The RPS program was accelerated in 2015 with SB 350 which mandated a 50 percent RPS by 2030. In 2018, SB 100 was signed into law, which again increased the RPS to 60 percent by 2030 and requires all electricity in the State to come from carbon-free resources by 2045.

Title 20 Appliance Efficiency Regulations

California's Appliance Efficiency Regulations, CCR Title 20, contain standards for both federally regulated appliances and non-federally regulated appliances. The regulations are updated regularly to allow consideration of new energy efficiency technologies and methods. The current standards were adopted by the CEC in 2018. The standards outlined in the regulations apply to appliances that are sold or offered for sale in California. More than 23 different categories of appliances are regulated, including refrigerators, freezers, water heaters, washing machines, dryers, air conditioners, pool equipment, and plumbing fittings.

California Energy Efficiency Standards (Title 24)

The State regulates energy consumption under Title 24 Building Standards Code, Part 6 of theCCR (also known as the California Energy Code). The Title 24 Building Energy Efficiency Standards were developed by the CEC and apply to energy consumed for heating, cooling, ventilation, water heating, and lighting in new residential and non-residential buildings. The California Energy Code is updated every three years, with the most recent iteration (2016) effective as of January 1, 2017, and the next version (2019) planned to go into effect on January 1, 2020. The CEC's long-term vision is that future updates to the California Energy Code will support zero-net energy for all new single-family and low-rise residential buildings by 2020 and new high-rise residential and non-residential buildings by 2030. Refer to **Section 3.7** for additional information on Title 24 requirements.

California Green Building Standards Code

Title 24 Building Standards Code, Part 11 of the CCR is referred to as the CALGreen Code. The purpose of the CALGreen Code is to improve public health, safety, and general welfare by enhancing the design and construction of buildings through the use of building concepts having a positive environmental impact and encouraging sustainable construction practices in the following categories: (1) planning and design; (2) energy efficiency; (3) water efficiency and conservation; (4) material conservation and resource efficiency; and (5) environmental air quality. Refer to **Section 3.**7 for additional information on Title 24 requirements.

CEQA Guidelines

Under CEQA, GHG impacts are exclusively cumulative impacts because no single project could, by itself, result in a substantial change in climate. (CEQA *Guidelines* § 15064.4(b); see BAAQMD, 2012; California Air Pollution Control Officers Association, 2008). Therefore, the evaluation of cumulative GHG impacts presented below evaluates whether the Proposed Project would make a considerable contribution to cumulative climate change effects. Additionally, BAAQMD has not established a quantitative threshold relative to construction related emissions.

City of St. Helena General Plan Update 2040

The Climate Change Element of the City of St. Helena General presents a framework to help the City respond to and plan for climate change. It aims to effectively address energy and water conservation, renewable energy production, transportation, sustainable business development, and the responsible evolution of the City to reduce climate change impacts in St. Helena. The Climate Change Element of the General Plan includes the following polices and implementation actions related to City water treatment facilities:

Policy CC6.1: Ensure that the City leads by example in managing its local government operations while implementing the following policy directions:

- Encourage the reduction of fossil fuel consumption by local government operations.
- Improve energy efficiency, implement alternative and renewable energy solutions, and reduce greenhouse gas emissions in City and county facilities and operations.
- Reducing solid waste from City and County operations and facilities.

Action CC6.E: Convert street lighting, water pumping, water treatment, and other energy-intensive operations to more efficient technologies.

In 2012, the City also adopted a GHG reduction target of 20 percent below 2005 levels by the year 2020. This target is consistent with the State's goal to reduce California emissions to 1990 levels by the year 2020.

Environmental Setting

"Global warming" and "climate change" are common terms used to describe the increase in the average temperature of the earth's near-surface air and oceans since the mid-20th century. Natural processes and human actions have been identified as impacting climate. The IPCC has concluded that variations in natural phenomena such as solar radiation and volcanoes produced most of the warming from pre-industrial times to 1950 and had a small cooling effect afterward. Since the 19th century however, increasing GHG concentrations resulting from human activity such as fossil fuel combustion, deforestation, and other activities are believed to be a major factor in climate change. GHGs in the atmosphere naturally trap heat by impeding the exit of solar radiation that has hit the earth and is reflected back into space—a phenomenon sometimes referred to as the “greenhouse effect.” Some GHGs occur naturally and are necessary to keep the earth’s surface inhabitable. However, increases in the concentrations of these gases in the atmosphere during the last 100 years have trapped solar radiation and decreased the amount that is reflected back into space, intensifying the natural greenhouse effect and resulting in the increase of global average temperature.

Carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFC), perfluorocarbons (PFC), and sulfur hexafluoride (SF_6) are the principal GHGs. When concentrations of these gases exceed historical concentrations in the atmosphere, the greenhouse effect is intensified. CO_2, CH_4, and N_2O occur naturally and are also generated through human activity. Emissions of CO_2 are largely by-products of fossil fuel combustion, whereas CH_4 results from off-gassing, natural gas leaks from pipelines and industrial processes, and incomplete combustion associated with agricultural practices, landfills, energy providers and other industrial facilities. Other human-generated GHGs include fluorinated gases such as HFCs, PFCs, and SF_6, which have much higher heat-absorption potential than CO_2, and are byproducts of certain industrial processes.

CO_2 is the reference gas for climate change, and is the GHG emitted in the highest volume. The effect that each GHG has on global warming is the product of the mass of their emissions and their global warming potential (GWP). GWP indicates how much a gas is predicted to contribute to global warming relative to how much warming would be predicted to be caused by the same mass of CO_2. For example, CH_4 and N_2O are substantially more potent GHGs than CO_2, with GWPs of approximately 30 and approximately 275 times that of CO_2, which has a GWP of 1.

In emissions inventories, GHG emissions are typically reported as MT of CO_2e. CO_2e is calculated as the product of the mass emitted by a given GHG and its specific GWP. While CH_4 and N_2O have much higher GWPs than CO_2, CO_2 is emitted in higher quantities and accounts for the majority of GHG emissions in CO_2e, both from commercial developments and human activity.

3.9.3 DISCUSSION OF IMPACTS

Given the global nature of climate change impacts, individual project impacts are most appropriately addressed in terms of the incremental contribution to global cumulative impacts. This approach is consistent with the view articulated by the IPCC *Change Fifth Assessment Report* (IPCC, 2014). Therefore, this analysis is of the cumulative impacts related to climate change.

Methodology

The Proposed Project’s short-term construction-related GHG emissions were estimated using the CalEEMod. CalEEMod is a statewide model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify GHG emissions from land use projects. The model quantifies direct GHG emissions from construction and operation (including vehicle use), as well as indirect GHG emissions, such as GHG emissions from energy use, solid waste disposal, vegetation planting and/or removal, and water use. The site-specific inputs and assumptions used for the purposes of GHG emissions modeling are listed in **Section 3.4.3**.

Operational emissions were estimated based on the anticipated increase in electricity use, using CARB's electricity emission factors from the 2018 Regulation for the Mandatory Reporting of Greenhouse Gas Emissions, as well as assumed operations of the proposed additional diesel-powered emergency generator. Emissions are expressed in annual MT of CO_2e, based on the global warming potential of the individual pollutants.

The BAAQMD has not developed quantitative GHG thresholds for project level analysis. For this analysis, predicted project-related GHG emissions were compared to the BAAQMD's operational GHG threshold of 1,100 MT of CO_2e (BAAQMD, 2017b). The quantitative thresholds developed by BAAQMD were formulated based on AB 32 and California Climate Change Scoping Plan reduction targets. Thus, a project cannot exceed a numeric BAAQMD threshold without also conflicting with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs (the state Climate Change Scoping Plan). Therefore, if a project exceeds a numeric threshold and results in a significant cumulative impact, it would also result in a significant cumulative impact with respect to plan, policy, or regulation consistency, even though the project may incorporate measures and have features that would reduce its contribution to cumulative GHG emissions.

Questions A and B

Would the project: Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment; or Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

Construction

Construction of the Proposed Project would emit GHG emissions from the combustion of diesel fuel in heavy equipment. As shown in **Table 3-8**, GHG emissions associated with construction of the Proposed Project are estimated to be approximately 203 MT of CO_2e. Construction GHG emissions are a one-time release and are typically considered separate from operational emissions, as global climate change is inherently a cumulative effect that occurs over a long period of time and is quantified on a yearly basis. As discussed earlier, BAAQMD has not established a quantitative threshold relative to construction-related emissions. Accordingly, construction emissions have been amortized over the estimated life of the Proposed Project and added to operational emissions.

TABLE 3-8. CONSTRUCTION GHG EMISSIONS

Source	GHG MT of CO_2e
2021 Construction Activities	181.40
2022 Construction Activities	21.84
Construction-Related GHG Emission	**203.24**
Amortized over Life of the Project[1]	***6.77***

[1] Life of the project is estimated to be 30 years based on air district recommendations (SCAQMD, 2008).
Source: **Appendix B**.

Operation

As discussed above, operation of the Proposed Project is not anticipated to result in an increase in additional traffic. Additionally, the Proposed Project would not increase the effective treatment capacity of the WWTRP. Therefore, the Proposed Project would not result in an increase in GHG emissions from additional traffic or increased WWTRP treatment capacity. However, the proposed MBR facilities would consume more electric power than the existing facilities. The off-site generation of electricity by electric suppliers would generate indirect GHG emissions. Additionally, the Proposed Project would generate GHG emissions from the operation and maintenance of an additional diesel-powered emergency generator to provide back-up power to the proposed facilities **Table 3-9** shows the indirect operational GHG emissions from the increase in electricity consumption under the Proposed Project and the direct GHG emissions from emergency generator operation.

TABLE 3-9. OPERATIONAL GHG EMISSIONS

Source	GHG
	MT of CO_2e
Electricity Use[1]	0.64
Emergency Generator[2]	11.46
Operational Emissions	**12.10**
Amortized Construction Emissions	**6.77**
Total GHG Emissions	**18.87**

[1] Based on default electricity emission factors from the 2018 Regulations for the Mandatory Reporting of GHG Emissions and assumed increased annual electricity use of 1.5 MWh.
[2] Based on 30 annual operating hours for maintenance and operation.
Source: **Appendix B**.

Findings

Less than Significant. As shown in **Table 3-9**, the combined amortized construction emissions and operational GHG emissions would be 18.87 MT per year for the life of the project, which is substantially less than the BAAQMD GHG threshold of 1,100 MT. Additionally, operation of the Proposed Project would be consistent with the City's General Plan Climate Change Element by supporting Policy CC6.1 to improve the energy efficiency of City wastewater treatment facilities. Therefore, because the Proposed Project would not exceed numeric GHG thresholds and is consistent with the Climate Change Element of the City's General Plan, the Proposed Project would not generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment or conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs. The Proposed Project's contribution to cumulative effects associated with climate change is considered less than significant.

Cumulative Impacts

Less than Significant. The Proposed Project would not create any significant new sources of GHG emissions; therefore, the Proposed Project would not contribute to adverse impacts associated with cumulative GHG emissions. This impact is considered less than significant.

Compliance with Federal Environmental Laws and Regulations

As discussed above, the Proposed Project's GHG emissions have been quantified consistent with CEQ guidance. Furthermore, the Proposed Project would not be adversely affected by climate change. Climate models for the region forecast mild increases in temperature and incidences of wildfire which are unlikely to adversely impact the infrastructure built as part of the Proposed Project (CEC, 2016).

3.9.4 MITIGATION MEASURES

None required.

3.10 HAZARDS AND HAZARDOUS MATERIALS

3.10.1 ENVIRONMENTAL CHECKLIST

HAZARDS AND HAZARDOUS MATERIALS	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☒	☐	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☒	☐	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code § 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?	☐	☐	☐	☒
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?	☐	☒	☐	☐

3.10.2 SETTING

Regulatory Context

Definition of Hazardous Material

A material is considered hazardous if it appears on a list of hazardous materials prepared by a federal, State, or local agency, or if it has characteristics defined as hazardous by such an agency. A hazardous material is defined in Title 22 of the CCR as:

> *A substance or combination of substances which, because of its quantity, concentration, or physical, chemical or infectious characteristics, may either (1) cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (2) pose a substantial present or potential hazard to human health or environment when improperly treated, stored, transported or disposed of or otherwise managed" (CCR, Title 22, Section 66260.10).*

U.S. Environmental Protection Agency

The USEPA administers numerous statutes pertaining to human health and the environment. The USEPA regulates toxic air contaminants through its implementation of the CAA. Although the CAA covers a range of air pollutants, Section 112(r) specifically covers "extremely hazardous materials" which include acutely toxic, extremely flammable, and highly explosive substances. Section 112(r) (referred to as the USEPA's Risk Management Plan) requires facilities involved in the use or storage of extremely hazardous materials to implement a Risk Management Plan (RMP). A RMP requires a detailed analysis of potential accident factors present at a facility and requires the implementation of mitigation measures designed to reduce the identified accident potential.

The USEPA also regulates the land disposal of hazardous materials through the Resource Conservation and Recovery Act (RCRA). Under RCRA, the USEPA regulates the activities of waste generators, transporters, and handlers (any individual who treats, stores, and/or disposes of a designated hazardous waste). RCRA further requires the tracking of hazardous waste from its generation to its final disposal through a process often referred to as the "cradle-to-grave" regulation. The "cradle-to-grave" regulation requires detailed documentation and record keeping for hazardous materials generators, transporters, and/or handlers in order to ensure proper accountability for violations.

Comprehensive Environmental Response, Compensation, and Liability Act

The Comprehensive Environmental Response, Compensation, and Liability Act provides a federal fund to clean up uncontrolled or abandoned hazardous-waste sites as well as accidents, spills, and other emergency releases of pollutants and contaminants into the environment. Through various enforcement mechanisms, the USEPA obtains private party cleanup orders and recovers costs from financially viable individuals and companies once a response action has been completed. Uncontrolled or abandoned hazardous waste site identification, monitoring, and response activities in states are coordinated though the state environmental protection or waste management agencies.

Federal Occupational Safety and Health Administration

The Occupational Safety and Health Administration (OSHA) regulates the preparation and enforcement of occupational health and safety regulations with the goal of providing employees a safe working environment. OSHA regulations apply to the work place and cover activities ranging from confined space entry to toxic chemical exposure. OSHA regulates workplace exposure to hazardous chemicals and activities through regulations governing work place procedures and equipment.

U.S. Department of Transportation

The U.S. Department of Transportation regulates the interstate transport of hazardous materials and wastes through implementation of the Hazardous Materials Transportation Act. This act specifies driver-training requirements, load labeling procedures, and container design and safety specifications. Transporters of hazardous wastes must also meet the requirements of additional statutes such as RCRA, discussed previously.

Department of Toxic Substances Control

The California Department of Toxic Substances Control (DTSC) regulates the generation, transportation, treatment, storage, and disposal of hazardous waste under the RCRA and the State Hazardous Waste Control Law. Both laws impose “cradle-to-grave” regulatory systems for handling hazardous waste in a manner that protects human health and the environment.

California Occupational Safety and Health Administration

California Occupational Safety and Health Administration (Cal/OSHA) assumes primary responsibility for developing and enforcing state workplace safety regulations. Cal/OSHA regulations concerning the use of hazardous materials in the workplace, as detailed in Title 8 of the CCR, include requirements for safety training, availability of safety equipment, accident and illness prevention programs, hazardous substance exposure warnings, and emergency action and fire prevention plan preparation.

Cal/OSHA enforces hazard communication program regulations that contain training and information requirements, including procedures for identifying and labeling hazardous substances, communicating hazard information related to hazardous substances and their handling, and preparation of health and safety plans to protect workers and employees at hazardous waste sites. The hazard communication program requires that Safety Data Sheets be available to employees and that employee information and training programs be documented.

Regional Water Quality Control Board

The SWRCB and RWQCBs also regulate hazardous substances, materials and wastes through a variety of state statutes including, for example, the Porter Cologne Water Quality Control Act, Cal. Water Code § 13000 et seq., and the underground storage tank cleanup laws (Cal. Health and Safety Code §§ 25280-25299.8). RWQCBs regulate all pollutant or nuisance discharges that may affect either surface water or groundwater. Any person proposing to discharge waste within any region must file a report of waste discharge with the appropriate regional board. The Proposed Project is located within the jurisdiction of the SFBRWQCB.

Certified Unified Program Agency

Hazardous waste management in the City of St. Helena is administered through the Napa County Division of Environmental Health, Certified Unified Program Agency (CUPA) (Napa County, 2020c). CUPA is responsible for the implementation of Unified Programs regarding the monitoring and proper disposal of hazardous waste, such as underground storage tanks, regulatory oversight of hazardous materials business plans, and the California Accidental Release Prevention Program (Napa County, 2020c). The St. Helena Fire Department oversees the acquisition, maintenance, and control of hazardous waste for all activities within the City (City of St. Helena, 2020a).

California Accidental Release Prevention Program, Risk Management Plan

Napa County has implemented a California Accidental Release Prevention (CalARP) Program in compliance with the CCR Title 19, Division 2, Chapter 4.5 (California Accidental Release Prevention), and OSHA Process Safety Management standards (Section 5189 of Title 8 of CCR, or CFR, Title 29, Section 1910.119). This program requires any business that handles more than threshold quantities of a Regulated Substance to develop a RMP. The RMP is implemented by the business to prevent or mitigate releases of regulated substances that could have off-site consequences. The City's WWTRP is required to have a CalARP RMP, as sodium hypochlorite (chlorine) is currently stored at the WWTRP and used in quantities above the CalARP (100 pound), Cal/OSHA (1,500 pound), or USEPA (2,500 pound) thresholds.

Environmental Setting

Existing WWTF Hazardous Materials Storage and Toxicity

Operation of the existing WWTRP involves the delivery, use, and storage of hazardous materials. The WWTRP currently stores sodium hypochlorite, also known as chlorine (Chemical Abstract Registry Service [CAS] No. 68476-34-6) and diesel fuel (CAS No. 68476-34-6) in maximum daily average quantities of 5000 gallons and 550 gallons, respectively. Sodium hypochlorite is used in the disinfection process but can be dangerous when exposed to eyes, skin, or the respiratory system (Fisher Scientific, 2020). Diesel fuel is stored on-site for refueling of vehicles as necessary. Diesel fuel is flammable and could pose a potential fire risk and is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200) (Fisher Scientific, 2020). The WWTRP also stores ascorbic acid (vitamin C) and sodium bisulfite, which are used in the dichlorination process. However, these chemicals are not considered Regulated Substances per Title 19 of the CCR.

Sensitive Receptors

Sensitive receptors are primarily those that have the potential to come in contact with hazardous material in its concentrated form. Therefore, WWTRP employees that are on-site are considered the primary sensitive receptors. In addition, the surrounding land uses and occupants are identified as potential sensitive receptors. The nearest sensitive receptors to the Project site are a residence located approximately 160 feet from the WWTRP western parcel boundary, the River Ranch Farm Workers Housing located approximately 500 feet east from the WWTRP eastern parcel boundary on the opposite side of the Napa River, a residence approximately 0.2 miles south of the Project site, a building approximately 630 feet west of the Project site, and a residence along the Napa River approximately 750 feet from the southeast corner of the Project site.

Study Area and Adjacent Property Database Reports

Database searches were conducted for records of known storage tank sites and known sites of hazardous materials generation, storage, and/or contamination within the vicinity of the Project site. The following database resources were reviewed:

- List of Hazardous Waste and Substances sites from the DTSC EnviroStor database (DTSC, 2020);
- Map of Leaking Underground Storage Tank (LUST) Sites locations by County and Fiscal Year from the SWRCB GeoTracker database (SWRCB, 2020a);
- List of solid waste disposal sites identified by the SWRCB with waste constituents above hazardous waste levels outside the waste management unit (SWRCB, 2020b);
- List of "active" CDOs and Cleanup and Abatement Orders from the SWRCB (CalEPA, 2020a); and
- List of hazardous waste facilities subject to corrective action pursuant to Section 25187.5 of the Health and Safety Code, identified by the DTSC (CalEPA, 2020b).

A discussion of any pertinent findings from the abovementioned databases is provided in **Section 3.10.3** below.

3.10.3 DISCUSSION OF IMPACTS

Questions A and B

Would the project: Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials; Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

Construction

Less than Significant with Mitigation. During grading and construction activities, it is anticipated that limited quantities of miscellaneous hazardous substances, such as gasoline, diesel fuel, hydraulic fluid, solvents, oils, paints, etc. would temporarily be brought onto the Project site. As with any liquid and solid, the handling and transfer between one container to another has the potential for an accidental release. This is a potentially significant impact. **Mitigation Measure HYD-1** would require the City obtain coverage under the current NPDES Construction General Permit for construction activities and implement the listed BMPs during construction, which addresses potential leaks and spills from vehicles and construction equipment. Furthermore, **Mitigation Measures HAZ-1** through **HAZ-4,** which address hazardous materials transport, accidental spill prevention, and proper construction staging, would mitigate potential impacts from accidental release of hazardous materials during construction of the Proposed Project. With implementation of **Mitigation Measure HYD-1** and **Mitigation Measures HAZ-1** through **HAZ-4** and adherence to regulatory requirements, potential impacts associated with hazardous materials during construction activities would be less than significant.

Operation

Less than Significant. With implementation of the Proposed Project, sodium hypochlorite and diesel fuel would continue to be stored on site. No new hazardous materials would be used as part of the Proposed Project. All chemicals would be transported, stored and used according to regulatory requirements and existing procedures for the handling of hazardous materials at the WWTRP. Further, all training, safety, and emergency response previsions would remain in effect and apply to the Proposed Project. The WWTRP maintains a CalARP RMP for the accidental release of hazardous materials used and stored at the WWTRP. With adherence to regulatory hazardous waste requirements and the CalARP RMP, neither WWTRP employees, the general public, nor surrounding off-site environment are anticipated to encounter a serious risk through project implementation during operations of the Proposed Project. Operational impacts would be less than significant.

Question C

Would the project: Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

No Impact. No schools are located within one-quarter mile of the WWTRP. The nearest schools, St. Helena Montessori School, The Young School Independent Montessori and Mila's Preschool Childcare Center Inc., and the St. Helena High School, are located approximately 0.84, 1.20, and 1.20 miles east of the WWTRP, respectively. No impact would occur.

Question D

Would the project: Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code § 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

No Impact. The Hazardous Waste and Substances Sites (Cortese) List is a planning tool used by the State, local agencies, and developers to comply with CEQA requirements in providing information about the location of hazardous materials release sites. The Cortese list is prepared in accordance with California Government Code Section 65962.5. The List of Hazardous Waste and Substances sites from DTSC EnviroStor and the SWRCB GeoTracker databases were reviewed to locate "Cortese List" sites. These databases indicated one site in the vicinity of the WWTRP Project site (DTSC, 2020). This site, identified on the DTSC EnviroStor database, is located approximately 1.43 miles west of the WWTRP at 1141 Main Street and identified as the Klass Cleaners, a dry-cleaning facility (DTSC, 2020). No LUST Sites were determined to be within 1,000 feet of the WWTRP (SWRCB, 2020a).

The Proposed Project is not located on a site included on a hazardous materials list and therefore, would not create a significant hazard to the public or the environment. No Impact would occur.

Question E

For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?

No Impact. The Project site is not located within an airport land use plan. No public airports are located within two miles of the WWTRP. The nearest airport is the Angwin-Parrett Field located over 4.82 miles north of the WWTRP. Neither temporary construction activities nor operations of the Proposed Project would affect the safe operations of any local airport. The Proposed Project would not result in a safety hazard or excessive noise for people residing or working in the vicinity of a private airstrip. No impact would occur.

Question F

Would the project: Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

No Impact. Construction of the Proposed Project would occur within the existing WWTRP boundaries and would not result in lane closures and thus would not affect emergency access or evacuation. Therefore, the Proposed Project would not interfere with an adopted emergency response plan or emergency evacuation plan in place through the State, County, or City. Operation of the Proposed Project would not interfere with emergency response or evacuation routes in the project vicinity, as no road construction is proposed and no additional personnel would need to access the Project site. No impact would occur.

Question G

Would the project: Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?

Less than Significant with Mitigation. As explained in **Section 3.21**, the Proposed Project is not located in a fire hazard severity zone and does not involve unique slopes or other factors that would exacerbate wildfire risks. The risk of igniting a wildfire during construction is not likely, as construction would occur in a currently developed area surrounded by the Napa River and irrigated vineyard. However, construction-related activities associated with the Proposed Project could involve the use of spark-producing construction equipment, which could temporarily increase the risk of igniting a fire on the Project site. This is a potentially significant impact. To reduce the risk of wildland fires, **Mitigation Measure HAZ 4** would be required to mitigate the potential to ignite fires during construction, such as requiring construction equipment to be equipped with a spark arrestor in good working order. The amount of diesel fuel stored on site would not increase as part of the Proposed Project and would be transported, stored, and used according to regulatory requirements and existing procedures for the handling of hazardous materials at the WWTRP. Therefore, with implementation of **Mitigation Measure HAZ 4**, the Proposed Project would not expose people or structures to a significant risk of loss, injury, or death involving wildland fires, and impacts would be less than significant.

Cumulative Impacts

Less than Significant with Mitigation. Hazard-Related impacts are site specific (i.e., have the potential to affect only a limited area). Various existing and proposed development infrastructure, including residential, industrial, and public facilities in the vicinity of the WWTRP would all involve the storage, use, disposal, and transport of hazardous materials to varying degrees during construction and operations. Hazardous materials utilized during construction and operations of the WWTRP would be limited to the existing Project site. The transport of hazardous chemicals to the WWTRP would be regulated in a similar fashion to other cumulative projects that require the transport of hazardous chemicals for site-specific operations.

Construction of the Proposed Project could potentially have adverse impacts associated with hazards and hazardous materials. **Mitigation Measures HAZ-1** through **HAZ-4,** which address hazardous materials transport, accidental spill prevention, construction staging, and fire ignition, would mitigate potential impacts from accidental release of hazardous materials and the potential to ignite a wildfire during construction of the Proposed Project to a less-than-significant level. Reduction of on-site hazardous related impacts, as discussed above, would ensure that construction activities would not result in impacts that would be cumulatively considerable.

Operation of the Proposed Project and cumulative projects could result in a cumulative impact if these projects were to result in potential exposure of hazardous materials to sensitive individuals or the general public-at-large, or if additional projects in the vicinity were to include the use or storage of hazardous materials. The WWTRP would comply with the existing WWTRP RMP as discussed above. Because hazardous materials use would be properly contained on-site, operation of the Proposed Project would not contribute to cumulatively considerable hazardous impacts.

3.10.4 MITIGATION MEASURES

HAZ-1

The City shall ensure through the enforcement of contractual obligations that all contractors transport, store, and handle construction-required hazardous materials in a manner consistent with relevant regulations and guidelines, which may include, but is not limited to, transporting and storing materials in appropriate and approved containers, maintaining required clearances, and handling materials using approved protocols.

HAZ-2

An accidental spill prevention and response plan shall be developed which will include a list of all hazardous materials used and/or stored on the Project site during construction activities; appropriate information about initial spill response, containment, and cleanup strategies; and a list of appropriate City contact information. The spill prevention and response plan shall be included as a component of the SWPPP described in **Mitigation Measure HYD-1**. The plan shall require containment equipment and sufficient supplies to combat spills of oil or hazardous substances shall be on site at all times during construction.

HAZ-3

Construction staging shall be established a minimum distance of 100 feet away from the Napa River. The storage of construction materials, including oils and hazardous substances will be at a distance of 100 feet from all drainage courses to prevent spills from reaching the aquatic environment. No vehicle maintenance shall occur on-site during construction.

HAZ-4

During construction, staging areas, welding areas, or areas slated for development using spark-producing equipment shall be cleared of dried vegetation or other materials that could serve as fire fuel. To the extent feasible, the contractor shall keep these areas clear of combustible materials in order to maintain a fire break. Any construction equipment that normally includes a spark arrester shall be equipped with an arrester in good working order. This includes, but is not limited to, vehicles, heavy equipment, and chainsaws.

3.11 HYDROLOGY/WATER QUALITY

3.11.1 ENVIRONMENTAL CHECKLIST

HYDROLOGY/WATER QUALITY	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
Would the project:				
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?	☐	☒	☐	☐
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	☐	☐	☒	☐
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would: i) result in a substantial erosion or siltation on- or off-site; ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite; iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or iv) impede or redirect flood flows?	☐	☒	☐	☐
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	☐	☐	☒	☐
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☐	☐	☒	☐

3.11.2 SETTING

Regulatory Context

Clean Water Act

The CWA (33 USC §§ 1251-1376), as amended by the Water Quality Act of 1987, is the major federal legislation governing water quality. The objective of the CWA is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." Important sections of the Act are as follows:

- Sections 303 and 304 provide for water quality standards, criteria, and guidelines. Under Section 303(d) of the CWA, the USEPA publishes a list every two years of impaired bodies of water for which water quality objectives are not attained. Total Maximum Daily Loads (TMDL) are established for contaminants of concern in order to ensure contamination levels decrease over time.
- Section 401 (Water Quality Certification) requires an applicant for any federal permit that proposes an activity, which may result in a discharge to waters of the United States to obtain certification from the state that the discharge will comply with other provisions of the Act.
- Section 402 establishes the NPDES, a permitting system for the discharge of any pollutant (except for dredged or fill material) into waters of the United States. This permit program is administered by the SWRCB and is discussed in detail below.
- Section 404 establishes a permit program for the discharge of dredged or fill material into waters of the United States. This permit program is jointly administered by USACE and the USEPA.

Federal Anti-Degradation Policy

The federal Anti-Degradation Policy is part of the CWA (Section 303(d)) and is designed to protect water quality and water resources. The policy directs states to adopt a statewide policy that includes the following primary provisions: (1) existing instream uses and the water quality necessary to protect those uses shall be maintained and protected; (2) where existing water quality is better than necessary to support fishing and swimming conditions, that quality shall be maintained and protected unless the state finds that allowing lower water quality is necessary for important local economic or social development; and (3) where high-quality waters constitute an outstanding national resource, such as waters of national and state parks, wildlife refuges, and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected.

Safe Drinking Water Act

Under the Safe Drinking Water Act (SDWA) (Public Law 93-523), passed in 1974, USEPA regulates contaminants of concern to domestic water supply. Contaminants of concern relevant to domestic water supply are defined as those that pose a public health threat or that alter the aesthetic acceptability of the water. These types of contaminants are regulated by USEPA primary and secondary Maximum Contaminant Levels (MCL). MCLs and the process for setting these standards are reviewed triennially. Amendments to the SDWA enacted in 1986 established an accelerated schedule for setting drinking water MCLs.

National Pollution Discharge Elimination System

Under Section 402(p) of the CWA, the USEPA established the NPDES to enforce discharge standards from a variety of sources. Both point source and non-point-source pollution is covered under the NPDES. Dischargers in both categories can apply for individual discharge permits, or apply for coverage under the General Permits that cover certain qualified dischargers. Point source discharges come from "any discernible, confined, and discrete conveyance," including municipal and industrial wastewater, stormwater runoff, combined sewer overflows, sanitary sewer overflows, and municipal separated storm sewer systems. NPDES permits impose limits on the pollutants discharged based on minimum performance standards or the quality of the receiving water, whichever type is more stringent in a given situation.

NPDES Permit – Disposal of Treated Effluent

The WWTRP's wastewater discharge is permitted through the SFBRWQCB. The City has a Water Reclamation Requirements Order No. 87-090 to regulate effluent discharge to land, and a recently updated NPDES Permit Order No. R2-2016-0003 to regulate discharge to the Napa River. The 2016 NPDES permit contains more stringent effluent limits for BOD and TSS, which the WWTRP anticipates that it would have difficulty meeting based on historical testing. As a result, the SFBRWQCB issued CDO No. R2-2016-0004 to the City, which mandated the WWTRP to comply with the specified discharge requirements, and to perform a feasibility study to evaluate and/or identify modifications to the WWTRP that would meet the new effluent limits.

NPDES Permit – Stormwater Drainage

Stormwater drainage at the WWTRP is regulated under NPDES General Permit No. CAS000001, titled *Statewide General Permit for Storm Water Discharges Associated with Industrial Activities.* The General Permit effectively prohibits the discharge of materials other than stormwater that are not authorized.

NPDES Permit – Construction Activity

The City must comply with the requirements of the most recent version of the NPDES Construction General Permit (currently the 2017 Construction General Permit). This permit regulates discharges from construction sites that disturb one acre or more of total land area. By law, all storm water discharges associated with construction activity where clearing, grading, and excavation results in soil disturbance must comply with the provisions of this NPDES permit. The permitting process requires the development and implementation of an effective SWPPP. The project applicant must submit a Notice of Intent to the SWRCB to be covered by a NPDES permit and prepare the SWPPP prior to the beginning of construction. The SWPPP must include BMPs to reduce pollutants and any more stringent controls necessary to meet state and local water quality standards.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (California Water Code Section 13000 et seq.) provides the basis for water quality regulation within California. The Act requires a "Report of Waste Discharge" for any discharge of waste (liquid, solid, or otherwise) to land or surface waters that may impair a beneficial use of surface or groundwater of the State. The RWQCB implements waste discharge requirements identified in the Report.

State Non-Degradation Policy

In 1968, as required under the federal Anti-Degradation Policy described previously, the SWRCB adopted a Non-Degradation Policy aimed at maintaining high quality for waters in California. The Non-degradation Policy states that the disposal of wastes into state waters shall be regulated to achieve the highest water quality consistent with maximum benefit to the people of the state and to promote the peace, health, safety, and welfare of the people of the state. The policy provides as follows:

1. Where the existing quality of water is better than required under existing water quality control plans, such quality would be maintained until it has been demonstrated that any change would be consistent with maximum benefit to the people of the state and would not unreasonably affect present and anticipated beneficial uses of such water.
2. Any activity which produces waste or increases the volume or concentration of waste and which discharges to existing high-quality waters would be required to meet WDRs that would ensure (1) pollution or nuisance would not occur and (2) the highest water quality consistent with the maximum benefit to the people of the state would be maintained.

Napa County General Plan

The Napa County General Plan includes a Water Resources Element, which addresses water resources by providing background information, goals, policies, and action items related to water quality, quantity, and conservation by highlighting the importance of water supply planning and monitoring and the importance of protecting natural systems that provide water for consumptive uses, including groundwater supplies.

California Code of Regulations - Title 22, Division 4, Chapter 3 – Water Recycling Criteria

This section of the CCR, commonly referred to as Title 22, establishes the recycled water quality criteria, acceptable uses of recycled water, wastewater treatment requirements for each use, use area requirements, engineering report requirements, reporting and record keeping requirements, and design requirements for operational reliability of treatment.

The regulations establish acceptable levels of constituents in recycled water for a range of uses and prescribe means for assurance of reliability in the production of recycled water. Criteria for the production of recycled water include water quality standards, treatment process requirements, operational requirements, and treatment reliability requirements. The intent of the regulations is to ensure the protection of public health associated with the use of recycled water. Title 22 recycled water regulations for a specific reuse category are based on the expected degree of contact with the recycled water.

City of St. Helena Municipal Code

Title 13 of the City's municipal code includes several chapters related to hydrology and water quality. These chapters provide ordinances pertaining to water service systems, water management, water use efficiency and new development, wells, sewer service systems, wastewater discharge, stormwater and runoff pollution control, and more.

Regional Hydrology

Napa River

The Project site is bordered by the Napa River, which runs east of the property. The Napa River runs through the Napa River Watershed and drains into many tributaries along a 55-mile segment from the headwaters of St. Helena and ultimately drains into the San Pablo Bay to the south (Napa Resources Conservation District, 2020). The Napa River lies within USGS hydrologic unit code (HUC) 18050002 (USGS, 2020c). Average annual rainfall for the City is approximately 37 inches, the majority of which occurs between December and March (U.S. Climate Data, 2019).

The Napa River is a gauged, perennial river. The majority of peak flows generally occur during the winter and spring months following significant rain or snow. Background flow data collected by the USGS indicates that average flow of the Napa River is approximately 2.2 cubic feet per second, or approximately 1.4 million gallons per day (USGS, 2020d).

Water Quality

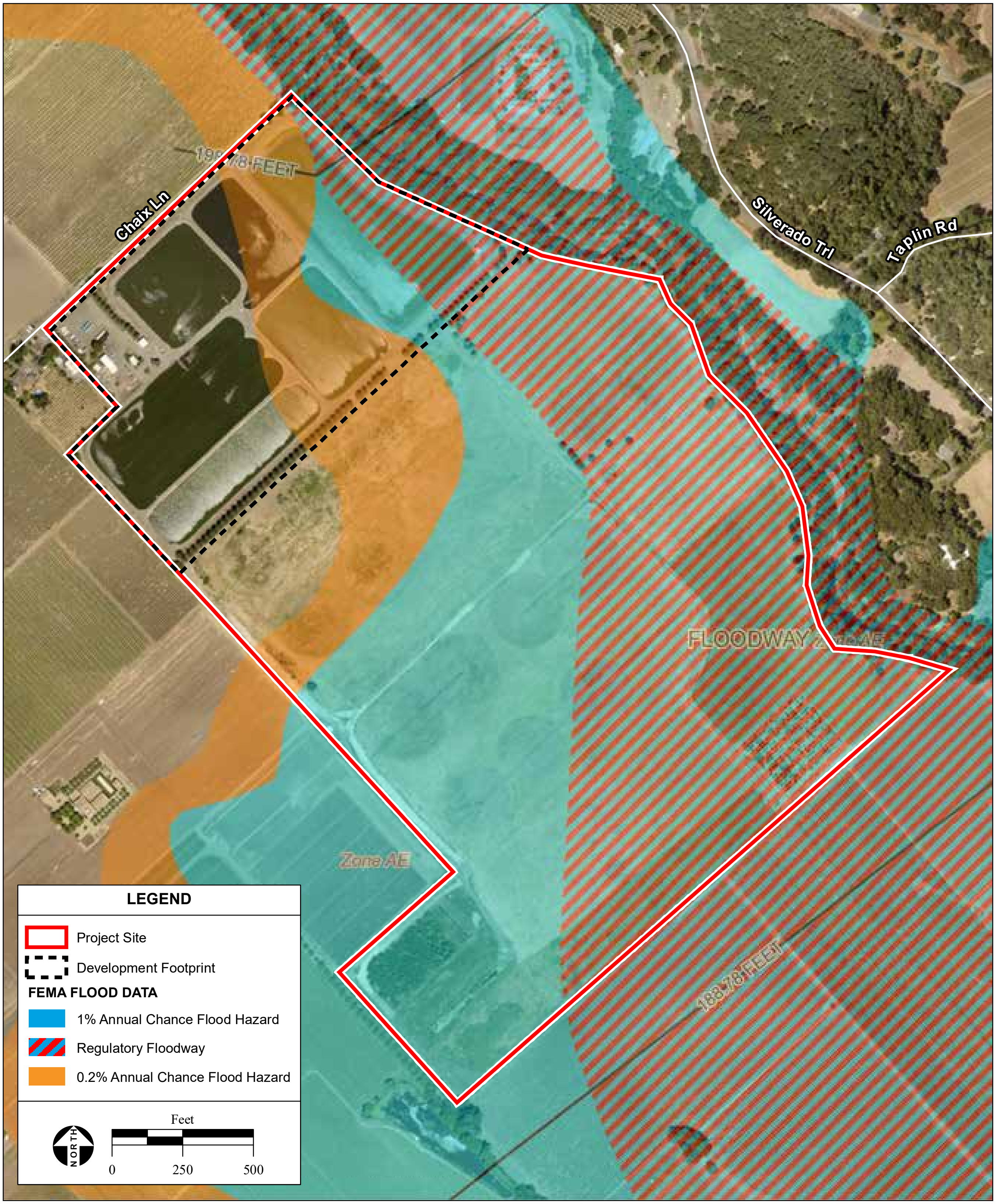
The Napa River is listed on the CWA Section 303(d) list of impaired waterbodies for nutrients, pathogens, and sedimentation/siltation (SWRCB, 2014). The listing for sediment in the Napa River originated from fine sediment impacts to spawning and rearing habitat as noted in the TMDL. The TMDL provides actions to reduce fine sediment input to the non-tidal portions of the main stems and all freshwater tributaries.

Floodplain

FEMA oversees the delineation of flood zones and the provision of federal disaster assistance. FEMA manages the National Flood Insurance Program and publishes the Flood Insurance Rate Maps (FIRM), that show the expected frequency and severity of flooding by area, typically for the existing land use and type of drainage/flood control facilities present. The Project site is located on FIRM 06055C0264E, FIRM 06055C0377E, FIRM 06055C0270E, and FIRM 06055C0385E. Eastern portions of the Project site along the Napa River are within a FEMA-defined Regulatory Floodway, classified as Zone AE. A “Regulatory Floodway” is defined by FEMA as the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height. Communities must regulate development in these floodways to ensure that there are no increases in upstream flood elevations (FEMA, 2019). A portion of the Project site (mainly the irrigation spray field, which would have no development) is within a 1 Percent Annual Chance Flood Hazard Zone (100-year floodplain). Additionally, a small portion of the existing WWTRP ponds and a section of the irrigation spray field is within a 0.2 Percent Annual Chance Flood Hazard Zone (500-year floodplain). However, the gravel area where the MBR system and the majority of the upgrades would be located is outside the 100- and 500-year floodplain, in an area of minimal flood hazard (Zone X) (CalOES, 2015; FEMA, 2020). FEMA flood zones are depicted on **Figure 3-6**.

Groundwater

The City is located in the Napa Valley Subbasin in the Napa-Sonoma Valley Groundwater Basin. The Napa-Sonoma Valley Groundwater Basin is designated as a high priority basin under the Sustainable Groundwater Management Act (SGMA). Under SGMA, high and medium priority basins should reach sustainability within 20 years of implementing their sustainability plans. Napa County does not currently



SOURCE: FEMA FIRM effective, 9/26/2008; Napa County aerial photograph, 6/19/2018; AES, 8/24/2020

Figure 3-6
FEMA Flood Zones

have a Groundwater Sustainability Plan (GSP), but development of a GSP is in progress and a finalized GSP will be submitted by January 31, 2022 (Napa County, 2020e).

3.11.3 DISCUSSION OF IMPACTS

Question A

Would the project: Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?

Less than Significant with Mitigation. Construction of the Proposed Project could potentially violate water quality standards or waste discharge requirements, as construction equipment and materials have the potential to leak, thereby discharging pollutants into stormwater or groundwater. Construction site pollutants include particulate matter, sediment, oils and greases, concrete, and adhesives. Discharge of these pollutants could result in contamination of area drainages and the Napa River, causing an exceedance of water quality objectives. This is a potentially significant impact. **Mitigation Measure HYD-1** would require the City obtain coverage under the current NPDES Construction General Permit for construction activities and implement the listed BMPs during construction to prevent impacts to water quality.

As discussed in **Section 2.3.2**, the Proposed Project has been designed to increase the quality of treated effluent discharged to the Napa River to meet the waste discharge requirements set forth in the 2016 Permit. These requirements were established to attain and maintain applicable water quality criteria to protect the designated beneficial uses of receiving waters, which includes the Napa River. Implementation of the Proposed Project would improve water quality and would result in compliance with WDRs that are protective of such beneficial uses. Therefore, operation of the Proposed Project would not have a significant impact on the water quality of the Napa River.

With implementation of **Mitigation Measure HYD-1**, the Proposed Project would comply with the California General NPDES Permit for construction activities and impacts related to water quality standards would be reduced to less-than-significant levels. Furthermore, implementation of the Proposed Project would improve the quality of wastewater discharged at the WWTRP.

Question B

Would the project: Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

Less than Significant. All water uses within the WWTRP are non-potable and pumped from an on-site well. As discussed in **Section 2.4.2**, treated water stored in the clearwell of the MBR system would be used as process water at the WWTRP for cleaning and other minor uses associated with WWTRP operations. Therefore, the MBR system would not require an additional water supply and may reduce overall groundwater consumption at the WWTRP.

The Proposed Project would replace approximately 63,000 square feet of existing gravel with asphalt pavement, thereby increasing the impervious surfaces on the Project site and potentially impeding groundwater recharge. However, as described in **Section 3.8**, the soils on the Project site are well-drained; the WWTRP is surrounded by agricultural fields which could absorb additional runoff and allow groundwater recharge. Therefore, impacts to groundwater resources would be less than significant.

Question C

Would the project: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would: i) result in a substantial erosion or siltation on- or off-site; ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite; iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or iv) impede or redirect flood flows?

Less than Significant with Mitigation. Grading, cut and fill activities, and earth-moving activities associated with construction of the Proposed Project have the potential to result in erosion, siltation, temporary changes to drainage patterns, and contamination of stormwater. This is a potentially significant impact. Water quality decreases with increased turbidity and TSS that result from erosion and siltation of stockpiled soil or open excavations, influencing downstream ecology. However, **Mitigation Measure HYD-1** would ensure compliance with the CWA by requiring the City to obtain coverage under the current NPDES Construction General Permit for construction activities and implement the listed BMPs during construction to prevent impacts resulting from erosion. Implementation of BMPs such as the use of fiber rolls, hay bales, and silt fencing, would reduce the potential for sediment and stormwater runoff containing pollutants from entering receiving waters. The Construction General Permit also includes post-construction performance standards, requiring all construction sites match pre-project hydrology to ensure that the physical and biological integrity of aquatic ecosystems are sustained.

The MBR system and associated upgrades would be constructed and located on a currently developed and relatively flat area of the WWTRP. The Proposed Project would not substantially alter the existing topography and drainage patterns would not be permanently altered. The Proposed Project would replace approximately 63,000 square feet of existing gravel with asphalt pavement, thereby increasing the impervious surfaces on the Project site and potentially increasing surface runoff. However, any increased runoff would be minimal and would not result in flooding on or off site and would not exceed the capacity of existing stormwater drainage systems. Furthermore, WWTRP upgrades would occur primarily in the laydown storage yard, which is located in an area of minimal flood hazard (FEMA-classified Zone X) and would not place structures within a floodplain such that flood flows would be impeded or redirected.

With implementation of **Mitigation Measure HYD-1**, the Proposed Project would comply with the California General NPDES Permit for construction activities and impacts related to alterations in drainage patterns and impervious surfaces would be reduced to less-than-significant levels.

Question D

Would the project: In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?

Less than Significant. As previously mentioned, a portion of the Project site (mainly the irrigation spray fields, which would have no development) is within a 1 Percent Annual Chance Flood Hazard Zone and a small portion of the existing WWTRP ponds and a section of the irrigation spray field is within a 0.2 Percent Annual Chance Flood Hazard Zone. However, the gravel area where the MBR system and the majority of the upgrades would be located is classified by FEMA as an area of minimal flood hazard (Zone X). The MBR treatment system and associated upgrades would be constructed and located on currently developed areas of the WWTRP in an area of minimal flood hazard. The WWTRP would not be expanded further into any flood hazard zone. The Project site is not located in a tsunami emergency response planning zone or a seiche zone (CalOES, 2015). In addition, the Proposed Project does not involve building any levees or dams and would not expose people or structures to a significant risk of loss, injury, or death involving flooding due to dam or levee failure. Therefore, the Proposed Project would not result in flooding on- or off-site and impacts would be less than significant.

Question E

Would the project: Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

Less than Significant*.* As previously discussed, construction of the Proposed Project would not substantially alter the drainage pattern of the Project site, create or contribute runoff water that would exceed the capacity of stormwater drainage systems, or impact groundwater recharge. As previously discussed, the MBR system would not require an additional water supply and may reduce overall groundwater consumption at the WWTRP. The Proposed Project has been designed to increase the quality of treated effluent discharged to the Napa River to meet the more stringent waste discharge requirements set forth in the 2016 Permit. Implementation of the Proposed Project would improve water quality and would result in compliance with WDRs. Therefore, the Proposed Project would not result in significant impacts to a water quality control plan or sustainable groundwater management plan. Impacts would be less than significant.

Cumulative Impacts

Less than Significant with Mitigation. The Proposed Project and potential cumulative projects in the vicinity of the Project site would be required to comply with the NPDES Construction General Permit, which is intended to reduce the potential for cumulative impacts to water quality during construction (refer to **Mitigation Measure HYD-1)**. Therefore, impacts on cumulative construction-related water quality effects would be less than significant after compliance with the NPDES Construction General Permit.

Additionally, the Proposed Project would improve the water quality of the treated effluent discharged to the Napa River and would not require additional water supplies. When considered with other potential development in the area, the Proposed Project would not result in adverse cumulative impacts due to surface water quality, or to groundwater supplies and quality. Each of the cumulative development projects and the Proposed Project would be subject to local, State, and federal regulations designed to minimize cumulative impacts. Mitigation measures for the Proposed Project in combination with compliance with City, State, and federal regulations, are expected to reduce cumulatively considerable impacts to a less-than-significant level.

Compliance with Federal Environmental Laws and Regulations

As discussed above, preventative measures shall be taken to avoid surface water contamination (see **Mitigation Measures HYD-1**, **BIO-1**, and **HAZ-1** through **HAZ-3**) and there are no federally protected wetlands or Waters of the U.S. located within the Project site. Therefore, permitting in accordance with the CWA is not necessary. Additionally, no nearby rivers are classified as wild and scenic (National Wild and Scenic Rivers System, 2020). Construction and operation of the Proposed Project would take place within existing developed and disturbed areas and could result in only slight changes to the volume and rate of runoff; therefore, the Proposed Project would not impact groundwater recharge or storm water conveyance and detention. As discussed above, a portion of the Project site is within a 1 Percent Annual Chance Flood Hazard Zone and a small portion of the existing WWTRP ponds and a section of the irrigation spray field is within a 0.2 Percent Annual Chance Flood Hazard Zone. Federal EO 11988 outlines an eight-step decision-making process for floodplain impacts, which includes searching for practical alternatives to avoid development within a floodplain. There is no practical way to upgrade the WWTRP and install a MBR treatment system through an off-site alternative, as the system needs to utilize and connect to the existing pond system. Furthermore, the proposed MBR system and the bulk of construction would occur in an area classified by FEMA as an area of minimal flood hazard (Zone X), with only necessary upgrades to existing facilities being located within the 1 percent and 0.2 percent annual change flood hazard zones. The Proposed Project would comply with all federal regulations relating to hydrology and water quality.

3.11.4 MITIGATION MEASURES

HYD-1

The City shall obtain coverage for project related construction activities under the SWRCB NPDES Construction General Permit. The SWRCB requires that all construction sites have adequate control measures to reduce the discharge of sediment and other pollutants to streams to ensure compliance with Section 303 of the CWA. To comply with the NPDES permit, the City will file a Notice of Intent with the SWRCB and prepare a SWPPP prior to construction, which shall include a detailed, site-specific listing of the potential sources of stormwater pollution; pollution prevention measures (erosion and sediment control measures and measures to control non-stormwater discharges and hazardous spills) including a description of the type and location of erosion and sediment control BMPs to be implemented at the Project site; and a BMP monitoring and maintenance schedule to determine the amount of pollutants leaving the Project site. A copy of the SWPPP must be current and remain on the Project site. Control measures are required prior to and throughout the rainy season. Water quality BMPs identified in the SWPPP could include, but are not limited to, the following:

- Areas where ground disturbance would occur shall be identified in advance of construction and limited to only approved areas.
- All vehicular construction traffic shall be confined to the designated access routes and staging areas.
- All equipment maintenance and cleaning shall be confined to staging areas. Staging areas utilized for equipment maintenance and cleaning shall be located a minimum of 100 feet from streams and waterways, including the Napa River. No vehicle maintenance shall occur on-site during construction.

- All supervisory construction personnel shall be informed of environmental concerns, permit conditions, and final project specifications. Said Personnel will be responsible for instructing all on-site work to meet the requirements of the SWPPP including making sure all work is conducted outside of protected trees' drip lines to the extent possible.
- Restore disturbed areas to pre-construction contours to the fullest extent possible.
- Hay/straw bales and silt fences would be used to control erosion during stormwater runoff events.
- Salvage, store, and use the highest quality soil for native re-vegetation/seeding.
- Leave drainage gaps in topsoil and spoil piles to accommodate/reduce surface water runoff.
- Sediment control measures shall be in place prior to the onset of the rainy season and will be maintained until disturbed areas have been re-vegetated. Erosion control structures must be in place and operational at the end of each day if work activities are to occur during the rainy season.
- Fiber rolls shall be placed along the perimeter of disturbed areas to ensure sediment and other potential contaminants of concern are not transported off-site or to open trenches. Locations of fiber rolls will be field adjusted as needed and according to the advice of the certified SWPPP inspector.
- Vehicles and equipment stored in the construction staging area shall be inspected regularly for signs of leakage. Leak-prone equipment will be staged over an impervious surface or other suitable means will be provided to ensure containment of any leaks. Vehicle/equipment wash waters or solvents will not be discharged to surface waters or drainage areas.
- During the rainy season (dates to be specified in the SWPPP), soil stockpiles and material stockpiles will be covered and protected from the wind and precipitation. Plastic sheeting will be used to cover the stockpiles and straw wattles will be placed at the base for perimeter control.
- All contractors shall immediately control the source of any leak and immediately contain any spill utilizing appropriate spill containment and countermeasures. All leaks and spills shall be reported to the designated representative of the lead contractor and shall be evaluated to determine if the spill or leak meets mandatory SWPPP reporting requirements. Contaminated media shall be collected and disposed of at an off-site facility approved to accept such media.

3.12 LAND USE/PLANNING

3.12.1 ENVIRONMENTAL CHECKLIST

LAND USE/PLANNING	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
Would the project:				
a) Physically divide an established community?	☐	☐	☐	☒
b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☒	☐

3.12.2 SETTING

Regulatory Context

City of St. Helena General Plan Update 2040

Applicable City General Plan goals, policies, and objectives include:

Land Use and Growth Management

LU5.1 Discourage conversion of existing farmland to non-agricultural uses.

Public Facilities and Services

PF1.S Provide for capital needs of water and wastewater systems.

PF2.B Continue wastewater treatment system upgrades to reduce the number and scale of implementation constraints on the recycled water program. This can ensure that the system is ready for investment when funding for implementation becomes available.

City of St. Helena Municipal Code

Applicable City zoning ordinances include:

Chapter 17.68 Public and Quasi-Public (PQP) District: conditional uses within the PQP district include uses, building, structures, facilities and activities owned, leased or operated by public and/or quasi-public entities. Because of the wide variety of possible public and quasi-public uses and legal relationships involved it is not possible to fully implement the traditional list of uses with fixed development standards. As a result, all public and quasi-public uses in the PQP district shall require a use permit, public hearing and review. Requirements for landscaping and screening are also incorporated into the PQP district.

Napa County Code of Ordinances

County zoning ordinances that are applicable to parcels surrounding the Project site include:

Chapter 18.16 Agricultural Preserve (AP) District: the AP district classification is intended to be applied in the fertile valley and foothill areas of Napa County in which agriculture is and should continue to be the predominant land use, where uses incompatible to agriculture should be precluded and where the development of urban-type uses would be detrimental to the continuance of agriculture and the maintenance of open space which are economic and aesthetic attributes and assets of the county.

Chapter 18.20 Agricultural Watershed (AW) District: the AW district classification is intended to be applied in those areas of the county where the predominant use is agriculturally oriented, where watershed areas, reservoirs and floodplain tributaries are located, where development would adversely impact on all such uses, and where the protection of agriculture, watersheds and floodplain tributaries from fire, pollution and erosion is essential to the general health, safety and welfare.

Napa County General Plan (2018)

County goals, policies, and objectives would be relevant when analyzing cumulative impacts of the Proposed Project, as the Proposed Project may cause cumulative impacts beyond City limits. The Agricultural Preservation and Land Use Element of the Napa County General Plan (2013) contains several goals and policies pertaining to agricultural resources in the County. Agricultural resources are discussed below in the context of the zoning for the irrigation spray fields. County General Plan goals, policies, and objectives relevant to the cumulative setting include:

Goal AG/LU-1 Preserve existing agricultural land uses and plan for agriculture and related activities as the primary land uses in Napa County.

Goal AG/LU-5 With municipalities, other governmental units, and the private sector, plan for commercial, industrial, residential, recreational, and public land uses in locations that are compatible with adjacent uses and agriculture.

Policy AG/LU-3 The County's planning concepts and zoning standards shall be designed to minimize conflicts arising from encroachment of urban uses into agricultural areas. Land in proximity to existing urbanized areas currently in mixed agricultural and rural residential uses will be treated as buffer areas and further parcelization of these areas will be discouraged.

Policy AG/LU- No new non-agricultural use or development of a parcel located in an agricultural area shall be permitted unless it is needed for the agricultural use of the parcel, except as provided in Policies AG/LU-2, AG/LU-5, AG/LU-26, AG/LU-44, AG/LU-45, and ROS-1.

Environmental Setting

Project Site Land Uses

The 124-acre Project site encompasses the existing WWTRP, including the storage laydown area, the existing wastewater pond system, and irrigation spray fields (**Figures 2-2**, **2-3**, and **2-4**). Existing WWTRP facilities are described in **Section 2.3**. The Project site consists of four parcels. The parcels which comprise the development footprint and contain the existing laydown yard and pond system (APNs 030-240-013 and 030-240-009) are entirely within City limits and are zoned, which are intended to provide for government-owned facilities (City of St. Helena, 2018). The parcels that contain the irrigation spray fields (APNs 030-240-017 and 030-250-018) are within unincorporated Napa County and are zoned AP District (Napa County, 2020a).

Surrounding Land Uses

Surround land uses are mainly comprised of vineyards and scattered residential housing. Lands to the west and south of the Project site are within unincorporated Napa County and are zoned AP. Lands to the east of the Project site and Napa River are also within unincorporated Napa County and zoned AW District. A residence is located directly adjacent to the northwest boundary of the Project site (APN 030-240-008); this parcel is located within unincorporated Napa County and is zoned AP. State Route 29/State Route 128 runs in a north/south direction approximately one mile away from the western boundary of the Project site.

3.12.3 DISCUSSION OF IMPACTS

Question A

Would the project: Physically divide an established community?

No Impact. Projects that have the potential to physically divide an established community typically include new freeways and highways, major arterials streets, and railroad lines. The Proposed Project would occur within the existing WWTRP limits; therefore, it would not physically divide an established community. No impact would occur.

Question B

Would the project: Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?

Less than Significant. The Proposed Project would be constructed within the existing WWTRP boundaries in an area designated for Public Facilities. No development or improvements are proposed to the existing irrigation spray fields, which are zoned AP, and no agricultural land is proposed to be removed or developed. Land uses adjacent to the Project site consist of agriculture, agriculture supporting businesses, and scattered residences. Construction of the Proposed Project may create temporary land use conflicts with the sensitive land uses near to the Project site from dust and noise. The probability of these nuisances occurring, as well as mitigation measures to lessen their impact, is discussed further in **Section 3.4, Air Quality,** and **Section 3.14, Noise**. After mitigation, all possible nuisances associated with the construction of the Proposed Project in proximity to sensitive land uses would be reduced to less than significant.

The Proposed Project is consistent with applicable policies in the City's General Plan; specifically, Objective PF2.B detailed above to continue wastewater treatment system upgrades. The upgrades to the WWTRP would be consistent with all water quality standards as discussed in **Section 3.11**, **Hydrology and Water Quality**. Therefore, implementation of the Proposed Project would not conflict with any plans, policies, or regulations adopted for the purpose of avoiding or mitigating an environmental effect. Impacts would be less than significant.

Cumulative Impacts

Less than Significant. Potential cumulative projects in the vicinity of the Project site, including population growth resulting from build-out of the City's and County's General Plans, would be developed in accordance with local and regional planning documents. As described above, lands to the west and south of the Project site are within unincorporated Napa County and are zoned AP. Lands to the east of the Project site and Napa River are also within unincorporated Napa County and zoned AW. Because these two land uses protect agricultural uses, including preserving agricultural land from future development, and are mostly developed with vineyards, it is not likely that areas surrounding the WWTRP would support growth in a way that would conflict with operations at the WWTRP. Thus, cumulative impacts associated with land use compatibility are expected be less than significant. Additionally, as discussed above, the Proposed Project is consistent with the General Plan land use designations, goals, and policies, and thus would not contribute to the potential for adverse cumulative land use effects.

3.12.4 MITIGATION MEASURES

None required.

3.13 MINERAL RESOURCES

3.13.1 ENVIRONMENTAL CHECKLIST

Mineral Resources	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
Would the project:				
a) Result in the loss of availability of a known mineral resource that would be a value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☒

3.13.2 SETTING

Regulatory Setting

Pursuant to the mandate of the Surface Mining and Reclamation Act of 1975, the State Mining and Geology Board designates mineral deposits that have regional, multi-community, or statewide economic significance (Napa County, 2005b).

Environmental Setting

Napa County has traditionally been dominated by agriculture and some manufacturing industries (Napa County, 2005b). In recent decades, the most economically significant production has been the mining and processing of crushed rock for the production of building stone and aggregate produced from hard-rock quarries. Since the late 1800s, mineral commodities mined in Napa County have consisted of chromite, chrysotile asbestos, clays, magnesite, manganese, mercury, mineral water, obsidian, petroleum, pumice, gold, silver, and quarry rock (Napa County, 2005b). The Project site does not contain known mineral deposits which are either of statewide significance or the significance of which requires further evaluation (USGS, 2020).

3.13.3 DISCUSSION OF IMPACTS

Questions A and B

Would the project: Result in the loss of availability of a known mineral resource that would be a value to the region and the residents of the state; Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?

No impact. According to the USGS Mineral Resources Data System, there are no known mineral resources located on the Project site. Therefore, the Proposed Action would not result in the loss of availability of any mineral resources that could be of value to the region. Additionally, there are no locally important mineral resource recovery sites in the area (USGS, 2020). No impacts would occur to mineral resources.

3.13.4 MITIGATION MEASURES

None required.

3.14 NOISE

3.14.1 ENVIRONMENTAL CHECKLIST

NOISE	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
Would the project result in:				
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☒	☐
b) Generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

3.14.2 SETTING

Background Information on Noise

Fundamentals of Acoustics

Acoustics is the science of sound. Sound may be thought of as mechanical energy of a vibrating object transmitted by pressure waves through a medium to human (or animal) ears. If the pressure variations occur frequently enough (at least 20 times per second), then they can be heard and are called sound. The number of pressure variations per second is called the frequency of sound and is expressed as cycles per second or Hertz.

Noise is a subjective reaction to different types of sounds. Noise is typically defined as (airborne) sound that is loud, unpleasant, unexpected or undesired, and may therefore be classified as a more specific group of sounds. Perceptions of sound and noise are highly subjective from person to person.

Measuring sound directly in terms of pressure would require a very large and awkward range of numbers. To avoid this, the decibel (dB) scale was devised. The decibel scale uses the hearing threshold (20 micropascals), as a point of reference, defined as 0 dB. Other sound pressures are then compared to this reference pressure, and the logarithm is taken to keep the numbers in a practical range. The decibel scale allows a million-fold increase in pressure to be expressed as 120 dB, and changes in levels (dB) correspond closely to human perception of relative loudness.

The perceived loudness of sounds is dependent upon many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable, and can be approximated by A-weighted sound levels. There is a strong correlation between A-weighted sound levels (expressed as dBA) and the way the human ear perceives sound. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment.

The decibel scale is logarithmic, not linear. In other words, two sound levels 10-dB apart differ in acoustic energy by a factor of 10. When the standard logarithmic decibel is A-weighted, an increase of 10-dBA is generally perceived as a doubling in loudness. For example, a 70-dBA sound is half as loud as an 80-dBA sound, and twice as loud as a 60 dBA sound.

Community noise is commonly described in terms of the ambient noise level, which is defined as the all-encompassing noise level associated with a given environment. A common statistical tool is the average, or equivalent, sound level (L_{eq}), which corresponds to a steady-state A weighted sound level containing the same total energy as a time varying signal over a given time period (usually one hour). The L_{eq} is the foundation of the composite noise descriptor, L_{dn}, and shows very good correlation with community response to noise.

The day/night average level (also referred to as L_{dn}) is based upon the average noise level over a 24-hour day, with a +10-dB weighing applied to noise occurring during nighttime (10:00 P.M. to 7:00 A.M.) hours. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures. Because L_{dn} represents a 24-hour average, it tends to disguise short-term variations in the noise environment.

Table 3-10 lists several examples of the noise levels associated with common situations. **Appendix E** provides a summary of acoustical terms used in this report.

Effects of Noise on People

The effects of noise on people can be placed in three categories:

- Subjective effects of annoyance, nuisance, and dissatisfaction
- Interference with activities such as speech, sleep, and learning
- Physiological effects such as hearing loss or sudden startling

Environmental noise typically produces effects in the first two categories. Workers in industrial plants can experience noise in the last category. There is no completely satisfactory way to measure the subjective effects of noise or the corresponding reactions of annoyance and dissatisfaction. A wide variation in individual thresholds of annoyance exists and different tolerances to noise tend to develop based on an individual's past experiences with noise.

TABLE 3-10. TYPICAL NOISE LEVELS

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	--110--	Rock Band
Jet Fly-over at 300 meters (1,000 ft.)	--100--	
Gas Lawn Mower at 1 meter (3 ft.)	--90--	
Diesel Truck at 15 meters (50 ft.), at 80 km/hour (50 mph)	--80--	Food Blender at 1 meter (3 ft.) Garbage Disposal at 1 meter (3 ft.)
Noisy Urban Area, Daytime Gas Lawn Mower, 30 m (100 ft.)	--70--	Vacuum Cleaner at 3 meters (10 ft.)
Commercial Area Heavy Traffic at 90 meters (300 ft.)	--60--	Normal Speech at 1 meter (3 ft.)
Quiet Urban Daytime	--50--	Large Business Office Dishwasher in Next Room
Quiet Urban Nighttime	--40--	Theater, Large Conference Room (Background)
Quiet Suburban Nighttime	--30--	Library
Quiet Rural Nighttime	--20--	Bedroom at Night, Concert Hall (Background)
	--10--	Broadcast/Recording Studio
Lowest Threshold of Human Hearing	--0--	Lowest Threshold of Human Hearing
Source: **Appendix E**.		

Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted: the so-called ambient noise level. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by those hearing it.

With regard to increases in A-weighted noise level, the following relationships occur:

- Except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived;
- Outside of the laboratory, a 3-dBA change is considered a just-perceivable difference;
- A change in level of at least 5 dBA is required before any noticeable change in human response would be expected; and
- A 10-dBA change is subjectively heard as approximately a doubling in loudness, and can cause an adverse response.

Stationary point sources of noise – including stationary mobile sources such as idling vehicles – attenuate (lessen) at a rate of approximately 6 dB per doubling of distance from the source, depending on environmental conditions (e.g., atmospheric conditions and either vegetative or manufactured noise barriers, etc.). Widely distributed noises, such as a large industrial facility spread over many acres, or a street with moving vehicles, would typically attenuate at a lower rate.

Existing Noise and Vibration Environments

Existing Sensitive Receptors

Some land uses are considered more sensitive to noise than others. Land uses often associated with sensitive receptors generally include residences, schools, libraries, hospitals, and passive recreational areas. Sensitive noise receptors may also include threatened or endangered noise sensitive biological species, although many jurisdictions have not adopted noise standards for wildlife areas. Noise sensitive land uses are typically given special attention in order to achieve protection from excessive noise.

Near the Project site, sensitive land uses include an existing single-family residential use located in Napa County, on an agriculturally zoned property. The existing single-family home is located on Chaix Lane, approximately 200 feet southwest from the proposed MBR plant. Other sensitive uses in the vicinity of the WWTRP include the River Ranch Farm Workers Housing located approximately 500 feet east from the WWTRP eastern parcel boundary on the opposite side of the Napa River, a residence approximately 0.2 miles south of the Project site, a building approximately 630 feet west of the Project site, and a residence along the Napa River approximately 750 feet from the southeast corner of the Project site. With the exception of the existing single-family use located on Chaix Lane, all other receptors are located 1,500 feet, or more, from the noise-generating components of the Proposed Project. This additional distance will provide natural sound attenuation of more than 17 dBA at these receptors located further from the Proposed Project. Therefore, this analysis will focus primarily on the Chaix Lane receptor located approximately 200 feet from the proposed MBR plant.

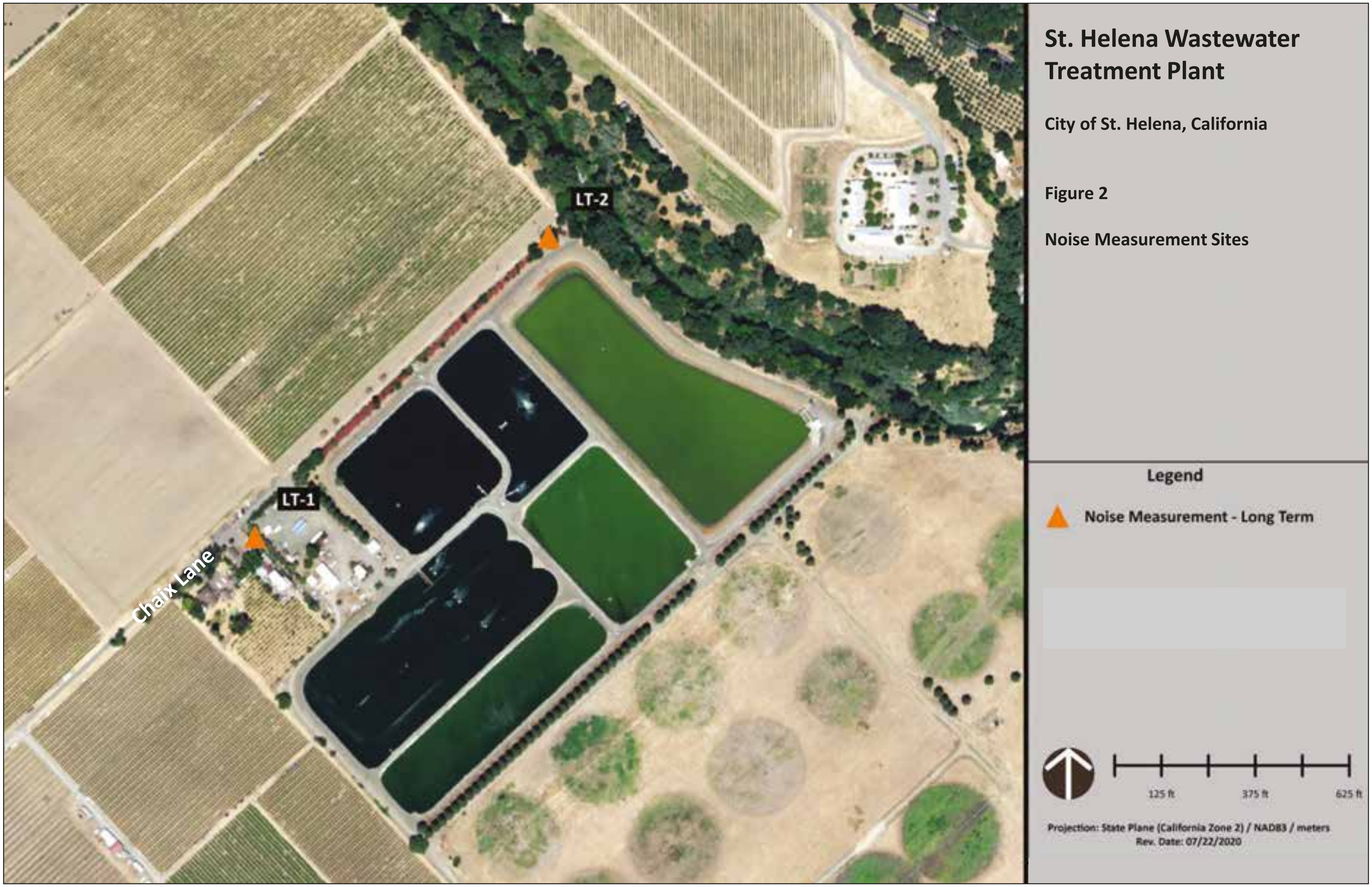
Existing General Ambient Noise Levels

The existing ambient noise environment in the project vicinity is primarily defined by operational noise emanating from existing agricultural activities, the existing treatment plant, and natural sounds such as birds, insects, and wind.

To quantify the existing ambient noise environment in the project vicinity, Saxelby Acoustics conducted continuous (24 hour) noise level measurements at two locations on the Project site. Noise measurement locations are shown on **Figure 3-7**. A summary of the noise level measurement survey results is provided in **Table 3-11**. **Appendix E** contains the complete results of the noise monitoring.

The sound level meters were programmed to record the maximum, median, and average noise levels at each site during the survey. The maximum value, denoted Lmax, represents the highest noise level measured. The average value, denoted Leq, represents the energy average of all of the noise received by the sound level meter microphone during the monitoring period. The median value, denoted L50, represents the sound level exceeded 50 percent of the time during the monitoring period.

Larson Davis Laboratories model 812, 820, and 831 precision integrating sound level meters were used for the ambient noise level measurement survey. The meters were calibrated before and after use with a B&K Model 4230 acoustical calibrator to ensure the accuracy of the measurements. The equipment used meets all pertinent specifications of the American National Standards Institute for Type 1 sound level meters (ANSI S1.4).



SOURCE: Saxelby Acoustics, 7/22/2020; AES, 9/9/2020

Figure 3-7
Noise Monitoring Sites

TABLE 3-11. SUMMARY OF EXISTING BACKGROUND NOISE MEASUREMENT DATA

Site	Location	Date	L_{dn}	Daytime L_{eq}	Daytime L_{50}	Daytime L_{max}	Nighttime L_{eq}	Nighttime L_{50}	Nighttime L_{max}
LT-1	Northwestern Corner of Project site	7/22/20	51.5	52.7	41.2	66.8	38.8	33.3	48.7
LT-1	Northwestern Corner of Project site	7/23/20	46.7	46.8	39.9	63.3	37.2	32.6	47.4
LT-2	Northeastern Corner of Project site	7/22/20	48.3	44.7	41.9	60.9	41.7	38.0	54.8
LT-2	Northeastern Corner of Project site	7/23/20	47.1	45.1	43.0	60.0	39.7	38.2	50.6

Notes: All values shown in dBA. Daytime hours: 7:00 a.m. to 10:00 p.m. Nighttime Hours: 10:00 p.m. to 7:00 a.m.
Source: **Appendix E**

Existing Wastewater Treatment Operations

Saxelby Acoustics conducted noise level measurements of various wastewater treatment plant (WWTP) equipment to evaluate the existing noise levels generated by the wastewater treatment plant. The results of that data collection is shown in **Appendix E**.

The SoundPLAN noise prediction model was used to map existing WWTP noise levels. Inputs to the model included sound power levels for existing equipment, existing buildings, terrain type, and locations of sensitive receptors. These predictions are made in accordance with International Organization for Standardization (ISO) standard 9613-2:1996 (Acoustics – Attenuation of sound during propagation outdoors). ISO 9613 is the most commonly used method for calculating exterior noise propagation. Figure 3 of **Appendix E** shows the existing operational noise contours for the wastewater treatment plant at the nearest residential use.

Regulatory Setting

Federal Noise Abatement Criteria

The Federal Highway Administration (FHWA) provides construction noise level thresholds in its Construction Noise Handbook, 2006, which are provided in **Table 3-12**.

TABLE 3-12. FEDERAL CONSTRUCTION NOISE THRESHOLDS

Noise Receptor Locations and Land Uses	Daytime (7 A.M. - 6 P.M.)	Evening (6 P.M. - 10 P.M.)	Nighttime (10 P.M. - 7 A.M.)
	dBA, Leq[1]		
Noise-Sensitive Locations: (residences, institutions, hotels, etc.)	78 or Baseline + 5 (whichever is louder)	Baseline + 5	Baseline + 5 (if Baseline < 70) or Baseline + 3 (if Baseline > 70)
Commercial Areas: (businesses, offices, stores, etc.)	83 or Baseline + 5	None	None
Industrial Areas: (factories, plants, etc.)	88 or Baseline + 5	None	None

Notes: 1 - Leq thresholds were empirically determined.
Source: **Appendix E**.

Operational noise standards used would be the FHWA Noise Abatement Criteria (NAC) for the assessment of noise consequences related to surface traffic and other project-related noise sources; however, the Proposed Project would not increase traffic volumes in the project area.

The assessment of vibration noise is based on the Federal Transportation Administration (FTA) standards of 0.5 Peak Particle Velocity (PPV) for structures and 0.1 PPV for annoyance of people (FTA, 2006).

St. Helena General Plan

The following policies of the City of St. Helena General Plan Public Health, Safety, and Noise Element are applicable to the Proposed Project.

Policy PS2.5 — An increase in average noise levels of 5 dBA or greater is considered to be significant and to constitute a noise impact by the noise source in question for the purpose of environmental analyses.

St. Helena Municipal Code

Section 8.24.010 – Unnecessary noises generally

Section 8.24.010 of the St. Helena Municipal Code identifies noise limits for construction activities. Monday through Saturday, construction activities which generate noise that can be heard at the property line of any parcel of real property within the city limits shall be limited to eight a.m. to five p.m. Delivery of materials/equipment and cleaning and servicing of machines/equipment shall be limited to seven a.m. to six p.m. Exceptions to these time restrictions may be granted by the public works director for one of the following reasons: (a) inclement weather affecting work; (b) emergency work; or (c) other work, if work and equipment will not create noise that may be unreasonably offensive to neighbors as to constitute a nuisance. The city engineer must be notified and give approval in advance of such work. On Sundays and Holidays (Federal and Local), no construction activities are allowed which generate noise that can be heard at the property line of any parcel of real property within the city limits.

Napa County General Plan

While the Proposed Project is located within the City of St. Helena, the adjacent noise-sensitive receptors are located within Napa County. Therefore, the following standards from the Napa County General Plan and Napa County Code are considered, in addition to applicable standards from the City of St. Helena

General Plan. The following policies of the Napa County General Plan Noise Element are applicable to the Proposed Project.

Policy CC-36 Residential and other noise-sensitive activities shall not be located where noise levels exceed the standards contained in the Noise Element without provision of noise attenuation features that result in noise levels meeting the current standards of the County for exterior and interior noise exposure.

Policy CC-38 The following are the County's standards for maximum exterior noise levels for various types of land uses established in the County's Noise Ordinance.

TABLE 3-13. NAPA COUNTY EXTERIOR NOISE STANDARDS

Land Use Type	Time Period	Noise Level (dBA) by Noise Zone Classification[1]		
		Rural	Suburban	Urban
Single-Family Homes and Duplexes[2]	10 P.M. to 7 A.M.	45	45	50
	7 A.M to 10 P.M.	50	55	60
Multiple Residential 3 or More Units Per Building (Triplex)[2]	10 P.M. to 7 A.M	45	50	55
	7 A.M to 10 P.M.	50	55	60
Office and Retail	10 P.M. to 7 A.M	60		
	7 A.M. to 10 P.M..	65		
Industrial and Wineries[3]	Anytime	75		

Notes: dBA =A-weighted decibels
1 noise levels not to be exceeded more than 30 minutes in any hour (L_{50})
2 For the purposes of implementing this policy, standards for residential uses shall be measured at the housing unit in areas subject to noise levels in excess of the desired levels shown above.
3 Industrial noise limits are intended primarily for use at the boundary of industrial zones rather than for noise reduction at the industrial use.

Source: **Appendix E**.

Napa County Code

Section 8.16.060 – Interior noise standards

Section 8.16.060 of the Napa County Code identifies maximum permissible dwelling interior sound levels for residential uses. Daytime (7 A.M. – 10 P.M.) maximum interior noise levels for residential uses are limited to 60 dBA; nighttime (10 P.M. – 7 A.M.) maximum interior noise levels are limited to 55 dBA. Section 8.16.060 indicates that no person shall operate or cause to be operated within a dwelling unit any source of sound or allow creation of any noise which causes exceedance of these noise levels for a cumulative period of more than 5 minutes in any hour, or these noise standards plus 5 decibels (dB) for a cumulative period of more than 1 minute in any hour, or these noise standards plus 10 dB for the maximum measured ambient noise for any period of time.

Section 8.16.070 – Exterior noise limits

Section 8.16.070 of the Napa County Code (Napa County, 2013) identifies the noise standards for the various categories of land use identified by the noise control office (see **Table 3-13**). Section 8.16.070 states that no person shall operate, or cause to be operated, any source of sound at any location within the unincorporated area of the county, or allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person, which causes the noise level, when measured on any other property, either incorporated or unincorporated, to exceed:

a. The noise standard for that land use (see **Table 3-13)** for a cumulative period of more than 30 minutes in any hour;
b. The noise standard plus five dB for a cumulative period of more than 15 minutes in any hour;
c. The noise standard plus ten dB for a cumulative period of more than 5 minutes in any hour;
d. The noise standard plus fifteen dB for a cumulative period of more than 1 minute in any hour;
e. The noise standard plus twenty dB or the maximum measured ambient level, for any period of time.

In order to compensate for the character of sound, Section 8.16.070 states that if an offensive noise, as judged by the noise control officer, contains a steady, audible tone such as a whine, screech or hum, or is a repetitive noise such as hammering or riveting, or contains music or speech, the standard limits (see **Table 3-13)** shall be reduced by five dB, but not lower than forty-five.

Section 8.16.080 – Construction or Demolition

Section 8.16.080 of the Napa County Code identifies noise limits for construction activities, allowable in excess of the standard noise limits identified in **Table 3-14**. Specifically, Section 3.16.080 regulates noise generated by operation of any tools or equipment used in construction, drilling, repair, alteration or demolition work between the hours of 7 p.m. and 7 a.m., such that the sound therefrom creates a noise disturbance across a residential or commercial real property line, except for emergency work of public service utilities or by variance issued by the appropriate authority (**Table 3-14**).

TABLE 3-14. NAPA COUNTY NOISE LIMITS FOR CONSTRUCTION ACTIVITIES

	Residential	Commercial	Industrial
Daily: 7 A.M. to 7 P.M.	75 dBA	80 dBA	85 dBA
Daily: 7 P.M. to 7 A.M.	60 dBA	65 dBA	70 dBA
Source: Napa County, 2020.			

3.14.3 DISCUSSION OF IMPACTS

Methodology

Evaluation of Future Operational Noise at Residential Receptors

The following is a list of assumptions used for the noise modeling. The data used is based upon a combination of manufacturer’s provided data and Saxelby Acoustics data from similar operations. Figure 4 of **Appendix E** shows the predicted wastewater treatment plant noise contours following the addition of the MBR treatment plant.

MBR Packaged Unit: Two packaged Cloacina MBR plants operating continuously during the daytime and nighttime. Data collected by Saxelby Acoustics. Assumes equipment is housed within sound attenuation enclosures, similar to that observed by Saxelby Acoustics at the Descanso Gardens 50,000 GPD-MEMPAC-M treatment system. Maximum noise level for this unit assumed to be 58 dBA at 25 feet in any direction from plant.

Sound Wall: An 8-foot tall sound wall would be located west of the MBR unit, shielding the nearby residential use. The location of the wall is noted on Figure 4 of **Appendix E** and shown in more detail on Figure 5 of **Appendix E**.

Saxelby Acoustics used the SoundPLAN noise prediction model. Inputs to the model included sound power levels for the proposed equipment, existing and proposed buildings, terrain type, and locations of sensitive receptors. These predictions are made in accordance with ISO standard 9613-2:1996 (Acoustics – Attenuation of sound during propagation outdoors). ISO 9613 is the most commonly used method for calculating exterior noise propagation.

Construction Noise Environment

During the construction of the Proposed Project, noise from construction activities would temporarily add to the noise environment in the project vicinity. As shown in **Table 3-15**, activities involved in construction would generate maximum noise levels ranging from 76 to 90 dB at a distance of 50 feet.

TABLE 3-15. CONSTRUCTION EQUIPMENT NOISE

Type of Equipment	Maximum Level, dBA at 50 feet
Auger Drill Rig	84
Backhoe	78
Compactor	83
Compressor (air)	78
Dozer	82
Dump Truck	76
Excavator	81
Generator	81
Pneumatic Tools	85
Source: **Appendix E**.	

Construction activities would take place within the Proposed Project's development footprint, which is within City limits. The Proposed Project would adhere to the City's construction noise limits as dictated by the City of St. Helena Municipal Code Section 8.24.010: construction activities shall be limited to between the daytime hours of 8:00 A.M. and 5:00 P.M Monday through Saturday. No construction activities shall take place on Sundays or Federal and local holidays. It should be noted that the City construction noise limits are more restrictive than the County's and would satisfy both the City and County construction noise restrictions.

Construction Vibration Environment

The primary vibration-generating activities associated with the Proposed Project would occur during construction when activities such as grading, utilities placement, and parking lot construction occur. **Table 3-16** shows the typical vibration levels produced by construction equipment.

TABLE 3-16. VIBRATION LEVELS FOR VARIOUS CONSTRUCTION EQUIPMENT

Type of Equipment	Peak Particle Velocity at 25 feet (inches/second)	Peak Particle Velocity at 50 feet (inches/second)	Peak Particle Velocity at 100 feet (inches/second)
Large Bulldozer	0.089	0.031	0.011
Loaded Trucks	0.076	0.027	0.010
Small Bulldozer	0.003	0.001	0.000
Auger/drill Rigs	0.089	0.031	0.011
Jackhammer	0.035	0.012	0.004
Vibratory Hammer	0.070	0.025	0.009
Vibratory Compactor/roller	0.210 (Less than 0.20 at 26 feet)	0.074	0.026
Source: **Appendix E**.			

Noise Level Increase Criteria for Long-Term Project-Related Noise Level Increases

The CEQA *Guidelines* define a significant impact of a project if it "increases substantially the ambient noise levels for adjoining areas." Generally, a project may have a significant effect on the environment if it will substantially increase the ambient noise levels for adjoining areas or expose people to severe noise levels. In practice, more specific professional standards have been developed. These standards state that a noise impact may be considered significant if it would generate noise that would conflict with local project criteria or ordinances, or substantially increase noise levels at noise sensitive land uses. The potential increase in traffic noise from the project is a factor in determining significance. Research into the human perception of changes in sound level indicates the following:

- A 3 dB change is barely perceptible,
- A 5 dB change is clearly perceptible, and
- A 10 dB change is perceived as being twice or half as loud.

Many jurisdictions have adopted specific criteria for determining significant noise increases. In this case the City of St. Helena General Plan Policy PS2.5 considers average noise increases of 5 dBA or greater to be significant and to constitute a noise impact for the purpose of environmental analyses.

Question A

Would the project result in: Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Construction

Less than Significant. During construction of the Proposed Project, noise from construction activities would add to the noise environment in the immediate project vicinity. As indicated in **Table 3-15**, activities involved in construction would generate maximum noise levels ranging from 76 to 85 dBA L_{max} at a distance of 50 feet. Construction activities would also be temporary in nature and are anticipated to occur during normal daytime working hours.

Construction of project components would occur over the course of 12 to 16 months. It is anticipated that construction of the WWTRP Phase I upgrades would begin in spring of 2021 and be completed in 2022. The following equipment may be utilized occasionally during construction of the Proposed Project:

- Front-end loader
- Crane
- Water truck
- Air compressor
- Concrete truck
- Flat-back delivery truck
- Trencher
- Backhoe/Loader
- Welding truck
- Dump truck

Noise would also be generated during the construction phase by increased truck traffic on area roadways. A project-generated noise source would be truck traffic associated with transport of heavy materials and equipment to and from the construction site. This noise increase would be of short duration and would occur only during daytime hours.

Noise from localized point sources (such as construction sites) typically decreases by approximately 6 dBA with each doubling of distance from source to receptor. Given this noise attenuation rate and assuming no noise shielding from either natural or manmade features (e.g., trees, buildings, fences), the existing sensitive receptor located within approximately 200 feet of construction activity could experience maximum instantaneous noise levels of up to 73 dBA L_{max}. Average noise levels would be expected to be 5-10 dBA less than maximum noise levels, or 63-68 dBA Leq. These levels are less than the Napa County 75 dBA exterior construction noise standard for daytime (7 A.M. to 7 P.M.) activities. As dictated by the City of St. Helena Municipal Code Section 8.24.010, construction activities shall be limited to between the daytime hours of 8:00 A.M. and 5:00 P.M Monday through Saturday. No construction activities shall take place on Sundays or Federal and local holidays. Adherence to the City's construction noise hours would not allow construction to occur outside of daytime hours; therefore, Napa County's 60 dBA exterior construction noise standard for nighttime activities would not be exceeded. Impacts relating to exterior noise levels due to construction of the Proposed Project would be considered less than significant.

Operation

Less than Significant. As shown on Figure 4 of **Appendix E**, the Proposed Project is predicted to generate a noise level of 34.9 dBA L_{50} at the nearest residential use. This noise is primarily composed of sound emanating from the proposed MBR system. When the project-only noise of 34.9 dBA L_{50} is combined with the existing measured average ambient noise level of 32.6 dBA L_{50}, the resulting existing plus project noise level would be 36.9 dBA L_{50}. This would comply with the Napa County 45 dBA L_{50} nighttime exterior noise standard for rural residential uses.

The post project ambient noise levels would increase 4.3 dBA over existing ambient noise levels. This is less than the City's 5 dBA threshold for significant noise increases. Therefore, impacts relating to noise levels due to operation of the Proposed Project would be considered less than significant.

Question B

Would the project result in: Generation of excessive groundborne vibration or groundborne noise levels?

Less than Significant. Construction vibration impacts include human annoyance and building structural damage. Human annoyance occurs when construction vibration rises significantly above the threshold of perception. Building damage can take the form of cosmetic or structural.

The **Table 3-15** data indicate that construction vibration levels anticipated for the Proposed Project are less than the 0.2 inches per second threshold at distances of 26 feet. Sensitive receptors which could be impacted by construction related vibrations, especially vibratory compactors/rollers, are located further than 26 feet from typical construction activities. At distances greater than 26 feet construction vibrations are not predicted to exceed acceptable levels. Additionally, construction activities would be temporary in nature and would likely occur during normal daytime working hours. This is a less-than-significant impact and no mitigation is required.

Question C

For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

No Impact. There are no public or private airstrips within two miles of the Project site. No impact would occur.

Cumulative Impacts

Less than Significant. As stated above, operation of the Proposed Project would not increase existing ambient noise levels above the applicable thresholds at sensitive receptors. Operation of the Proposed Project would require maintenance activities; however, these activities would be periodic and would not expose sensitive receptors to noise levels above the existing ambient noise level, cause substantial temporary or periodic increases in noise levels, nor permanently increase the ambient noise. Therefore the Proposed Project would not result in cumulatively considerable impacts. This impact is considered less than significant.

Compliance with Federal Environmental Laws and Regulations

As described above, the Proposed Project would not raise the ambient noise level beyond the FHWA construction noise threshold of 78 dB at sensitive receptors. This impact is considered less than significant. The Proposed Project would comply with all federal regulations relating to noise, including the FHWA Construction Noise Handbook and NAC.

3.14.4 MITIGATION MEASURES

None required.

3.15 POPULATION AND HOUSING (AND ENVIRONMENTAL JUSTICE)

3.15.1 ENVIRONMENTAL CHECKLIST

POPULATION AND HOUSING (AND ENVIRONMENTAL JUSTICE)	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
Would the project:				
a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☒	☐
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

3.15.2 SETTING

Regulatory Setting

Environmental Justice Communities

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations, as amended, directs federal agencies to develop an Environmental Justice Strategy that identifies and addresses disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations. The CEQ is responsible for verifying the federal government’s compliance with EO 12898 and the NEPA. The CEQ, in consultation with the USEPA and other agencies, has developed guidance to assist federal agencies with their NEPA procedures so that environmental justice concerns are effectively identified and addressed.

According to guidance from the CEQ (1997) and USEPA (1998), agencies should consider the composition of the affected area, to determine whether minority populations, low-income populations, or Indian tribes are present in the area affected by a proposed action and, if so, whether there may be disproportionately high and adverse environmental effects to those populations. Communities may be considered “minority” under the executive order if one of the following characteristics apply:

- The cumulative percentage of minorities within a Census tract is greater than 50 percent (primary method of analysis).
- The cumulative percentage of minorities within a Census tract is less than 50 percent, but the percentage of minorities is meaningfully greater than the minority population percentage in the

general population or other appropriate unit of geographic analysis (secondary method of analysis).

According to the USEPA, either the county or the state can be used when considering the scope of the "general population." A definition of "meaningfully greater" is not given by the CEQ or USEPA, although the latter has noted that any affected area that has a percentage of minorities that is above the state's percentage is a potential minority community and any affected area with a minority percentage double that of the state's is a definite minority community under EO 12898.

Communities may be considered "low-income" under the executive order if one of the following characteristics applies:

- The median household income for a Census tract is below the poverty line (primary method of analysis).
- Other indications are present that indicate a low-income community is present within the Census tract (secondary method of analysis).

In most cases, the primary method of analysis would suffice to determine whether a low-income community exists in the affected environment. However, when a Ccensus tract income may be just over the poverty line or where a low-income pocket within the tract appears likely, the secondary method of analysis may be warranted. Other indications of a low-income community under the secondary method of analysis include limited access to health care, overburdened or aged infrastructure, and dependence on subsistence living.

Environmental Setting

As of July 1, 2019, the population for Napa County is estimated at 1137,744 people, and the population for the City is 6,102 (U.S. Census, 2019). The majority of the population within the City is served by the WWTRP. The remaining population uses septic tanks for wastewater treatment.

3.15.3 DISCUSSION OF IMPACTS

Question A

Would the project: Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?

Less than Significant. The Proposed Project does not involve the development of any homes or businesses. The Proposed Project would not increase the effective treatment capacity of the WWTRP and additional employees are not anticipated to be needed to operate the proposed facilities at the WWTRP. Therefore, the Proposed Project would not directly induce population growth and would have a less than significant impact on population growth.

Question B

Would the Project: Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?

No Impact. The Proposed Project would not displace existing housing or people that would necessitate the construction of replacement housing.

Cumulative Impacts

No Impact. The Proposed Project is not expected to increase growth, and therefore would not contribute to cumulative impacts associated with growth.

Compliance with Federal Environmental Laws and Regulations

The Proposed Project is located in the City of St. Helena in Napa County. Approximately 8.4 percent of the City's population and approximately 8.8 percent of the County's population is below the poverty level (U.S. Census, 2019). This is below California's overall poverty level of 12.8 percent (U.S. Census, 2019). Upgrades to the existing WWTRP would allow the City to continue providing services to City residents and would untimely improve the quality of water discharged to the Napa River. With the inclusion of **Mitigation Measures AQ-1**, **AQ-2**, **BIO-1**, **HAZ-1** through **HAZ-4**, and **HYD-1** to reduce construction-related impacts, the Proposed Project would not disproportionally impact any minority or low-income population or have an adverse impact associated with environmental justice. The Proposed Project would comply with all federal regulations relating to population, housing, and environmental justice.

3.15.4 MITIGATION MEASURES

None required.

3.16 PUBLIC SERVICES

3.16.1 ENVIRONMENTAL CHECKLIST

PUBLIC SERVICES	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
Would the project:				
Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services:				
a) Fire Protection?	☐	☒	☐	☐
b) Police Protection?	☐	☐	☐	☒
c) Schools?	☐	☐	☐	☒
d) Parks?	☐	☐	☐	☒
e) Other public facilities?	☐	☐	☐	☒

3.16.2 SETTING

Fire Protection/Emergency Medical Service

Fire Protection and emergency medical services within the City of St. Helena are provided by the St. Helena Fire Department. The fire department has one station, located at 1480 Main Street, approximately 2.4 miles from the Project site. A total of 28 people are staffed by the St. Helena Fire Department (City of St. Helena, 2020c). The nearest hospital to the Project site is Adventist Health St. Helena, which is located at 10 Woodland Road, approximately 5.5 miles from the Project site, and provides a comprehensive range of inpatient and outpatient medical services (Adventist Health, 2020).

Law Enforcement

Law enforcement services within the City of St. Helena are provided by the St. Helena Police Department. The police department has one station, located at 1480 Main Street, approximately 2.4 miles from the Project site. A total of 19 people are staffed by the St. Helena Police Department (City of St. Helena, 2020d).

Schools

The St. Helena Unified School District services the City and includes St. Helena Primary School (grades TK-2), St. Helena Elementary School (grades 3-5), Robert Louis Stevenson Middle School (grades 6-8), and St. Helena High School (grades 9-12) (St. Helena Unified, 2020).

Parks

The City of St. Helena Parks Division of the Public Works Department is responsible for management of parks in the St. Helena area, which includes ten parks, four pathways, street trees, benches, and parking lots (City of St. Helena, 2020b). The Wappo Park and adjoining Wappo Dog Park, are the closest recreational facilities to the WWTRP, located approximately 0.9 miles northwest of the site. The remaining eight parks (Baldwin, Crane, Jacob Meily, Lyman, Mary Fryer, Mennen, St. Helena Skate, and Stone Bridge) are over a mile from the Project site.

3.16.3 DISCUSSION OF IMPACTS

Question A

Would the project: Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services: fire protection?

Less than Significant with Mitigation. The Proposed Project would upgrade the City's current WWTRP. Construction-related activities associated with the Proposed Project could involve the use of spark-producing construction equipment, which could temporarily increase the risk of igniting a fire on the Project site. This is a potentially significant impact. **Mitigation Measure HAZ-4** would minimize potential fire risks from construction activities by requiring a spark arrestor in good working order. With implementation of **Mitigation Measure HAZ-4**, the Proposed Project would not significantly increase fire risk over existing conditions, or demand for fire protection services and impacts would be less than significant.

Questions B – E

Would the project: Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services: police protection; schools; parks; other public facilities?

No Impact. The Proposed Project would not increase the number of employees on site or the WWTRP service area. Construction, operation, and maintenance activities associated with the Proposed Project would not create impacts to police protection, local schools and parks, or increase demand for other public facilities. No impact to these public services would occur.

Cumulative Impacts

Less than Significant with Mitigation. As described above, the Proposed Project would not increase the potential demand for police, schools, parks, or other public facilities. However, construction of the Proposed Project could potentially temporarily increase the demand for fire protection services. With implementation of **Mitigation Measure HAZ-4**, impacts related to fire protection services would be reduced to less than significant and would not create a cumulatively considerable impact.

3.16.4 MITIGATION MEASURES

With implementation of **Mitigation Measure HAZ-4**, no other mitigation is necessary.

3.17 RECREATION

3.17.1 ENVIRONMENTAL CHECKLIST

RECREATION	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☒

3.17.2 SETTING

The City of St. Helena Parks Division of the Public Works Department is responsible for management of parks in the St. Helena area, which includes ten parks, four pathways, street trees, benches, and parking lots (City of St. Helena, 2020b). The Wappo Park and adjoining Wappo Dog Park, are the closest recreational facilities to the WWTRP, located approximately 0.9 miles northwest of the Project site. The remaining eight parks (Baldwin, Crane, Jacob Meily, Lyman, Mary Fryer, Mennen, St. Helena Skate, and Stone Bridge) are over a mile from the site.

3.17.3 DISCUSSION OF IMPACTS

Questions A and B

Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated? Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?

No impact. The Proposed Project would not result in population growth that would increase the use of regional parks and other recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment. Construction activities would be limited to a short-term duration and would not impede the use of existing access points to any City parks.

Cumulative Impacts

No Impact. The Proposed Project would not impact any existing recreational facilities. Therefore, it would not contribute towards cumulative impacts to recreational facilities.

3.17.4 MITIGATION MEASURES

None required.

3.18 TRANSPORTATION

3.18.1 ENVIRONMENTAL CHECKLIST

TRANSPORTATION	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
Would the project:				
a) Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	☐	☐	☒	☐
b) Conflict or be inconsistent with CEQA Guidelines § 15064.3, subdivision (b)?	☐	☐	☐	☒
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
d) Result in inadequate emergency access?	☐	☐	☐	☒

3.18.2 SETTING

Transportation Network

The Project site can be accessed via the following regional City roadways that provide access to the WWTRP facility:

- **Chaix Lane** is a two lane east/west oriented roadway in the vicinity of the Project site. Chaix Lane is classified as an Open Space/Rural Street by the City General Plan and provides access to the WWTRP and a small number residential and agricultural developments.
- **State Route 29** is a two lane north-south highway in the vicinity of the Project site that provides regional access throughout the County. SR-29 is classified as a Regional Connector by the City General Plan.

Bikeways, Pedestrian Facilities, Public Transportation System

There are no bicycle pathways/routes in the immediate vicinity of the Project site. There are no pedestrian facilities within the vicinity of the Project site. There is no public transportation which services the Project site.

3.18.3 DISCUSSION OF IMPACTS

Question A

Would the project: Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?

Less than Significant. The Proposed Project is not considered a trip generating project. However, construction would result in a short term increase in traffic levels on project area roadways. Construction vehicles and equipment expected to be used include, but are not limited to, legally loaded trucks, delivery and service trucks, and construction worker vehicles. At estimated peak day levels, up to approximately 76 one-way construction worker vehicle trips could occur (**Appendix B**). Additionally, during the work day it is estimated that approximately four material delivery trips per day would occur. State Route 29 currently experiences approximately 24,000 average daily trips in the vicinity of the Project site (Caltrans, 2017). Therefore, construction-related traffic would result in a negligible increase in traffic volumes on State Route 29. Additionally, while Chaix Lane currently experiences much lower traffic volumes, the increase in construction-related traffic would be temporary in nature and would not result in long-term exceedance of the City's traffic level of service goal of "C" for unsignalized intersections (City of St. Helena, 2019).This impact is considered to be less than significant.

Operation of Proposed Project is not anticipated to increase traffic. At full buildout, additional employees are not anticipated to be needed to operate the proposed facilities at the WWTRP. Additional trips would not be added to the roadway network and would not cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system, or result in deterioration in LOS below accepted standards; therefore, this impact is considered to be less than significant.

Question B

Would the project: Conflict or be inconsistent with CEQA Guidelines § 15064.3, subdivision (b)?

No Impact. The Proposed Project would not generate vehicle trips, and therefore would not result in an increase in vehicle mile traveled. No impact would occur.

Question C

Would the project: Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

No Impact. Construction of the Proposed Project would not alter existing roadways or change existing land uses. Therefore, the Proposed Project would not substantially increase hazards due to a geometric design feature or incompatible uses. No impact would occur.

Question D

Would the project: Result in inadequate emergency access?

No Impact. Construction would occur periodically over a period of up to sixteen months at the Project site. During construction, full lane closures on local roadways would not occur; therefore, construction activities would not impede emergency vehicles.

Cumulative Impacts

No Impact. Traffic impacts from the Proposed Project would be limited to short-term construction effects on roadways providing access to the Project site. No concurrent construction activities near the roadway network are anticipated; therefore, no cumulative impacts would occur.

3.18.4 MITIGATION MEASURES

None required.

3.19 Tribal Cultural Resources

3.19.1 Environmental Checklist

TRIBAL CULTURAL RESOURCES	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
Would the project:				
a) Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code § 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:				
i. Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or	☐	☒	☐	☐
ii. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code § 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code § 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☐	☒	☐	☐

3.19.2 Setting

California Native American prehistoric, historic, archaeological, cultural, and sacred places are essential elements in tribal cultural traditions, heritages, and identities. Because CEQA calls for a sufficient degree of analysis, tribal knowledge about the land and tribal cultural resources at issue are included in environmental assessments for projects that may have a significant impact on such tribal cultural resources (TCR). TCRs can only be identified by members of the Native American community, thus requiring consultation under CEQA.

Regulatory Context

AB 52, signed into law in 2014, established a new category of resources in CEQA called "tribal cultural resources" that considers the tribal cultural values in addition to the scientific and archaeological values when determining impacts and mitigation. Pursuant to PRC, Division 13, Section 21074, TCRs can be either:

1. Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either:

    a. Included or determined to be eligible for inclusion in the California Register of Historical Resources (California Register); or

    b. Included in a local register of historical resources as defined in subdivision (k) of Section 5020.1.

2. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to the eligibility criteria for the California Register (PRC § 5024.1(c)). In applying these criteria, the lead agency must consider the significance of the resource to a California Native American Tribe.

Native American tribes traditionally and culturally affiliated with a geographic area may have expertise concerning their tribal cultural resources. In light of this, AB 52 requires that, within 14 days of a decision to undertake a project or determination that a project application is complete, a lead agency shall provide written notification to California Native American tribes that have previously requested placement on the agency's notice list. Notice to tribes shall include a brief project description, location, lead agency contact information, and the statement that the tribe has 30 days to request consultation. The lead agency shall begin the consultation process within 30 days of receiving a request for consultation from a tribe.

Consultation

The City, as lead agency, identified Native American tribes which had requested placement on the City's AB 52 notice list. On August 4, 2020, the City sent six consultation letters to the following tribes: Kletsel Dehe Band of Wintun Indians, the Federated Indians of Graton Rancheria, Middletown Rancheria of Pomo Indians, Mishewal Wappo Tribe of Alexander Valley, and Yocha Dehe Wintun Nation. To date, the only Tribe to respond has been the Federated Indians of Graton Rancheria, who declined the invitation to consult on the Proposed Project.

3.19.3 DISCUSSION OF IMPACTS

Questions A and B

Would the project: Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code § 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is: i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or ii) A resource determined by the lead agency, in its *discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code § 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code § 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.*

Less than Significant with Mitigation. As discussed above in **Section 3.6**, no TCRs were identified during cultural resources investigations or consultation with Native American tribes. However, there is the possibility that unanticipated discoveries of subsurface archaeological deposits or human remains may occur. This is a potentially significant impact. The conclusion of formal consultation under AB 52 and the application of **Mitigation Measures TCR-1**, **CR-1**, and **CR-2** would reduce impacts to TCRs to a less-than-significant level.

3.19.4 MITIGATION MEASURES

TCR-1

If prehistoric archaeological resources are discovered during ground-disturbing activities, all such activities shall halt within 50 feet of the find until a professional archaeologist can evaluate the significance of the find in accordance with NRHP and CRHR criteria. In addition, representatives of the Native American community who were contacted by the City during the AB 52 process shall be contacted and asked if they wish to consult under the provisions of Section 106 of the NHPA. Construction shall not resume in the vicinity of the find until consultation is concluded or until a reasonable good-faith effort has failed to provide a resolution to further impacts that is acceptable to the consulting parties.

3.20 UTILITIES/SERVICE SYSTEMS

3.20.1 ENVIRONMENTAL CHECKLIST

UTILITIES/SERVICE SYSTEMS	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
Would the project:				
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	☐	☐	☒	☐
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?	☐	☐	☒	☐
c) Result in a determination by the waste water treatment provider, which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒
d) Generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	☐	☐	☒	☐
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	☐	☐	☒	☐

3.20.2 SETTING

Water Suppliers and Supply

Water is primarily provided to the City from Bell Canyon Reservoir, Stonebridge Wells, and water purchased from the City of Napa (City of St. Helena, 2020e). The most recent Master Water Plan includes a total of 2,033 acre-feet for the year of 2020 (City of St. Helena, 2006).

Solid Waste Collection and Disposal

Solid waste collection in the City is provided by Upper Valley Disposal and Recycling (UVDR) and disposed at the Clover Flat Landfill that is owned and operated by the Upper Valley Waste Management Agency (UVDR, 2020; Napa County, 2020d). The Clover Flat Landfill has a design capacity of 4.56 million cubic yards and is expected to reach its permitted capacity in 2047 (CalRecycle, 2014).

3.20.3 DISCUSSION OF IMPACTS

Questions A and B

Would the project: Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects; Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?

Less than Significant. The Proposed Project involves upgrading the City's existing WWTRP facility to meet more stringent effluent discharge limitations included within the 2016 Permit. The Proposed Project would not increase the effective treatment capacity of the WWTRP and the permitted capacity of wastewater flows into the WWTRP would not change or exceed the NPDES-permitted peak wet weather flow of 2.8 MGD. The environmental effects of the new wastewater treatment facilities resulting from the Proposed Project are evaluated throughout **Section 3.0** of this IS. As described in the other issue area sections of this IS, all environmental effects associated with the Proposed Project would be less than significant, or will be reduced to less than significant with mitigation.

All water uses within the WWTRP are non-potable and pumped from an on-site well. As discussed in **Section 2.4.2**, treated water stored in the clearwell of the MBR system would be used as process water at the WWTRP for cleaning and other minor uses associated with WWTRP operations. Therefore, the MBR system would not require an additional water supply and may reduce overall groundwater consumption at the WWTRP. Sufficient water supplies are available to serve the Proposed Project; demand for water supply would not increase. Therefore, the Proposed Project would not result in the construction of new or expanded water, or storm water drainage facilities that could cause significant environmental effects.

As part of the Proposed Project, the electrical system at the WWTRP would be upgraded to meet the most current design criteria adopted by the City and Napa County. This would include the installation of a 480-volt transformer on an existing electrical pole along the western boundary of the Project site, near the southern end of the proposed sound wall (see **Figure 2-5**), with electricity supplied by PG&E. Overhead distribution lines exist in the vicinity of the Project site. It is not anticipated that new distribution lines would be necessary to serve the Proposed Project. From the transformer, power would be distributed to the WWTRP through underground conduits. All electrical upgrades, including the digging of underground conduits, would occur within the development footprint, with construction impacts to the development footprint evaluated in **Sections 3.5**, **3.6**, **3.8**, **3.10**, **3.11**, and **3.19**. Impacts to electric power, natural gas, and telecommunications facilities would be less than significant.

Question C

Would the project: Result in a determination by the waste water treatment provider, which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

No impact. The Proposed Project involves upgrading the City's existing WWTRP facility to meet more stringent effluent discharge limitations included within the 2016 Permit. The Proposed Project would not increase the demand for wastewater services. No impact would occur.

Questions D and E

Would the project: Generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals; Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?

Less than Significant. A dewatering and solids handling process would be introduced to sufficiently dispose of waste sludge from the new MBR system; therefore, the Proposed Project would increase the generation of solid waste. Approximately 1,000 gallons of dewatered cake solids would be generated per day. Cake solids would be hauled to Clover Flat Landfill every other week, with a maximum of once per week. As stated above, the Clover Flat Landfill has a current average daily activity of 160 tons per day with a permitted maximum tonnage of 600 tons per day and is expected to reach its permitted capacity in 2047. The addition of 1,000 gallons of cake solids per day would represent a negligible amount in relation to the capacity of the landfill. Consequently, increased biosolids production would not affect landfill capacity or conflict with solid waste regulations. Therefore, the Proposed Project would not significantly increase demand for solid waste services and would not impair the attainment of solid waste reduction goals. Disposal of solid waste from the WWTRP would continue to comply with all applicable regulations related to solid waste. Impacts related to solid waste generation would be less than significant.

Cumulative Impacts

Less than Significant*.* Utility and service systems in the area, such as solid waste collection and disposal, would not experience a significant change in demand for services from existing conditions. Therefore, the Proposed Project would not contribute to cumulative impacts of utility and service systems.

3.20.4 MITIGATION MEASURES

None required.

3.21 Wildfire

3.21.1 ENVIRONMENTAL CHECKLIST

WILDFIRE	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:				
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	☐	☐	☒	☐
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	☐	☐	☒	☐
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	☐	☐	☐	☒

3.21.2 SETTING

Regulatory Context

State Responsibility Areas (SRA) are lands in California where the California Department of Forestry and Fire Protection (CAL FIRE) has legal and financial responsibility for wildfire protection and where CAL FIRE administers fire hazard classifications and building standard regulations. Local Responsibility Areas (LRA) include land in cities, cultivated agricultural lands, unincorporated non-flammable areas, and lands that do not meet the criteria for SRA of Federal Responsible Areas (Napa County, 2020). California PRC§§ 4201 through 4204 and California Government Code 51175-89 direct CAL FIRE to map fire hazard zones within state SRAs and LRAs, respectively, based on relevant factors such as fuels, terrain, and weather. These zones, referred to as Fire Hazard Severity Zones (FHSZ), are based on the physical conditions that give a likelihood that an area will burn over a 30 to 50-year period without considering modifications such as fuel reduction efforts. The zones also relate to the requirements for building codes designed to reduce the ignition potential to buildings in the wildland-urban interface zones.

The Napa County General Plan (2008) includes Policies SAF-14 through 17, which pertain to wildfire mitigation, which include criteria for development in high wildland fire hazard areas. In 2004, the County adopted the Napa Area Operational Hazard Mitigation Plan, which addresses a wide variety of disasters, including wildfires, and provides plans for reducing or mitigating these threats. The 2020 draft Napa County Multi-Jurisdictional Hazard Mitigation Plan will replace the 2004 Plan once approved. Furthermore, CAL FIRE implements the 2017 Sonoma-Lake-Napa Unit Strategic Fire Plan, which addresses fire suppression and public safety. On the state level, the Office of Emergency Services oversees and coordinates emergency preparedness, response, and recovery within the state of California. On the local level, the St. Helena General Plan Update 2040 includes policies that limit development in areas of high and very high FHSZs, as defined by CAL FIRE (see Policy PS4.2; Napa County, 2019b).

Environmental Setting

Napa County is characterized by narrow valleys and steep, hilly terrain and has an active history of wildfire. In some areas of the County, the buildup of fuels from the reduction of fire frequency and the spread of human development has led to an increase in the probability of wildfires. However, vineyards, which are prevalent in the county, have lower fuel loads than other biotic communities (Napa County, 2005a). The Project site is located within a flat and currently developed area within City limits. The Project site is surrounded by the Napa River to the east and vineyard operations on the north, west, and south. Given the Project site location, the threat of wildfire is greatly diminished.

The Proposed Project is not located in a SRA, but is rather located in an Incorporated LRA (CAL FIRE, 2007). The Project site is located within a FHSZ classification of “Non-VHFHSZ,” which indicates that the Project site is not located in a very high fire hazard severity zone, as classified by Cal Fire (CAL FIRE, 2008). This zone contains fuels (e.g., grasses, shrubs, trees, vines) that are not highly susceptible to wildland fire and have a low burn probability. Land immediately east of the Project site, on the opposite side of the Napa River, is classified as a “Moderate” FHSZ in a SRA.

3.21.3 DISCUSSION OF IMPACTS

Question A

If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project: Substantially impair an adopted emergency response plan or emergency evacuation plan?

No Impact. The Proposed Project is not located in a SRA or a very high FHSZ. The area immediately east of the Project site is classified as a Moderate FHSZ within a SRA. Construction of the Proposed Project would occur within the existing WWTRP boundaries and would not result in lane closures and thus would not affect emergency access or evacuation. Therefore, the Proposed Project would not interfere with an adopted emergency response plan or emergency evacuation plan in place through the State, County, or City. Operation of the Proposed Project would not interfere with emergency response or evacuation routes in the project vicinity, as no road construction is proposed and no additional personnel would need to access the Project site. No impact would occur.

Question B

If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project: Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?

Less than Significant. As mentioned above, the Proposed Project is not located in a SRA or a very high FHSZ. The Proposed Project would be located on a relatively flat, currently developed area surrounded by the Napa River and irrigated vineyard. The Proposed Project does not involve unique slopes or other factors that would exacerbate wildfire risks. Therefore, wildfire risk would not be exacerbated and the potential to expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of wildfire is less than significant.

Question C

If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project: Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?

Less than Significant. As mentioned above, the Proposed Project is not located in a SRA or a very high FHSZ. The MBR treatment system and associated upgrades would be constructed and located on currently developed areas of the WWTRP. As part of the Proposed Project, the electrical system at the WWTRP would be upgraded to meet the most current design criteria adopted by the City and Napa County. This would include the installation of a 480-volt transformer along the northern boundary of the Project site along Chaix Lane, with electricity supplied by PG&E. Overhead distribution lines exist in the vicinity of the Project site. It is not anticipated that new distribution lines, whether overhead or underground, would be necessary to serve the Proposed Project. As mentioned in **Section 2.4.2**, the electrical system would satisfy the requirements of the Electrical Safety Order of the CCR and National Fire Protection Association No.70, the National Electrical Code. Electrical equipment and upgrades would be designed and constructed in accordance with applicable codes. Once installed, the electrical system would not exacerbate fire risk and may result in a reduced fire risk, as the electrical system has not been upgraded since the WWTRP was constructed in 1966. Impacts would be less than significant.

Question D

If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project: Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?

No Impact. As mentioned above, the Proposed Project is not located in a SRA or a very high FHSZ. As described in **Section 3.8**, Geology and Soils, the Proposed Project is not located on an unstable geologic unit or soil and does not have a high risk of landslides or liquefaction. The Project site is currently developed and would not require grading that would alter drainage patterns. Therefore, the Proposed Project would not expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes. No impact would occur.

Cumulative Impacts

No Impact. Operation of the Proposed Project and cumulative projects could result in a cumulative impact if these projects exacerbated wildfire risk. The Project site and surrounding area is within City limits and not within a FHSZ. Furthermore, this area is largely developed with irrigated vineyards, which is a landscape that reduces the potential for uncontrolled wildfire. Therefore, the Proposed Project would not contribute to cumulative impacts related to wildfire.

3.21.4 MITIGATION MEASURES

None required.

3.22 MANDATORY FINDING OF SIGNIFICANCE

MANDATORY FINDINGS OF SIGNIFICANCE	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)	☐	☒	☐	☐
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☒	☐	☐

Question A

Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?

Less than Significant with Mitigation. As discussed in the previous sections, the Proposed Project could potentially have significant environmental effects with respect to Air Quality, Biological Resources, Cultural Resources, Hazards and Hazardous Materials, Hydrology and Water Quality, and Tribal Cultural Resources. However, the impacts of the Proposed Project would be reduced to a less-than-significant level with the implementation of the mitigation measures identified in the sections.

Question B

Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)

Less than Significant with Mitigation. Cumulative impacts for each resource area have been considered within the analysis of each resource area. When appropriate, mitigation measures have been provided to reduce all potential impacts to a less-than-significant level.

Question C

Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?

Less than Significant with Mitigation. The potential direct environmental effects of the Proposed Project have been considered within the discussion of each environmental resource area in the previous sections. When appropriate, mitigation measures have been provided to reduce all potential impacts to a less-than-significant level.

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APPENDICES

APPENDIX A

CONCEPTUAL DESIGN REPORT

City of St. Helena

WWTRP Phase 1 Upgrade Conceptual Design Report

Prepared by HydroScience Engineers, Inc.

October 2019

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TABLE OF CONTENTS

SECTION 1 – Introduction **1-1**
1.1 Background 1-1
1.2 Previous Studies 1-2
SECTION 2 – Existing WWTRP Facilities **2-1**
2.1 Existing Wastewater Treatment Process Description 2-1
2.1.1 Headworks and Primary Pump Station 2-1
2.1.2 AIPS System 2-3
2.1.3 Ponds 1A & 1B 2-4
2.1.4 Pond 2 2-4
2.1.5 Pond 3 2-4
2.1.6 Pond 4 2-5
2.1.7 Pond 5 2-5
2.1.8 Disinfection 2-5
2.2 Effluent Disposal 2-6
2.3 Effluent Limitations 2-6
SECTION 3 – Flows and Loads **3-8**
3.1 Current Flow and Loads 3-8
3.2 Influent Flow Design Basis Recommendation 3-11
3.3 Design Loading Recommendations 3-11
3.4 Seasonal Storage/Flow Equalization 3-17
SECTION 4 – Conceptual Treatment Alternatives **4-1**
4.1 MBR 4-1
4.1.1 Conventional MBR Treatment Plant 4-2
4.1.2 Packaged MBR Treatment Plant 4-7
4.2 SBR with Tertiary Filtration 4-13
4.2.1 Tertiary Filtration 4-17
4.3 Ultraviolet Disinfection 4-17
4.4 Comparison of Treatment Alternatives 4-18
4.4.1 Effluent Quality 4-18
4.4.2 Operations & Maintenance 4-19
4.4.3 Cost 4-20
SECTION 5 – Common WWTRP Facility Improvements **5-1**
5.1 Headworks and Primary/Secondary WWTRP Distribution Improvements 5-5
5.2 Pond Retrofit 5-8
5.3 Solids Handling 5-10
5.4 Site Improvements 5-12
5.5 Flow Meter Reconstruction 5-13
5.6 Chlorine Disinfection System and Effluent Pump Station 5-13
5.7 Domestic Water System 5-15
5.8 Electrical Improvements 5-16
5.9 Instrumentation and Controls 5-17

SECTION 6 – Preferred alternative 6-1
6.1 Final Recommendations..6-1
6.2 Engineer’s Preliminary Opinion of Probable Cost – Phase 1 Upgrades.......................6-1
6.3 Funding Options...6-3
SECTION 7 – References...7-1

LIST OF FIGURES

Figure 1-1: Vicinity Map 1-3
Figure 1-2: Current WWTRP Plant Layout 1-4
Figure 2-1: Current Process Flow 2-2
Figure 3-1: Daily Influent Flow and Rainfall, 2017-2019 3-9
Figure 3-2: Influent BOD Loadings.. 3-12
Figure 3-3: Influent TSS Loadings 3-12
Figure 3-4: Influent BOD Concentrations and Flow (2017-2019).. 3-15
Figure 3-5: Influent TSS Concentrations and Flow (2017-2019).. 3-16
Figure 4-1: Conceptual MBR Process Flow Diagram 4-5
Figure 4-2: Conceptual MBR Treatment Plant Site Plan 4-6
Figure 4-3: Example of Pre-Engineered, Packaged MBR Treatment Plant (Cloacina, 2019) 4-8
Figure 4-4: Conceptual Packaged MBR Process Flow Diagram 4-11
Figure 4-5: Conceptual Packaged MBR Treatment Plant Site Plan.................................... 4-12
Figure 4-6: Conceptual SBR Process Flow Diagram.. 4-15
Figure 4-7: Conceptual SBR Treatment Plant Site Plan 4-16
Figure 5-1: Overall Conventional MBR Improvement Plan 5-2
Figure 5-2: Overall Packaged MBR Improvement Plan 5-3
Figure 5-3: Overall SBR Improvement Plan 5-4

LIST OF TABLES

Table 2-1: Approximate Size of Existing Ponds 2-3
Table 2-2: NPDES/Reclamation Permit Water Quality Limitations 2-7
Table 2-3: Interim BOD and TSS Effluent Limits 2-7
Table 3-1: Influent Wastewater Analytical Flow Data 3-8
Table 3-2: Average Dry Weather Flow 3-10
Table 3-3: Influent Flow Design Basis Recommendations 3-11
Table 3-4: 2016-2019 Loading Rates.. 3-13

Table 3-5: Per Capita Loadings and Peak Loading Factors 3-13
Table 3-6: Projected Mass Loadings 3-13
Table 3-7: Recommended WWTRP Loading Rates for Phase 1 and Future Upgrades 3-14
Table 3-8: Approximate Size of Existing WWTRP Ponds 3-17
Table 3-9: Maximum Storage Volume to Store Historic Influent Flows 3-17
Table 4-1: Conventional MBR Screening Design Criteria 4-2
Table 4-2: MBR Design Criteria 4-4
Table 4-3: Conventional MBR Screening Design Criteria 4-7
Table 4-4: Packaged MBR Design Criteria 4-10
Table 4-5: Preliminary SBR Design Criteria 4-14
Table 4-6: Preliminary Tertiary Filtration Design Criteria 4-17
Table 4-7: Preliminary UV Disinfection Design Criteria 4-18
Table 4-8: Comparison of SBR and MBR Effluent Quality 4-18
Table 4-9: Cost Comparison of MBR vs SBR Treatment Alternatives 4-20
Table 5-1: Preliminary Design Criteria for Secondary Submersible Lift Station 5-6
Table 5-2: Existing Primary Pump Station Pump Data 5-6
Table 5-3: Preliminary Drying Bed Design Criteria for Conventional MBR & SBR 5-11
Table 5-4: Preliminary Volute Dewatering System Design Criteria for Packaged MBR 5-12
Table 6-1: Engineers Preliminary Opinion of Probable Cost – Phase 1 Upgrades 6-2

LIST OF APPENDICES

Appendix A: NPDES Permit No. CA0038016 (Order No. R2-2016-003)

Appendix B: Water Reclamation Permit (Order No. 87-090)

Appendix C: Cease and Desist Order No. R2-2016-004

Appendix D: St Helena Schedule Update - 1-18 042919

Appendix E: Flow Data

Appendix F: Preliminary Vendor Information for Conventional MBR Treatment Systems

Appendix G: Preliminary Vendor Information for Packaged MBR Treatment Systems

Appendix H: Preliminary Vendor Information for SBR Systems

SECTION 1 – INTRODUCTION

This Conceptual Design Report (Report) was prepared by HydroScience Engineers (HydroScience) for the City of St. Helena (City) in support of upgrading its Wastewater Treatment and Reclamation Plant (WWTRP).

This Report was prepared to analyze the current operations at the City's WWTRP and determine alternatives to upgrade the facilities to comply with the new, more stringent effluent limits required under its 2016 San Francisco Bay Regional Water Quality Control Board (RWQCB) National Pollutant Discharge Elimination System Permit No. CA0038016 (Order No. R2-2016-0003) (NPDES Permit), which is included in **Appendix A**. This Report is anticipated to help define WWTRP Upgrade Project (Project) alternatives and provide technical project requirements. The City expects to select a preferred Project based on this Report and procure a design-build team to implement near-term improvements to the WWTRP.

1.1 Background

The City of St. Helena WWTRP is located at 1 Chaix Lane/Thomann Lane, St. Helena in Napa County, southeast of the City and adjacent to the Napa River. **Figure 1-1** illustrates the geographical location of the City's WWTRP. The City of St. Helena owns and operates the WWTRP and its associated wastewater collection system. The WWTRP provides secondary treatment of wastewater collected from its service area in accordance with its NPDES Permit. An aerial view of the WWTRP layout is included as **Figure 1-2**.

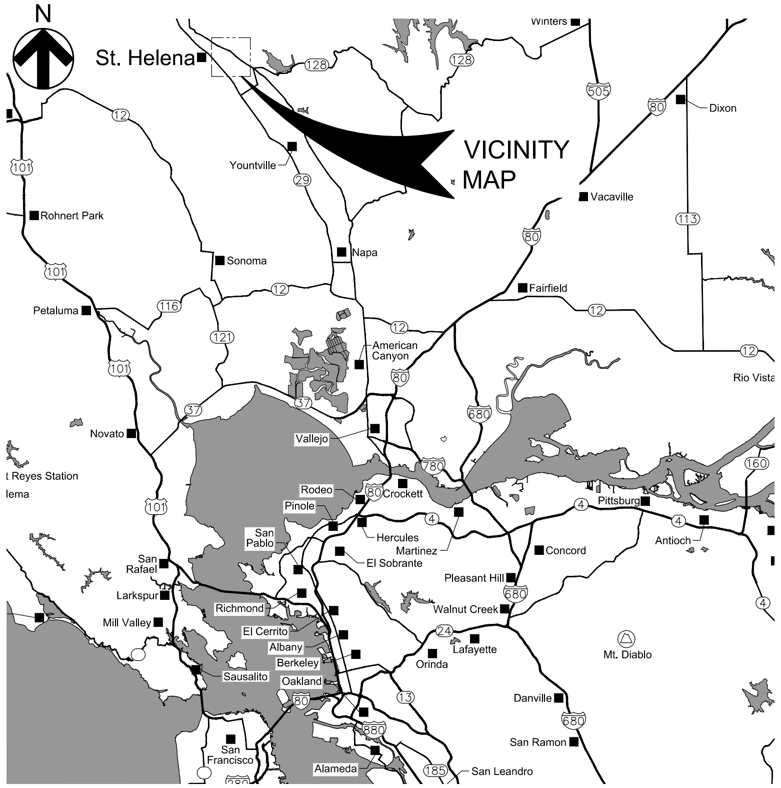
The WWTRP currently provides wastewater treatment to approximately 18.8 miles of collection system, ranging from 4 to 24-inches in diameter, and two sewer lift stations located on Crinella Drive and Charter Oak Avenue. According to City records, the sewer service area is comprised of 82% single family residential, 7% multi-family residential, and 11% commercial/industrial properties which include three wineries. One winery produces domestic wastewater while the two other wineries discharge both domestic and industrial strength wastewater to the WWTRP.

Concurrent with the issuance of its NPDES Permit, the City was also issued Cease and Desist Order (CDO) No. R2-2016-0004. The CDO was issued because the WWTRP, as currently configured, could not be expected to reliably meet the new discharge limitations issued in the NPDES Permit. The CDO included a Time Schedule Order for compliance with the discharge requirements and other interim compliance milestones.

1.2 Previous Studies

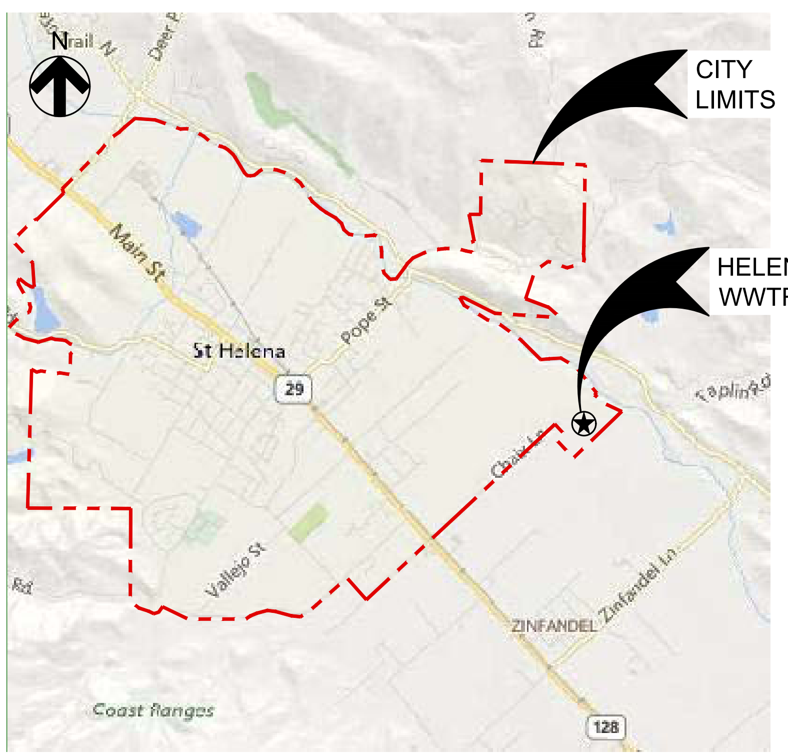
The City has previously commissioned various studies to analyze existing WWTRP operations and assess the feasibility of facility upgrades. These studies primarily focused on documenting current process effectiveness, condition assessment, and provided improvement recommendations that would enhance the facility's ability to meet effluent limitations in the future term. These studies were provided to HydroScience by the City and are summarized below.

- **West Yost & Associates, WWTRP Upgrades and Water Recycling Project Design Memorandum, May 2006.** This evaluation was prepared to mitigate operational issues identified by the City's annual discharge reports and facilitate development of defining the design criteria for WWTRP expansion and upgrades. This report evaluated wastewater flows and loadings, performed condition assessment of existing treatment processes, analyzed feasible upgrades and improvement alternatives, and determined a baseline for recycled water demands and distribution opportunities.
- **West Yost & Associates, City of St. Helena Water Supply Plan, October 2010.** This plan reviews the City's potable water demand projections and water supply. It recommends water supply strategies that would facilitate the City's General Plan and Housing Element while addressing future water supply deficiencies. In this report, the implementation of a recycled water program by utilizing the WWTRP's effluent is discussed.
- **City of St. Helena, Wastewater Treatment & Reclamation Plant/Collection System Facilities Status & Planning, October 2014.** This document was prepared to recalibrate the City of St. Helena's operational design capacities and future growth projections. City Staff utilized influent flow data to the WWTRP and recent population growth approximations to determine that average estimated per capita flows did not increase according to the trends established by West Yost in the 2006 Design Memorandum. As a result, the City recommended a reduction to the future Average Dry Weather Flow (ADWF) stated in the 2010 NPDES Order No. R2-2010-0105 from 0.84 MGD to 0.65 MGD.
- **Bennett Engineering Services, City of St. Helena Wastewater Facilities Evaluation Update, March 2015.** This evaluation reviews the WWTRP's condition in support of the City's 2016 NPDES Discharge Permit application. It provided information on capacity, effluent quality, growth projections, and other relevant information necessary to meet capacity and effluent quality requirement for the projected 2030 flows.
- **GHD, City of St. Helena Wastewater Treatment and Reclamation Plant Improvements Feasibility Study, June 2018.** This study was prepared in conformance with the CDO. It provided upgrade options that the City may take to meet the 2016 NPDES Discharge Permit requirements.
- **GHD, City of St. Helena Wastewater Treatment and Reclamation Plant Facilities Master Plan, May 2018 Draft.** This master plan includes qualitative assessments of the components of the WWTRP. It considered staff input and assets critical to the WWTRP and provided near-term and long term improvements.



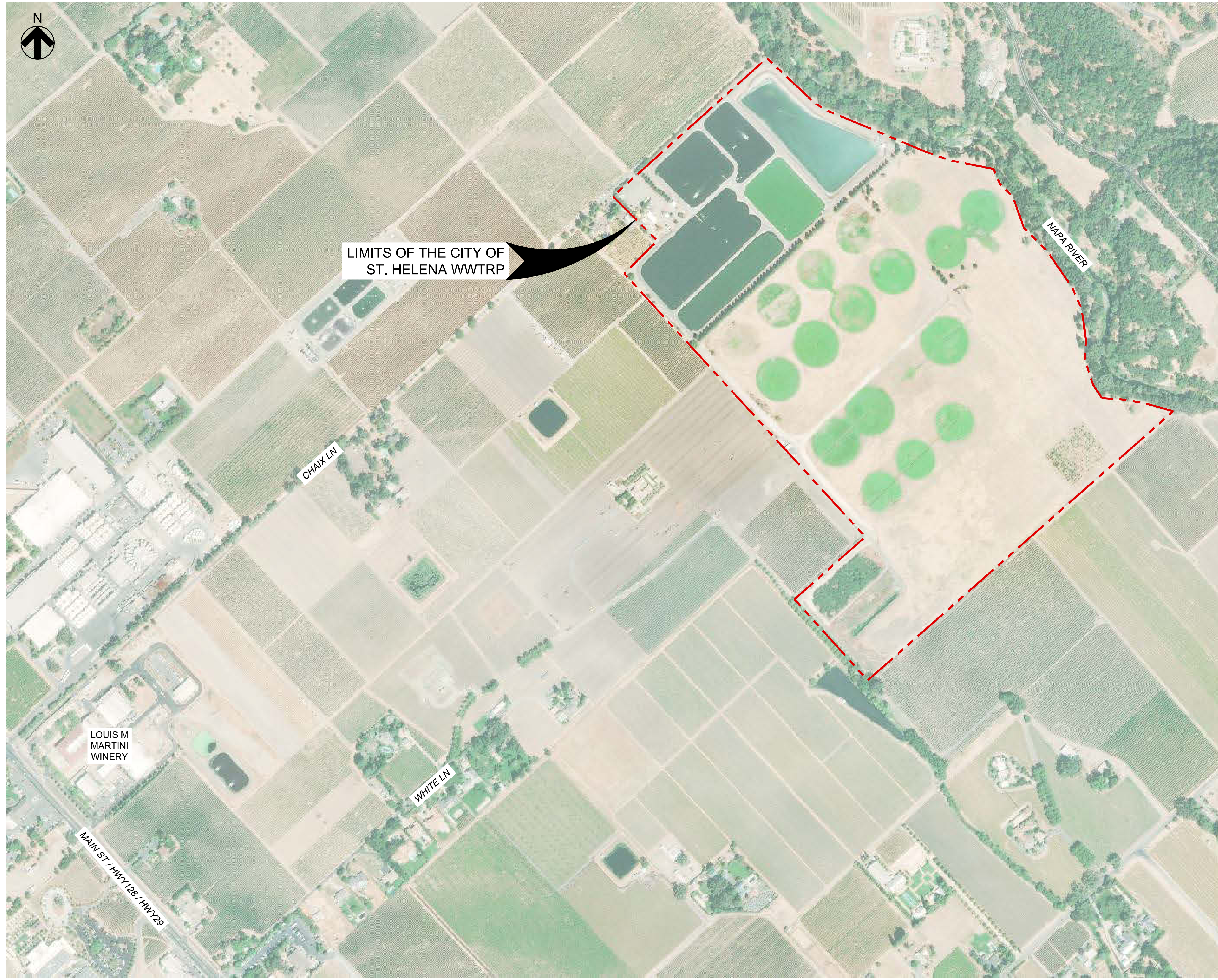
KEY MAP

SCALE: NTS



VICINITY MAP

SCALE: NTS



LOCATION MAP

GRAPHIC SCALE

-600 0 600 1,200

(IN FEET)
1 inch = 600 ft.

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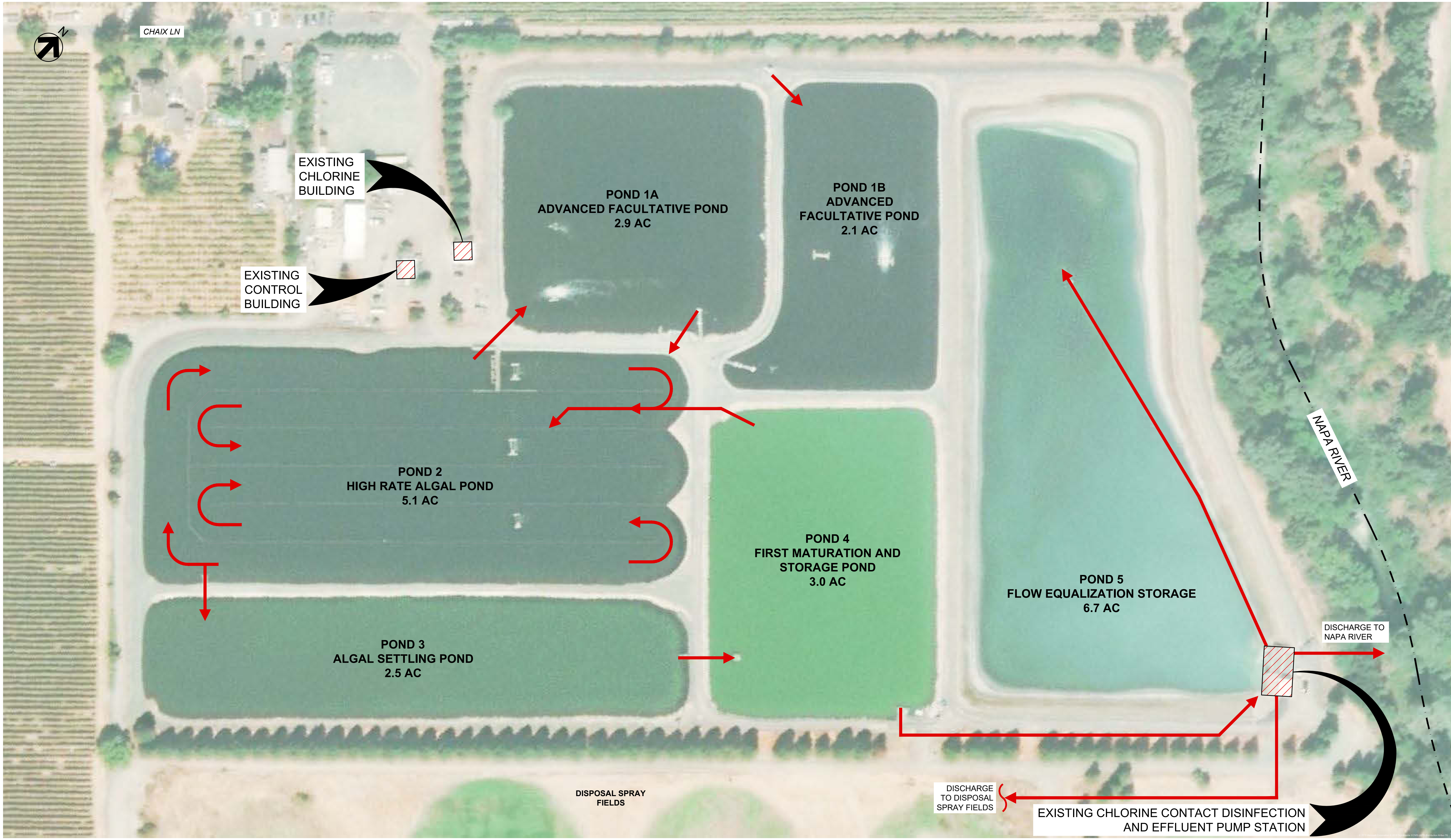
FIGURE 1-1
City of St. Helena
WWTRP Conceptual Design Report
Key Map, Vicinity Map & Location Map



GRAPHIC SCALE
-120 0 120 240
(IN FEET)
1 inch = 120 ft.

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FIGURE 1-2
City of St. Helena
WWTRP Conceptual Design Report
Facility Layout

SECTION 2 – EXISTING WWTRP FACILITIES

The existing WWTRP operates using an Advanced Integrated Wastewater Pond System (AIPS) permitted for an average dry weather flow of 0.5 MGD and a peak weather flow capacity of 2.8 MGD. The WWTRP discharges seasonally to the Napa River and year-round to irrigation spray fields located to the south of the WWTRP treatment ponds. A process flow diagram illustrating the current AIPS treatment system is shown in **Figure 2-1.**

2.1 Existing Wastewater Treatment Process Description

The WWTRP is comprised of the following treatment units:

- Headworks and Primary Pump Station
- Pond 1A – Type 1 AIPS primary inlet anaerobic digester
- Pond 1B – Type 2 AIPS
- Pond 2 – Type 1 AIPS High-Rate Algal Production (HRAP)
- Pond 3 – Type 1 AIPS algal settling and maturation
- Pond 4 – Maturation and flow equalization
- Disinfection Facilities – Chlorine contact basin and de-chlorination basin
- Pond 5 – Disposal storage and flow equalization
- Effluent Disposal – Reclamation by disposal fields or surface water discharge to the Napa River

Each of the aforementioned unit processes are further described in the sections below. Existing WWTRP facilities also include non-potable water supply infrastructure, chemical distribution, roads, permanent fencing, four buildings (Control/Primary Pump Station, Sodium Hypochlorite Storage, Effluent Pump Station/Disinfection, and Maintenance Shop buildings), process equipment, and electrical infrastructure.

2.1.1 Headworks and Primary Pump Station

Wastewater from the 24-inch influent sewer is received at the WWTRP primary pump station located in the WWTRP headworks facility and control building. Raw wastewater from the City's collection system enters the WWTRP headworks through a 24-inch influent gravity sewer pipeline. Influent sewage passes a set of parallel Channel Monster comminutors (grinders) that collects in a below grade wet well prior to distribution to the AIPS treatment ponds. The primary pump station distributes primary wastewater through a 16-inch force main to a flow distribution structure located between Ponds 1A and 1B.

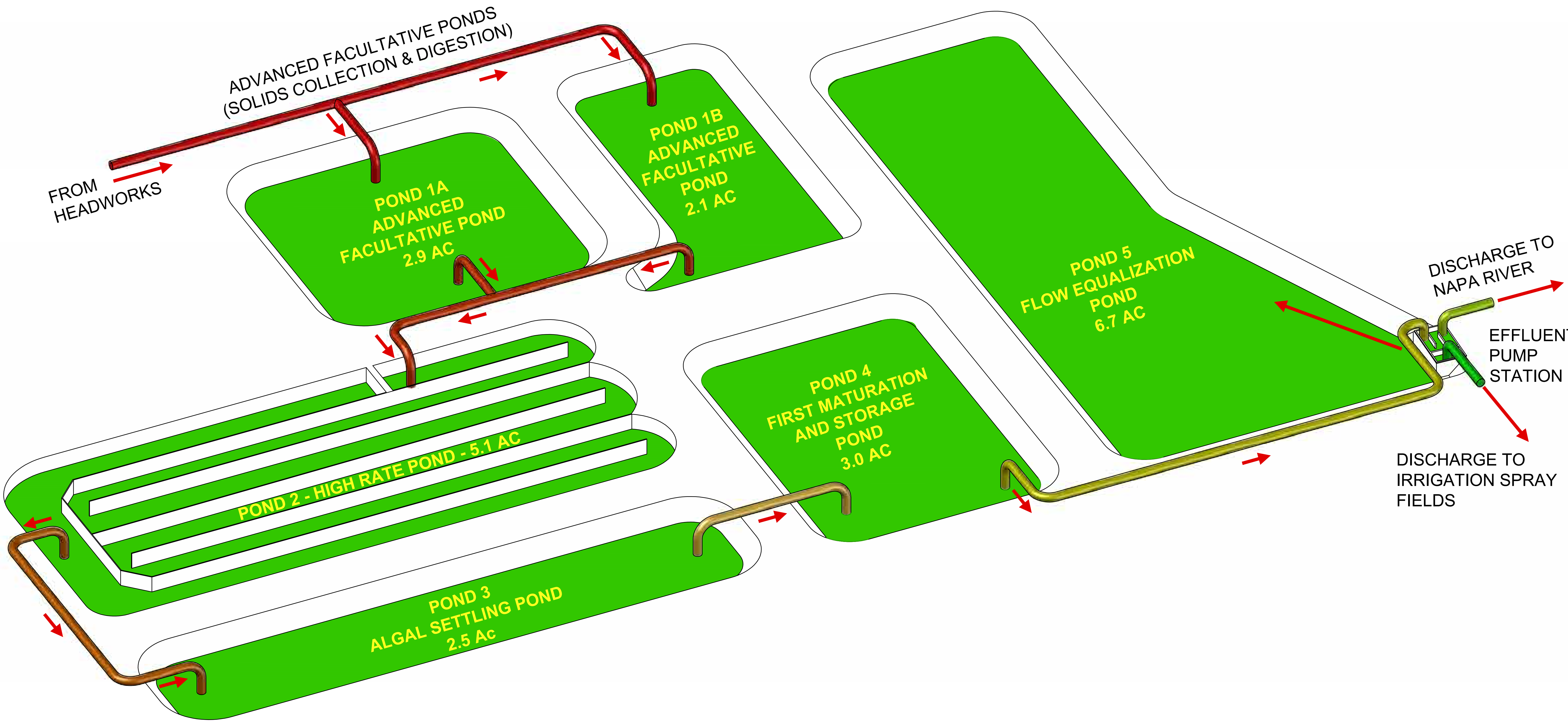

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FIGURE 2-1
City of St. Helena
WWTRP Conceptual Design Report
Current Process Flow

The WWTRP headworks facility and control building is a two-story structure that combines the influent headworks, primary pump station, office, operations building, electrical rooms, and laboratory facilities. The primary pump station and headworks are below the operations building and are accessed by separate stair cases. Due to the original design of the building, both below grade structures have poor maintenance access for installation and removal of equipment. All structures, electrical equipment and operations facilities are from original construction in 1966.

According to the WWTRP Facilities Master Plan, the existing channel monster comminutors were installed in 2005. The Facilities Master Plan notes that the comminutors were in good operational condition and the grinder cutting equipment was recently replaced. All sewage entering the WWTRP passes the existing comminutors to minimize the relative diameter of entering solids and debris and prevent clogging of the primary influent pumps. The existing primary influent pump station operates as a triplex pumping system designed to distribute a peak wastewater flow of 6.62 MGD. The existing pumps are dry-pit, submersible style pumps that pull water from the wet well based upon a level control system.

2.1.2 AIPS System

The WWTRP AIPS system consists of a series of five ponds that provide secondary level wastewater treatment. The AIPS is an adaptation of a waste stabilization ponds system based on a series of four advanced treatment ponds:

1. Advanced facultative ponds;
2. High rate algal pond for degradation of BOD and nutrient uptake;
3. Algal settling pond;
4. Final maturation pond for solar disinfection and pathogen inactivation.

The approximate size of each existing treatment pond is summarized in **Table 2-1**.

Table 2-1: Approximate Size of Existing Ponds

Pond No.	Name	Surface Area (Acres)	Water Depth (feet)	Volume (MG)
1A	Advanced Facultative Pond (Type 1)	2.9	10	8.1
1B	Advanced Facultative Pond (Type 2)	2.1	17.5 (Stage 1) 14.5 (Stage 2) 17.5 (Stage 3)	7.5
2	High Rate Algal Pond	5.1	3	4.0
3	Algal Settling Pond	2.5	9	6.3
4	First Maturation and Storage Pond	3.0	11.5	9.8
5	Flow Equalization Storage	6.7	13	24.6

Notes:
1. Source: *2015 WWTRP Wastewater Facilities Evaluation Update* (Bennett Engineering, 2015).

Once influent flow is distributed between Ponds 1A and 1B, wastewater flows sequentially through each pond by gravity. Wastewater leaves Ponds 1A and 1B via a circular outlet structure located between the ponds, which conveys flow to Pond 2. The outlet structure also has a bypass that allows flow to go directly to Pond 4. A portion of flow from Pond 2 is recirculated to Pond 1A and

1B to increase the dissolved oxygen concentration and algae development. Recirculated flow enters Ponds 1A and 1B through an inlet pipe located on the north ends of each pond. Flow is conveyed from Pond 2 to Pond 3, and from Pond 3 to Pond 4 using transfer structures through the levees. Flow from Pond 4 flows by gravity to the chlorine contact tanks through a 21-inch pipe located south of Pond 4 and Pond 5 under an access road. A detailed description of the AIPS system and function of each pond is provided below.

2.1.3 Ponds 1A & 1B

Pond 1A, constructed in 1965, was designed as a Type 1 AIPS which is a pond that acts as both a primary settling basin and a facultative pond. Pond 1A was originally constructed with a flat bottom and a water depth of approximately 10 ft.

Pond 1B was added during the 1990s to be a Type 2 AIPS, a modified version of the primary facultative pond. Pond 1B is segmented into three distinct cells by submerged berms. The first cell is an anaerobic flow contact “fermenter” with a depth of approximately 17.5 ft. The second cell is a mechanically aerated facultative pond where biological oxygen demand (BOD) is consumed by aerobic digestion. The third cell is another anaerobic pond designed as a quiescent settling zone, where solids can settle for anaerobic decomposition.

Oxygen-rich water from the high rate algal pond (Pond 2) is recirculated to Ponds 1A and 1B with a 5.0 hp Flygt pump to increase circulation around the ponds. The ponds also contain floating mechanical aerators.

Pond 1A and 1B were historically operated in parallel but currently operate in series. According to City Staff, the ponds are no longer operable in parallel. A previous study recommended that the influent distribution box to both ponds be modified using valves and piping to allow operation in both parallel and series (GHD, May 2018).

2.1.4 Pond 2

The Pond 2 HRAP pond is shallow (3 ft depth) and is intended to allow sunlight to penetrate the entire depth to facilitate algal growth, photosynthesis, and oxygen generation. Mixing equipment in Pond 2 is designed to maintain low flow velocity to minimize disruption to algae. Wastewater is discharged from Pond 2 to Pond 3 by gravity.

The 2015 Facilities Evaluation noted that Pond 2 routinely accumulates settled algae solids due to the nature of the pond design for algal growth and slow flow velocities.

2.1.5 Pond 3

Pond 3 is an algal settling pond with a race-track design. Wastewater flows quiescently through the pond allowing algae to settle. Effluent flows by gravity to Pond 4. Pond 3 effluent can also be discharged directly to the chlorine disinfection system if Pond 4 is offline.

2.1.6 Pond 4

Pond 4 is the first maturation and storage pond which is designed to continue the reduction of waste constituents through natural stratification, surface area, oxygen transfer and photosynthesis. Pond 4 is also designed to increase the hydraulic residence time of the overall process by equalizing flow prior to disinfection. Wastewater exits Pond 4 through an overflow structure which distributes secondary treated effluent to the chlorine contact basin located in the southeast corner of Pond 5. Prior to wet-weather conditions, the water level in Pond 4 can be drawn-down to provide operational flexibility and storage volume redundancy for maintenance staff.

2.1.7 Pond 5

Pond 5 is a large flow equalization basin which stores treated, disinfected effluent prior to disposal. Prior to storage, Pond 5 has an effluent discharge pipe, which discharges approximately 550 to 600 feet from the edge of the effluent Pump Station building, on the northwest end of the pond. Water that travels through the chlorine contact basin is eventually pumped to the north end of Pond 5 to encourage mixing of disinfected effluent. Previous studies have indicated that there is a leak in this pipeline approximately 180 feet from the edge of the Effluent Pump Station building that allows for some short circuiting to occur, and recommends that the pipe be replaced (GHD, May 2018).

2.1.8 Disinfection

The existing WWTRP disinfection system includes sodium hypochlorite storage and distribution, a baffled chlorine contact basin, chemical metering and pumping equipment, submerged diffusers, ascorbic acid dechlorination and a small operations room. All water entering Pond 5 is disinfected with sodium hypochlorite prior to equalization storage and disposal. The existing chlorine contact basin no longer operates as a plug flow system due to the hydraulic effects of depreciated baffle walls and adverse mixing. The chlorine contact basin is also relatively small when compared to the significant fluctuations of influent flow to the WWTRP. Therefore, due to these operational deficiencies, the City has difficulty managing chlorine contact times and chemical dosage rates to effectively complete the disinfection process.

Dechlorination of disinfected effluent is utilized prior to discharge to prevent discharge of effluent with positive chlorine concentrations to the Napa River. Dechlorination is performed using two different methods; natural decomposition and addition of ascorbic acid. Flow intended for discharge to the Napa River is sampled in Pond 5 and then dechlorinated when positive chlorine residual concentrations are observed. The point at which dechlorination occurs is immediately downstream of the WWTRP discharge channel.

Currently, the chemical dechlorination system is manually operated by City Staff and requires constant adjustment of ascorbic acid according to the expected discharge flow rate and free chlorine concentrations. Due to the complexities of manual dechlorination and lack of automated dosing, sampling, and instrumentation, the City has had difficulty continuously meeting the NPDES Permit effluent limitation due to insufficient dechlorination chemical contact times prior to surface water discharge.

2.2 Effluent Disposal

All effluent produced by the WWTRP is either discharged to the Napa River or land disposed of onto spray fields. During wet weather periods and when flow in the Napa River is high enough, effluent is discharged to the Napa River. During the discharge prohibition period or when flows in the Napa River are not high enough, effluent is stored in Pond 5 and then discharged to the irrigation spray fields located to the southeast of the WWTRP.

Secondary effluent going to Pond 5 passes through the chlorine contact basin and then is pumped 550-600 feet north through the effluent discharge pipe to the north end of Pond 5. Pumping chlorinated effluent to the far end of Pond 5 is important in order to promote adequate mixing of Pond 5 and prevent system short circuiting. The existing pumps are old and moderately corroded and were originally capable of diverting effluent discharge to the irrigation spray fields.

Effluent discharge to the Napa River is gravity fed using an open channel and controlled by a manually operated sluice gate. The effluent discharge channel diverts treated wastewater from Pond 5 to a small discharge structure located east of Pond 5. Ascorbic acid solution is gravity fed to the effluent discharge structure where effluent is mixed and dechlorination occurs. The NPDES Permit prohibits discharge to the Napa River unless the river flow-to-wastewater effluent ratio is 50:1, and prohibits discharge to the Napa River between June 1 and October 31.

Flow is pumped from Pond 5 to the irrigation spray fields by an irrigation spray field pump station located in an underground structure beneath the chlorine contact tanks. The WWTRP is permitted to discharge effluent to 87 acres of spray fields located south of the WWTRP. Land application to the spray fields is prohibited during rainfall, or when soils are saturated and runoff is likely. Chlorinated effluent is discharged to spray fields using the Effluent Pump Station, located beneath the chlorine contact tanks. The reclamation of its effluent for discharge to the City's spray irrigation fields is regulated under a Water Reclamation Permit (Order No. 87-090) (Reclamation Permit), included as **Appendix B**.

2.3 Effluent Limitations

When the RWQCB issued the NPDES Permit, the effluent water quality requirements were more stringent than the WWTRP could meet. Thus, the RWQCB issued CDO No. R2-2016-0004, included as **Appendix C**, requiring the City to upgrade the WWTRP by implementing advanced secondary treatment and issuing a time schedule order for compliance. Due to the October 2017 Napa Fires, the City experienced delays in its compliance progress and requested revisions to the compliance deadlines set by the RWQCB. In January 2018, the RWQCB approved a request by the City to revise the compliance schedule associated with the CDO. The revised scheduled (**Appendix D**), requires that the City achieve full compliance by March 1, 2023. Applicable water quality requirements in the NPDES Permit and Reclamation Permit are shown on **Table 2-2**.

Table 2-2: NPDES/Reclamation Permit Water Quality Limitations

Parameter	Units	Effluent Limitations		
		Napa River		Land Application
		Monthly Avg	Weekly Avg	
BOD5	mg/L	15	25	40
TSS	mg/L	15	20	--
Total Coliform Bacteria	MPN/ 100 mL	≤ 23, 5-sample median		≤ 23, 7-sample median
		≤ 240, any single sample		≤ 240, any two consecutive samples
Oil and Grease	mg/L	10, average daily 20, average monthly		--
pH	--	6.5-8.5, instantaneous		--
Total Residual Chlorine	mg/L	0		--
Copper, Total	µg/L	8.3		--
Cyanide, Total	µg/L	30		--
Ammonia, Total	mg-N/L	39		--

Unit Abbreviations:
mg/L = milligrams per liter
µg/L = micrograms per liter
MPN/100 mL = most probably number per milliliter

In addition to the water quality limitations outlined in the NPDES Permit after construction of the improvements, interim effluent water quality limits were also adopted for the existing plant effluent prior to construction of the new WWTRP. The interim BOD and TSS limits are presented in **Table 2-3**.

Table 2-3: Interim BOD and TSS Effluent Limits

Parameter	Weekly Average (mg/L)	Monthly Average (mg\L)
BOD_5	45	30
TSS	45	30

SECTION 3 – FLOWS AND LOADS

This section summarizes the WWTRP historical flows and loadings to provide a basis for developing design criteria for the proposed WWTRP improvements.

3.1 Current Flow and Loads

The City of St. Helena provided daily WWTRP influent wastewater flow data for the two-year period between February 1, 2017 and January 31, 2019. Tabular and plot summaries of the daily influent flow data are included in **Table 3-1** and **Figure 3-1**, respectively.

Consistent with all previous studies, current data analysis supports the conclusion that wet weather flow variation is due to rainfall derived infiltration and inflow (RDII). This flow response indicates that influent flow increases during precipitation events and then decreases rapidly after precipitation ceases. Previous studies have also hypothesized that late season rain events impact the WWTRP more significantly due to antecedent soil saturation and high groundwater elevations.

Table 3-1: Influent Wastewater Analytical Flow Data

Flow Parameter	Flow (MGD)
Average Day Daily Flow	0.526
Average Day Dry Weather Flow	0.377
Minimum Day Dry Weather Flow	0.243
Maximum Day Dry Weather Flow	0.800
Minimum Day Flow	0.197
Average Day Max Month Flow	2.052
Average Day Wet Weather Flow	0.816
Peak Day Max Month Flow	3.777

Notes:
1. Average Day Daily Flow is average of all daily influent flow data for two-year period.
2. Average Day Dry Weather Flow is average of influent flow for June, July and August of 2017 and 2018.
3. Minimum Day Dry Weather Flow is reported as the minimum day flow during the June, July and August dry weather period.
4. Maximum Day Dry Weather Flow is reported as the maximum day flow during the June, July and August dry weather period.
5. Minimum Day Flow is reported as the minimum daily flow identified within two-year data set.
6. Average Day Max Month is calculated using the average daily flow of the maximum flow month of February 2017.
7. Average Day Wet Weather Flow is calculated using the average daily flow of wet weather months.

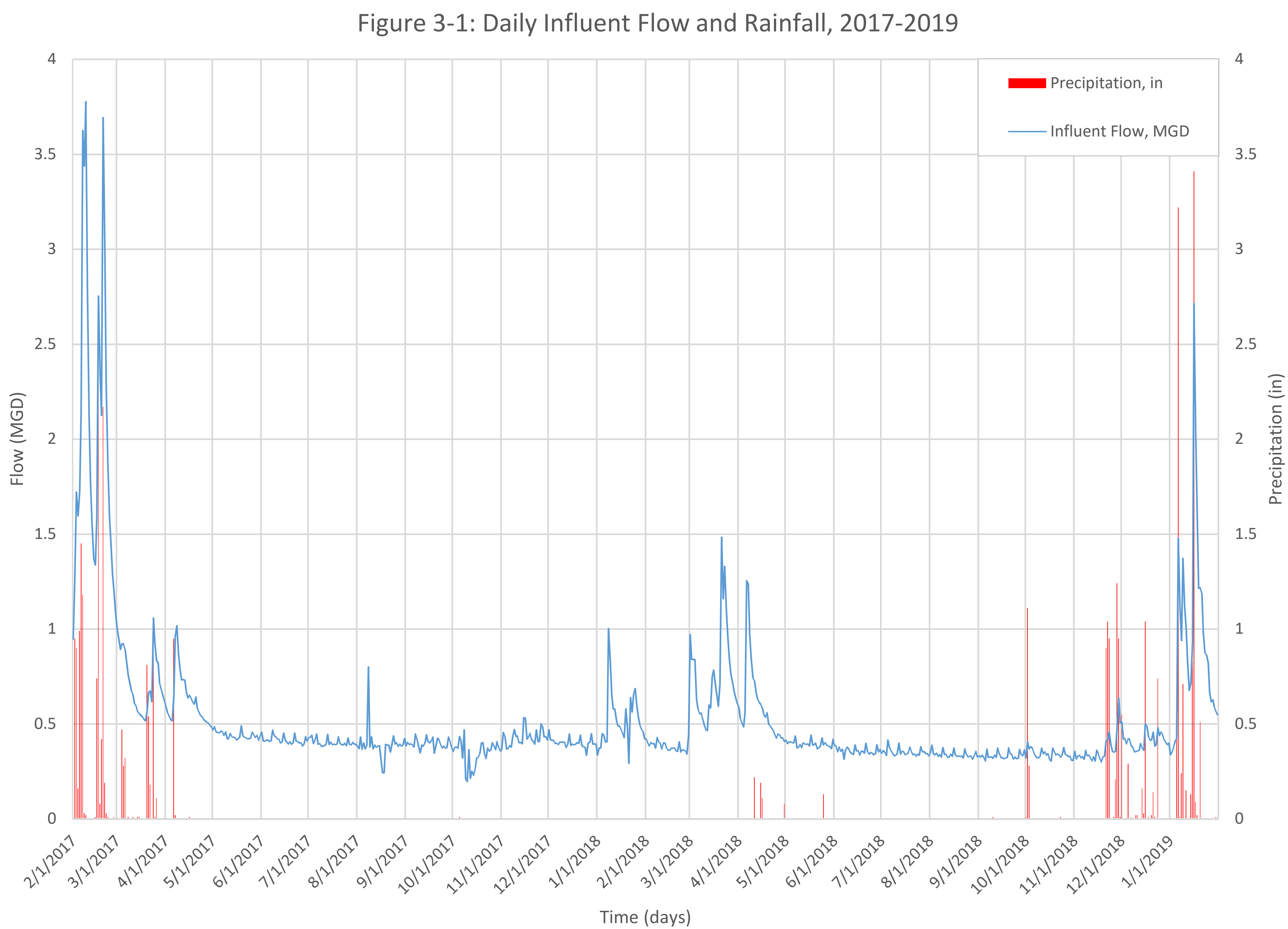


Figure 3-1: Daily Influent Flow and Rainfall, 2017-2019
Precipitation, in
Influent Flow, MGD
Flow (MGD)
Precipitation (in)
Time (days)
0
0.5
1
1.5
2
2.5
3
3.5
4
2/1/2017
3/1/2017
4/1/2017
5/1/2017
6/1/2017
7/1/2017
8/1/2017
9/1/2017
10/1/2017
11/1/2017
12/1/2017
1/1/2018
2/1/2018
3/1/2018
4/1/2018
5/1/2018
6/1/2018
7/1/2018
8/1/2018
9/1/2018
10/1/2018
11/1/2018
12/1/2018
1/1/2019

Table 3-2 presents the daily average, daily min, and daily max flow data during dry weather and wet weather. Short-term high flow events that are not connected to precipitation have still been observed at the WWTRP. During periods of rainfall, wet weather flows generally peak by up to ten times the ADWF.

According to previous studies, the City sanitary sewer collection system flow rates have historically exhibited a strong correlation to rainfall. As shown in **Figure 3-1,** peak WWTRP influent flows show the strongest flow correlation during precipitation events measuring over 1-inch of total daily rainfall. Additionally, the collection system's wet weather sensitivity appears to be particularly acute during periods of high groundwater and saturated soil conditions.

All of the available flow data from the analyzed period is presented in **Appendix E**.

Table 3-2: Average Dry Weather Flow

Flow Parameter	Dry Weather (MGD)	Wet Weather (MGD)
1995-2004[1]		
Daily Average	0.430	1.020
Daily Maximum	1.220	3.950
Daily Minimum	0.230	NA
2005-2014[2]		
Daily Average	0.415	0.735
Daily Maximum	0.671	3.731
Daily Minimum	0.261	NA
2017-2018[3, 4]		
Daily Average	0.377	0.816
Daily Maximum	0.800	3.777
Daily Minimum	0.243	0.293

Notes:
1. Reported as part of West Yost and Associates 2006 WWTRP Upgrades & Water Recycling Project.
2. Reported as part of City of St. Helena 2014 Operations Staff Wastewater Flow Analysis.
3. Flow data was not available for 2015 and 2016.
4. Calculated using data acquired for June-August period of 2017 & 2018 for dry weather and February 2017, December 2017 to February 2018, and December 2018 to January 2019.

3.2 Influent Flow Design Basis Recommendation

The proposed WWTRP flow parameters are presented in **Table 3-3**.

Table 3-3: Influent Flow Design Basis Recommendations

Flow Parameter	Phase I (MGD)	Future (MGD)
Average Dry Weather Flow[1]	0.50	0.65
Minimum Dry Weather Flow	0.24	0.20
Peak Hour Dry Weather Flow	0.95	1.20
Peak Hour Wet Weather Flow	5.20	5.20
Sustained Peak Flow	1.33	1.77
Design Peak Flow (Maximum Day)	1.50	2.00

The design peak wet weather flow rate is less than the observed peak hour weather flow rates because the existing ponds will be repurposed to be used as flow equalization and seasonal storage. The intent of the upgrade is to size the design peak flow to meet or exceed the sustained peak flow. Flows in excess of the design peak flow will be diverted to the equalization ponds for storage until influent flows decrease below the peak wet weather flow rate. The analysis of the capacity required for the ponds for equalization and emergency storage is discussed in **Section 3.4**.

Dry weather flow rates are expected to remain consistent with the ADWF identified in the NPDES Permit. Provisions to increase the ADWF to 0.65 MGD will be incorporated into planning of the plant where appropriate to minimize future capital costs. However, the treatment process will only be sized for an ADWF of 0.5 MGD during this project.

3.3 Design Loading Recommendations

HydroScience analyzed influent water quality data between 2016 and 2019 to evaluate the current WWTRP influent loading rates. Data was acquired from an Electronic Self-Monitoring and Reporting Program (eSMR) made publicly available by the RWQCB California Integrated Water Quality System (CIWQS). Water quality data was also provided by Larry Walker Associates, whom have been providing related various services to the City.

Limited water quality data was available after 2016, since reporting requirements mandated by the newly adopted Discharge Permit were reduced to a frequency of once per quarter during periods of discharge periods to the spray fields. During discharge to the Napa River, effluent water quality monitoring frequency increases to three times per week.

The influent BOD and TSS data are presented in **Figure 3-2** and **Figure 3-3**.

Figure 3-2: Influent BOD Loadings

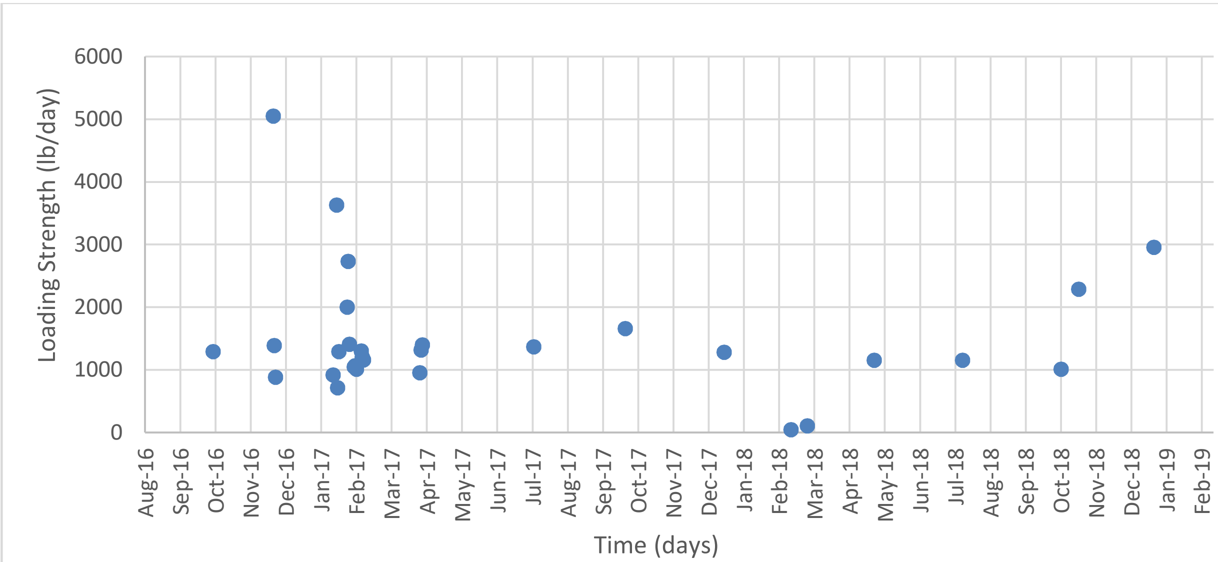
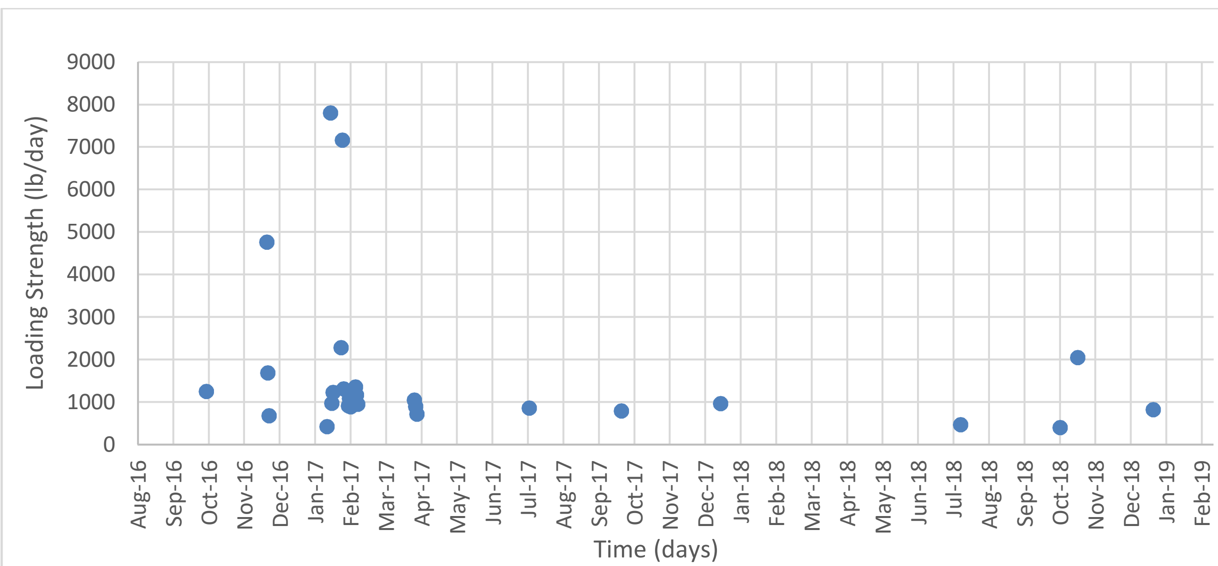


Figure 3-3: Influent TSS Loadings



A summary of the BOD, TSS and Ammonia loading parameters is presented in **Table 3-4**. The City does not sample for Ammonia, therefore, average influent ammonia concentrations were assumed to be twenty percent of the average influent BOD concentration for the purpose of this analysis.

Table 3-4: 2016-2019 Loading Rates

Loading Parameter	BOD (lbs/day)	TSS (lbs/day)	Ammonia (lbs/day)
Average Loading	1,490	1,550	300[1]
Sustained Peak Loading	2,290	3,380	460[1]
Maximum Day Loading	3,630	3,600	730[1]

Notes:
1. Ammonia loadings assumed to be approximately twenty percent of influent BOD loadings.

Constituent loadings were then determined on a per capita basis assuming a 2018 population of 6,118 residents. The per capita BOD, TSS, and Ammonia mass loadings are presented in **Table 3-5**.

Table 3-5: Per Capita Loadings and Peak Loading Factors

Loading Parameter	BOD	TSS	Ammonia
Average Loading (lb/Capita-day)	0.24	0.25	0.05
Sustained Peak Loading Factor	1.54	2.18	1.53
Maximum Day Peak Loading Factor	2.44	2.32	2.43

Using the average per capita loading rates and peak loading factors, current and future loading rates are approximated for BOD, TSS and ammonia in **Table 3-6.** Future City population was projected to increase by 0.5% per annum to 6,933 residents.

Table 3-6: Projected Mass Loadings

Loading Parameter	BOD (lbs/day)	TSS (lbs/day)	Ammonia (lbs/day)
Average Daily Loading			
Current	1,490	1,550	300
Future	1,688	1,756	340
Sustained Peak Loading			
Current	2,290	3,380	460
Future	2,595	3,830	521
Maximum Day Loading			
Current	3,630	3,600	730
Future	4,113	4,080	827

Results of the projected mass loading data analysis, summarized in **Table 3-6**, presented two primary issues which prohibited the application of this data as the basis of design for WWTRP upgrades.

Relying solely on this data resulted in overly conservative estimates of daily loading rates for TSS and Ammonia. The determination of high loading rates for TSS and Ammonia is primarily due to the lack of average dry weather influent loading data, which heavily skewed the influent loading data distribution.

Additionally, wastewater constituent concentrations for BOD and TSS tended to decrease as influent flow increased due to the increased presence of rainfall in the influent. It is believed that increased rainfall and influent flows would not result in similar BOD and TSS concentrations in the influent during higher flows, which is consistent with the available influent water quality data.

Therefore, a separate analysis was conducted using the inherent relationship between influent flow and constituent concentrations. Since the influent flow rates were previously determined for WWTRP upgrades, summarized in **Table 3-3,** HydroScience utilized the influent flow and concentration data provided in the WWTRP eSMR reports and constructed a two-year distribution of actual influent concentrations and flowrates. The relationship between influent BOD and TSS wastewater concentrations and influent flow rates are presented in **Figure 3-4** and **Figure 3-5**. These relationships illustrate the correlation between RDII and dilution of influent wastewater concentrations. Therefore, using this relationship, HydroScience was able to determine a conservative BOD and TSS loading concentration for each average-dry-weather, sustained peak, and maximum day influent flow parameter that is consistent with actual loading concentrations to the WWTRP.

As a result of this analysis, recommended loading rates were back calculated and summarized in **Table 3-7**.

Table 3-7: Recommended WWTRP Loading Rates for Phase 1 and Future Upgrades

Loading Parameter	BOD		TSS		Ammonia[1]	
	(mg/L)	(lb/day)	(mg/L)	(lb/day)	(mg/L)	(lb/day)
Average Daily Loading						
Phase I	425	1,772	300	1,251	85	354
Future	425	2,304	300	1,626	85	460
Sustained Peak Loading						
Phase I	250	2,773	200	2,218	42	466
Future	250	3,690	200	2,952	42	620
Maximum Day Loading						
Phase I	250	3,128	200	2,502	42	525
Future	250	4,170	200	3,336	42	700

Notes:
1. Ammonia loadings assumed to be approximately twenty percent of influent BOD loadings.

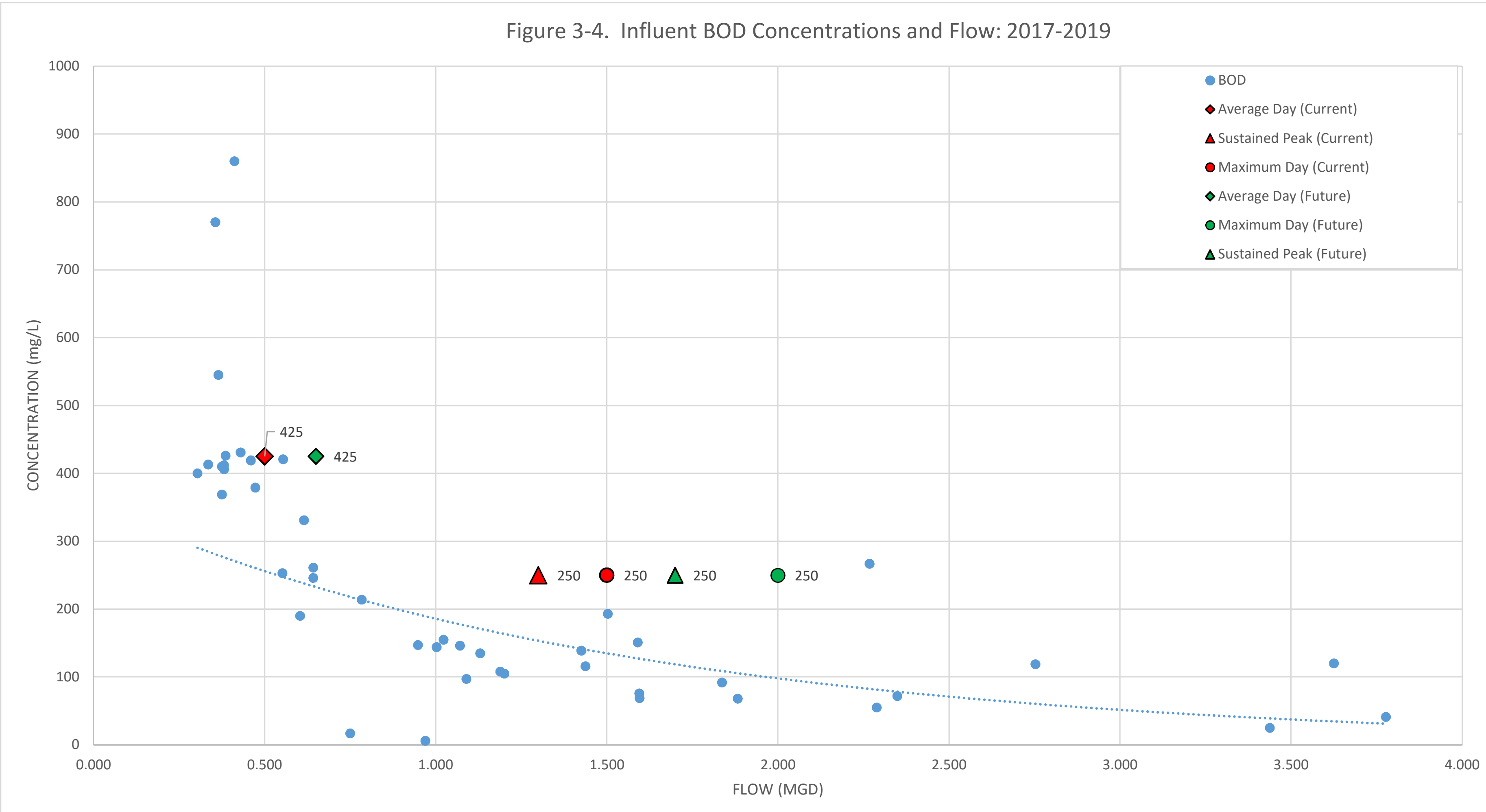


Figure 3-4. Influent BOD Concentrations and Flow: 2017-2019
CONCENTRATION (mg/L)
FLOW (MGD)
0
100
200
300
400
500
600
700
800
900
1000
0.000
0.500
1.000
1.500
2.000
2.500
3.000
3.500
4.000
425
425
250
250
250
250
BOD
Average Day (Current)
Sustained Peak (Current)
Maximum Day (Current)
Average Day (Future)
Maximum Day (Future)
Sustained Peak (Future)

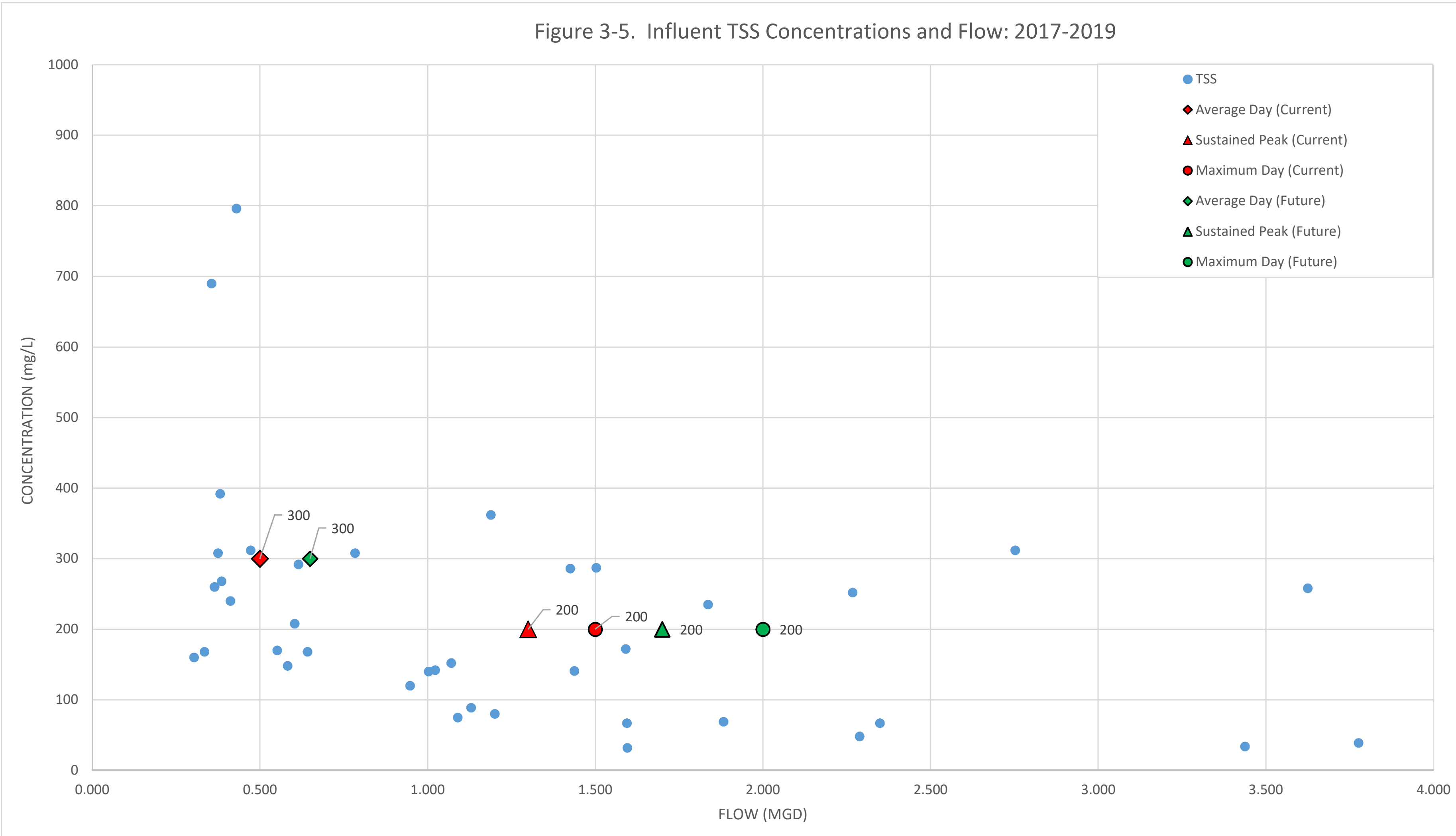


Figure 3-5. Influent TSS Concentrations and Flow: 2017-2019
CONCENTRATION (mg/L)
1000
900
800
700
600
500
400
300
200
100
0
0.000
0.500
1.000
1.500
2.000
2.500
3.000
3.500
4.000
FLOW (MGD)
300
300
200
200
200
200
TSS
Average Day (Current)
Sustained Peak (Current)
Maximum Day (Current)
Average Day (Future)
Sustained Peak (Future)
Maximum Day (Future)

3.4 Seasonal Storage/Flow Equalization

The wastewater management strategies presented in **SECTION 4** all propose to utilize WWTRP Ponds 1A through Pond 3 for seasonal storage and flow equalization of screen influent. Using these ponds for storage of treatment plant influent has the effect of reducing the peak flow requirements associated with the new treatment process. Ponds 4 and 5 would continue to be used as storage disinfection and disposal equalization for pumping effluent to land disposal. The pond capacities are presented in **Table 3-8**.

Table 3-8: Approximate Size of Existing WWTRP Ponds

Pond No.	Surface Area (Acres)	Water Depth (feet)	Volume (MG)
1A	2.9	10	8.1
1B	2.1	14.5-17.5 ft	7.5
2	5.1	3	4.0
3	2.5	9	6.3
4	3.0	11.5	9.8
5	6.7	13	24.6

Notes:
1. Source: 2015 WWTRP Wastewater Facilities Evaluation Update (Bennett Engineering, 2015).

Using influent flow data, HydroScience calculated the required influent equalization volume for different plant peak wet weather flow capacities. Based on a dataset of historic influent flows during the 2017-2019 time period, HydroScience estimated the maximum volume of storage required and how long flows would need to be stored before that flow could be returned to the new treatment process. The maximum storage volume required for various distribution percentiles and storage volume durations during the two year data period is provided in **Table 3-9**.

Table 3-9: Maximum Storage Volume to Store Historic Influent Flows

Percentile	Plant Capacity (MGD)	Max. Diversion (MG)[1]	Storage Duration (Days)[2]
98th Percentile	1.88	9.7	30
97th Percentile	1.54	16.3	44
96th Percentile	1.33	21.1	59
95th Percentile	1.19	24.5	77
90th Percentile	0.82	35.1	154

Notes:
1. Maximum diversion represents the total volume diverted to emergency storage system between 2017 and 2019.
2. Storage duration is approximate sustained duration number of days requiring storage prior to return of equalized wastewater.

Together, Ponds 1A through 3 have a combined capacity of approximately 25.9 MG. With the WWTRP having a peak flow of 1.5 MGD for Phase 1 upgrades, and 2.0 MGD at buildout, the WWTRP would have sufficient treatment plant capacity and seasonal storage to convey and store influent flows with a 98% confidence at buildout.

SECTION 4 – CONCEPTUAL TREATMENT ALTERNATIVES

The City intends to upgrade the WWTRP treatment process to produce tertiary effluent that complies with all NPDES Permit requirements. Additionally, the City would like to have the ability to, in the future, reuse effluent for unrestricted non-potable reuse as defined by Title 22.

Two potential treatment process train alternatives were evaluated in this document to meet these objectives: Membrane Bioreactor (MBR) and Sequencing Batch Reactor (SBR) treatment systems. In coordination with treatment process equipment manufacturers, a conceptual treatment process train has been assembled to successfully fulfill the project objectives. Each process train would include process specific improvements for the production of Title 22 quality effluent, as well as common improvements that would be present in both the MBR and SBR treatment trains. Common improvements are further defined in **Section 5**.

Due to the operational capabilities of MBR treatment systems (higher mixed liquor concentrations and lower retention times) and the WWTRP's capacity requirements, a packaged MBR treatment plant will also be evaluated as a feasible option for consideration. For the purposes of this report, a packaged treatment plant is considered to be an all-inclusive, pre-engineered treatment plant, delivered with all facilities necessary to receive raw wastewater and meet the project objectives. Packaged treatment plants provide cost benefits on all engineering fronts and can expedite the procurement process based upon the elimination of construction related inefficiencies.

Therefore, this section will evaluate three feasible treatment plant alternatives for the City's WWTRP Phase 1 upgrades:

- Conventional MBR Treatment Plant;
- Packaged MBR Treatment Plant;
- SBR Treatment Plant with Tertiary Filtration.

It was noted that each of these alternatives will include a series of common improvements that will occur regardless of the treatment alternative selected. These common improvements are described in **Section 5**.

This section is intended to provide a general description of each process alternative, evaluate the merits of each proposed treatment process train, and a comparison of features and associated construction costs. Final project costs combining the preferred treatment process train alternative and the proposed common improvements is defined in **Section 5**.

4.1 MBR

MBR systems provide primary, secondary, and tertiary treatment through a combination of anoxic and aerobic biological reactors and the use of submerged membranes for solids separation. An MBR system would provide a high removal efficiency of nitrogen, phosphorus, bacteria, biochemical oxygen demand, and total suspended solids.

Typical MBR processes consist of screening, anoxic and aerobic zones, membrane filtration in a separate membrane tank, permeate pumping, membrane cleaning system, return and waste activated sludge systems and UV disinfection. A description of the individual MBR system components is provided in the following sections.

4.1.1 Conventional MBR Treatment Plant

Conventional MBR treatment plants include the design and integration of discrete treatment process components which are comprised to establish an operational treatment process that produces high quality effluent. Each component of the treatment plant is commonly procured separately, by specialized vendors, whom are solely responsible for the engineering and procurement of the individual treatment packages. Conventional MBR treatment plants are constructed onsite by engineering contractors responsible for constructing all structural, mechanical and electrical components of the system.

A conceptual MBR process flow diagram for a conventional style MBR plant is presented in **Figure 4-1.** A conceptual description of a conventional MBR treatment plant that is expected to fulfill the project objective is described in the following sections.

Screening: A primary and a standby fine screen will screen all influent prior to it entering into the anoxic zone of the MBR. Two parallel fine screening units will be installed on a concrete pedestal designed to continuously operate under all flow scenarios. Each unit will have the capacity to individually operate under maximum day flow conditions (1.5 MGD) in the event that one screen is under maintenance or malfunctions. The screen will be sized to remove solids in excess of 2 microns to protect the membrane filtration units from being damaged by large debris. Solids removed by the screens will be captured and separated into bags and collected in dumpsters for permanent disposal. All influent to the WWTRP upgrades will be screened. **Table 4-1** presents the preliminary design criteria for the screening process.

Table 4-1: Conventional MBR Screening Design Criteria

Criteria	Parameter
Fine Screens	
Type of Screening Device	Auger or Rotary Drum
Solid Size Range	0.2 mm - 2 mm
Number of Screening Units Required	2 (One Duty, One Standby)
Flow Condition	Maximum Day
Operation	Continuous

Distribution Box: After screening, wastewater will gravity flow to an above grade distribution box. The distribution box will include a mixing chamber for the reintroduction of mixed liquor through the return activated sludge system. Mixed liquor will then gravity flow over a weir and into a distribution chamber which modulates the flow of wastewater to each downstream MBR using automated sluice gates. The distribution box will be hydraulically sized to automatically overflow wastewater to a wet well with submersible pumps that can pump excess flows to the retrofitted ponds for flow equalization and emergency storage. Water levels in the distribution box will drive the hydraulic profile of the downstream anoxic and aeration bioreactors which will be continuously monitored by an ultrasonic level sensor.

RAS will also be conveyed from the membrane basin to the distribution box, where it will mix with screened influent. RAS flow rates are typically a factor of 5 to 6 times greater than the influent flow rate.

Anoxic Basin: Screened influent from the distribution box would enter the first step of the MBR process via the anoxic basin. Each anoxic basin will have an approximate footprint of 27 x 27 feet and have a volume of 80,000 to 100,000 gallons. The different volumes represent low level and high-high process levels, respectively.

Two concrete basins are required to meet the Phase 1 flow and loading parameters, however the permanent concrete basins will be sized to accommodate future flow conditions. In the near term, the City will have operational flexibility to adjust water levels as necessary. The water level in the anoxic basin will typically rise and fall, providing some equalization for the treatment process. Within the anoxic basin, mixed liquor will be continuously mixed using retrievable, submersible mixers. The dissolved oxygen in the anoxic basin is typically near zero, since air is not being added to the basin.

Aeration Basin: Mixed liquor will flow from the anoxic basins to aeration basins through a system of submerged pipe penetrations and mechanical sluice gates. The aeration basins will have an approximate footprint of approximately 27 x 87 feet and are designed to accommodate a range of treatment capacities from 270,000 to 350,000 gallons each, representing the low level and high-high process levels, respectively.

Air will be introduced to the aeration basin to promote oxidation by a system of process blowers and fine bubble diffusers. The blowers will be positive displacement type with variable frequency drives (VFDs) with a capacity of approximately 1,222 standard cubic feet per minute (SCFM) per basin. A weir will maintain water levels in the aeration basin. Mixed liquor will overtop a weir to leave the aeration basin and flow by gravity into the membrane basins. It is expected that valving will be provided to allow flow to go from any aeration basin to any membrane basin.

Membrane Basin: The membrane basins will contain two submerged ultrafiltration membrane cassettes per basin to treat the Phase 1 flow rate. Space for a third cassette will be provided to accommodate the buildout flow rate. Two parallel ultrafiltration units will be constructed in above grade stainless steel tanks to accommodate the average day flow with one membrane train offline. The membrane basins will have a footprint of 24 x 10 feet with a volume of approximately 16,000 gallons each. Permeate will be pumped out of the membrane basin by applying a slight vacuum to the permeate header, and drawing water through the membrane, leaving the solids behind in the membrane basin. Space will be provided for the addition of a third parallel ultrafiltration unit as part of a future expansion project.

The permeate pump station will consist of three centrifugal pumps, each with a capacity of 4.5 MGD. Permeate pumped through the membrane cassette is then conveyed to either the effluent storage tank or directly to disinfection. The membrane blowers will provide scour air and process air to the membrane basins. This air is designed to continue the aeration of the mixed liquor, and provide scour air to help clean the membranes. There will be two positive displacement membrane blowers with VFDs, each with the capacity to provide air at 1,100 SCFM.

Table 4-2 provides the preliminary design criteria for the conceptual MBR system. A process flow diagram for the MBR system is provided in **Figure 4-1**. A conceptual site plan illustrating the MBR system is provided in **Figure 4-2**. Conceptual MBR proposals were provided from Aqua Aerobic

Systems and Suez, and are attached as **Appendix F.** Approximate capital costs associated with the construction of the conventional MBR wastewater treatment plant are presented in **Table 4-9**.

Table 4-2: MBR Design Criteria

Criteria	Parameter
Anoxic Basin	
Number of Basins	2
Total Volume	100,000 Gallons
Hydraulic Retention Time	1-3 hours
Type of Mixer	Submersible
Aeration Basin	
Number of Basins	2
Total Volume	350,000 Gallons
Hydraulic Retention Time	9 hours
MLSS Concentration	5,000 – 10,000 mg/L
F/M Ratio	0.191 lb Was/ lb BOD
Actual Oxygen Required	7,752 lbs O_2/day
Membrane Basin	
Number of Basins	2
Tank Volume	16,000 Gallons
No. Membrane Modules per Tank	3
Average Membrane Flux Rate (Each Cassette)	17.5 Gallons/day/ft^2

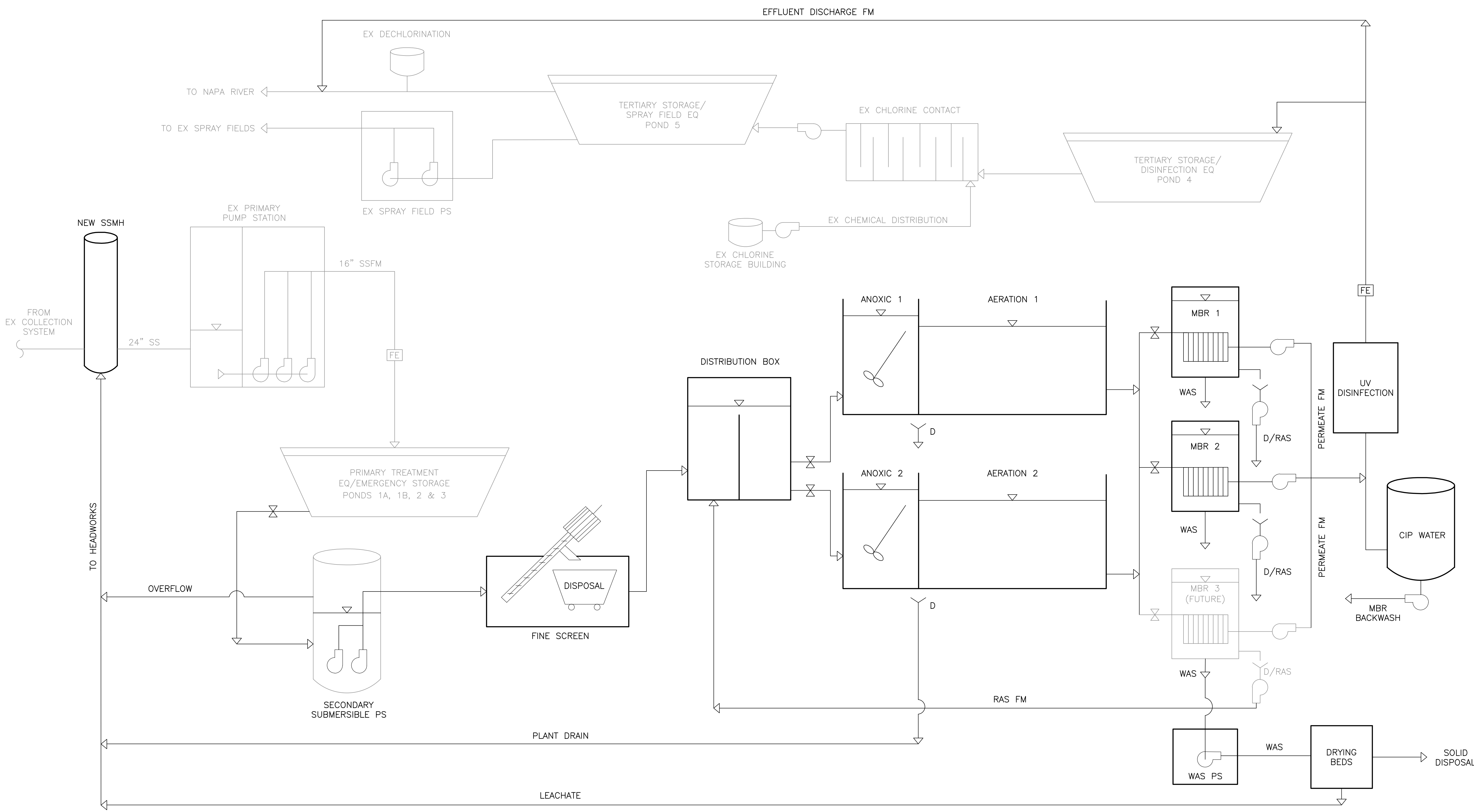


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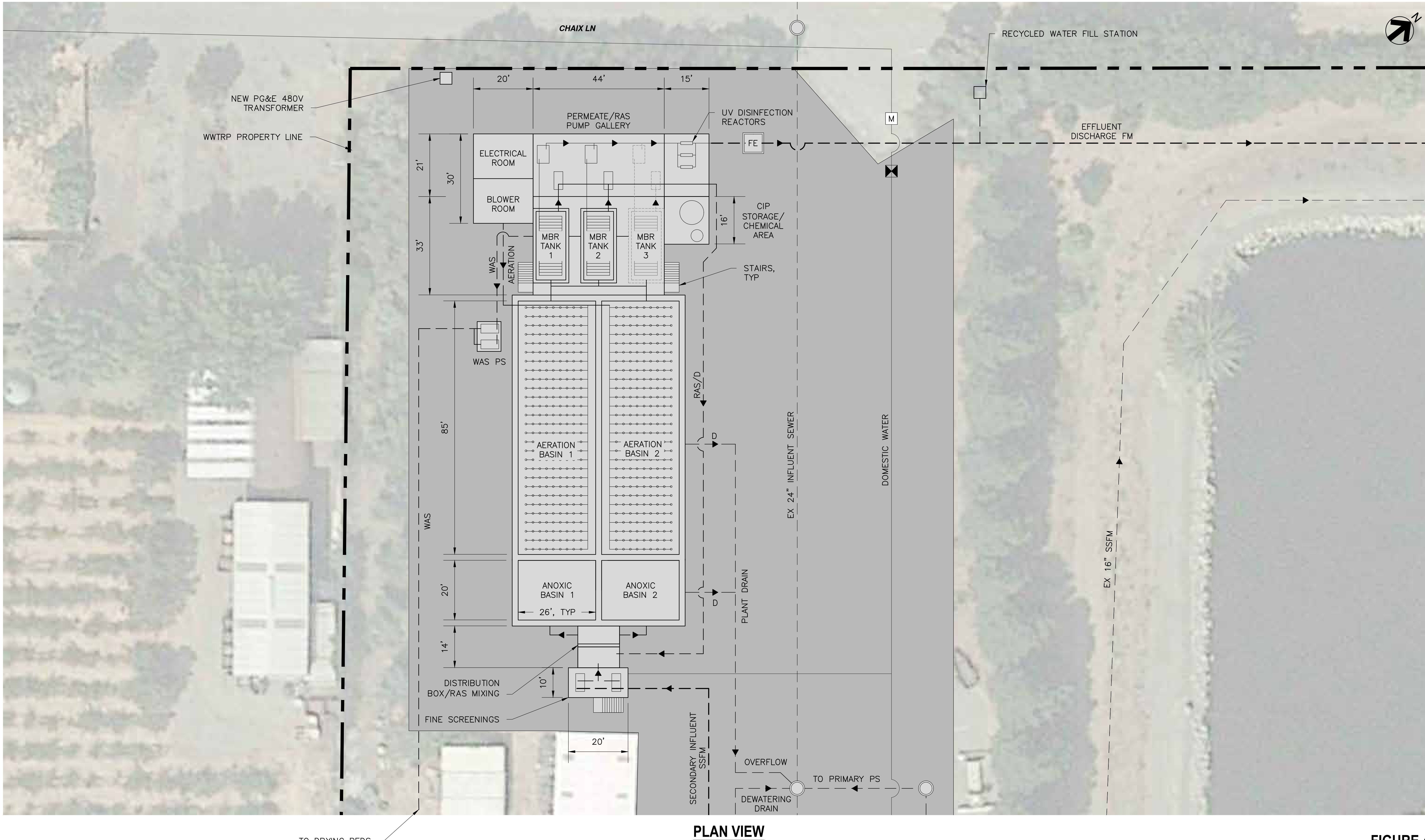
FIGURE 4-1
CITY OF ST. HELENA
WWTRP CONCEPTUAL DESIGN REPORT
CONCEPTUAL MBR PROCESS FLOW DIAGRAM



PLAN VIEW

SCALE: 1" = 30'

HydroScience

FIGURE 4-2
THE CITY OF ST. HELENA
WWTRP CONCEPTUAL DESIGN REPORT
CONCEPTUAL MBR TREATMENT PLANT SITE PLAN

4.1.2 Packaged MBR Treatment Plant

Packaged treatment plants are proprietary systems manufactured to be fully functional, compact, and ready for production of tertiary effluent from plant influent upon delivery. These systems are specifically engineered to meet the volumetric requirements of the biological process and come fully equipped with stainless steel tanks, mechanical equipment and piping, electrical systems, controls, pumps, handrails, catwalks, and stair cases. Once approved, the fabrication and delivery of packaged treatment plants can occur rapidly, which could reduce the duration of installation and construction when compared to conventional style treatment plants.

Packaged treatment systems are commonly sole sourced, factory assembled systems that are semi-customizable based upon the influent flow and loading parameters and limited by the spatial constraints of delivery vehicles. For larger capacity packaged treatment systems, the all-encompassing system is procured as various skid mounted process components which are delivered individually and hydraulically connected in the field.

HydroScience analyzed the feasibility of utilizing a packaged MBR treatment plant in lieu of a custom designed conventional MBR plant conceptually described in **Section 4.1.1**. An example of a packaged MBR plant is illustrated in Error! Reference source not found..

Headworks: The existing WWTRP headworks facility will remain as constructed, underneath the existing operations building for distribution to Ponds 1A and 1B. Headworks improvements to accommodate the Phase 1 WWTRP facility are described in the common improvements of **Section 5.**

Screening: A primary and a standby fine screen will screen all influent prior to it entering into the anoxic zone of the MBR. Two parallel fine screening units will be installed on a stainless steel influent basin pedestal designed to continuously operate under all flow scenarios. Each unit will have the capacity to individually screen 1 MGD of influent to the treatment plant. The parallel screening system will operate simultaneously in scenarios where influent flow exceeds 1 MGD. The screen will be sized to remove solids in excess of 2 microns to protect the membrane filtration units from being damaged by large debris. Solids removed by the screens will be captured and separated into bags and collected in dumpsters for permanent disposal. **Table 4-13** presents the preliminary design criteria for the screening process.

Table 4-3: Conventional MBR Screening Design Criteria

Criteria	Parameter
Fine Screens	
Type of Screening Device	Auger or Rotary Drum
Solid Size Range	0.2 mm - 2 mm
Number of Screening Units Required	2 (One Duty, One Standby)
Flow Condition	Maximum Day
Operation	Continuous

Figure 4-3: Example of Pre-Engineered, Packaged MBR Treatment Plant (Cloacina, 2019)

Anoxic Basin: Screened influent would enter the first step of the MBR process through two hydraulically connected points of entry to the anoxic treatment trains. Once screened influent is equally distributed to each discrete anoxic train, which will have a combined volume of 58,000 gallons. This is equivalent to approximately four hours of hydraulic residence time. Each anoxic treatment train will have an approximate footprint of 45 x 40 feet which includes a four foot separation between anoxic basins to accommodate utility connections and piping.

Unlike the conventional MBR, the City will not have operational flexibility to adjust water levels as necessary. Instead, the packaged MBR system will rely on mixed liquor concentration adjustments to accommodate variable influent flow and loading conditions. Within each anoxic basin, mixed liquor will be continuously mixed using retrievable, submersible mixers. The packaged MBR is expected to require two submersible mixers per anoxic basin.

Aeration Basin: Mixed liquor will transition from the anoxic basin to the aeration basin through a system of submerged pipe penetrations and submerged isolation gates. The packaged system will include two separate aeration basin treatment trains, each designed with a total aeration treatment process of 130,000 gallons. Each aeration train results in an approximate footprint of approximately 40 x 60 feet and are designed to operate at a MLSS concentration of 8,800 mg/L and a hydraulic residence time of approximately 17 hours.

Air will be introduced to the aeration basin to promote oxidation by a system of process blowers and fine bubble diffusers. The blowers will be positive displacement type with variable frequency drives (VFDs) with an air supply capacity of approximately 1,500 standard cubic feet per minute

(SCFM) per basin. Mixed liquor will overtop a weir to leave the aeration basin and flow by gravity into the membrane basins.

Membrane Basin: The packaged membrane system will be designed to separate solids from liquids using a system of submerged ultrafiltration FibrePlate membrane cassettes. Both treatment trains will include a system of four working membrane basins designed to operate in parallel to meet the sustained peak Phase 1 flow rate condition. Operation of the filtration system will require the modulation of each membrane cassettes membrane flux rate, providing operators the ability to meet the demands of variable flow conditions or sustained maintenance. The membrane basin gallery will have a total footprint of approximately 40 x 25 feet with a volume of approximately 2,300 gallons each. Permeate will be pumped out of the membrane basin by applying a slight vacuum to the permeate header, and drawing water through the membrane, leaving the solids behind in the membrane basin.

The permeate pump station will consist of four rotary lobe pumps, each with a peak capacity of 230 GPM. Permeate pumped through the membrane cassette is then conveyed to either the effluent clear well or directly to an above grade effluent storage tank for effluent equalization. The membrane blowers will provide scour air and process air to the membrane basins. This air is designed to continue the aeration of the mixed liquor, and provide scour air to help clean the membranes. There will be four positive displacement membrane blowers with VFDs, each with the capacity to provide air at 600 SCFM.

Effluent Equalization and Discharge Pumping: Filtered water from the permeate pumps will distribute to two separate locations prior to discharge: a membrane filtration clearwell and an above grade storage tank for effluent discharge equalization and storage. Distribution to either storage tank will be controlled by ultrasonic level transducers and a set of automatic control valves. The clearwell will be a covered, 3,000 gallon storage reservoir solely designed to operate as a working volume for the membrane filtration clean in place (CIP) system. The above grade effluent storage tank will provide the net positive suction head for an effluent pump station to pump tertiary treated effluent through UV disinfection and then onwards to either the Napa River outfall or Pond 4.

Table 4-4 provides the preliminary design criteria for the conceptual packaged MBR treatment plant. A process flow diagram for the MBR system is provided in **Figure 4-4**. A conceptual site plan illustrating the packaged MBR system is provided in **Figure 4-5**. The conceptual packaged MBR treatment plant design utilized as a basis for this report is a proprietary system designed by Cloacina. Cloacina's preliminary design proposal has been attached to this report as **Appendix G.** Approximate capital costs associated with the construction of the MBR wastewater treatment are presented in **Table 4-9**.

Table 4-4: Packaged MBR Design Criteria

Criteria	Parameter
Anoxic Basin	
Number of Basins	4
Total Volume	116,000 Gallons
Hydraulic Retention Time	4 hours
Type of Mixer	Submersible
Aeration Basin	
Number of Basins	6
Total Volume	260,000 Gallons
Hydraulic Retention Time	17 hours
MLSS Concentration	8,800 – 10,000 mg/L
F/M Ratio	0.12 lb Was/ lb BOD
Total Oxygen Supplied	2,266 SCFM
Membrane Basin	
Number of Basins	8
Tank Volume	2,300 Gallons
No. Membrane Modules per Tank	1
Average Membrane Flux Rate (Each Cassette)	33.3 Gallons/day/ft^2
Effluent Discharge Equalization Storage Tank	
Above Grade Storage Tank Volume	20,000 Gallons
Tank Type	Welded Stainless Steel
Tank Dimensions	11’Ø x 30’ H
Effluent Discharge Pump Station	
Number of Effluent Pumps	2
Pump Capacity	300 GPM
Operating Pressure	40 PSI

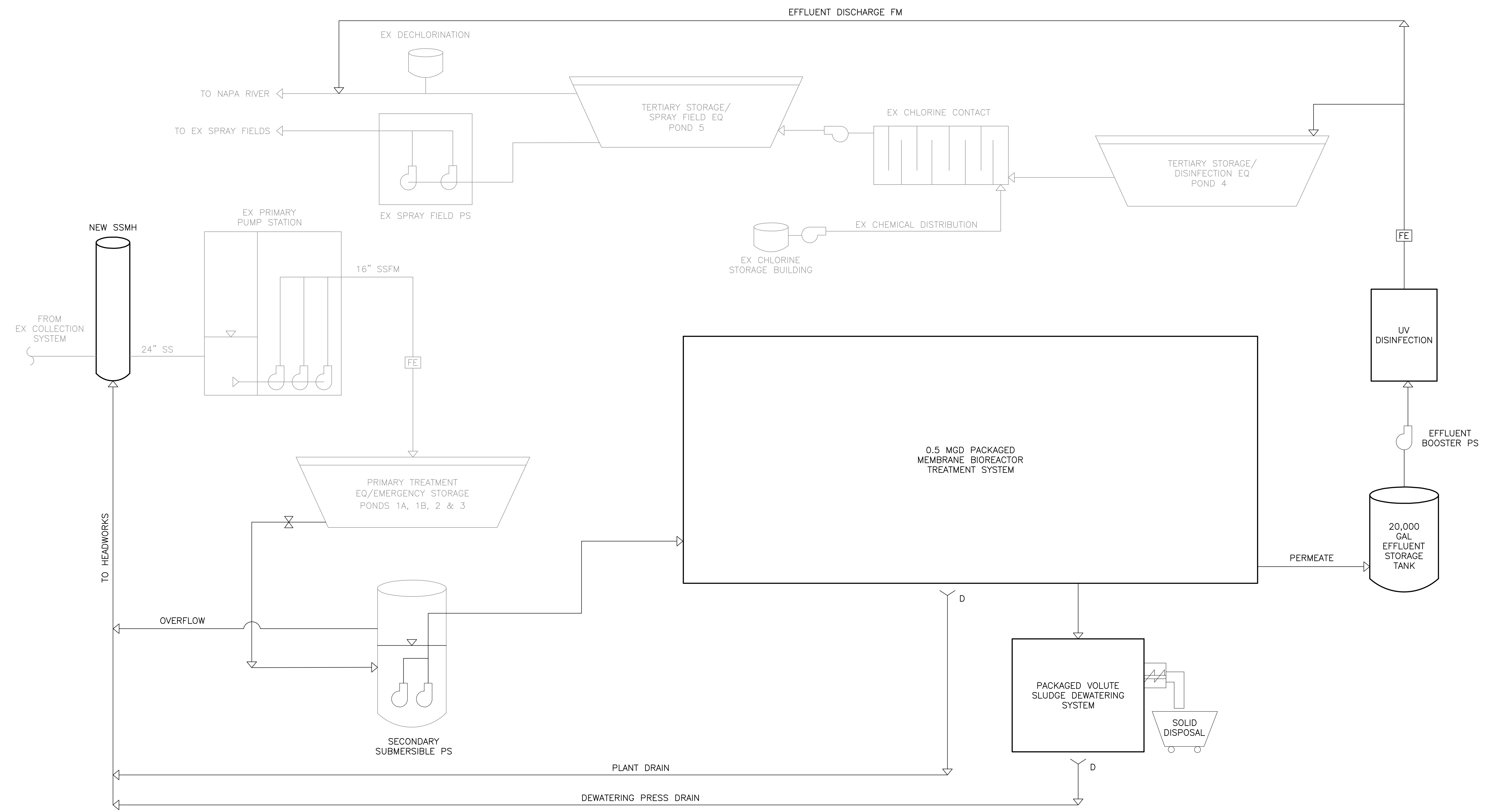


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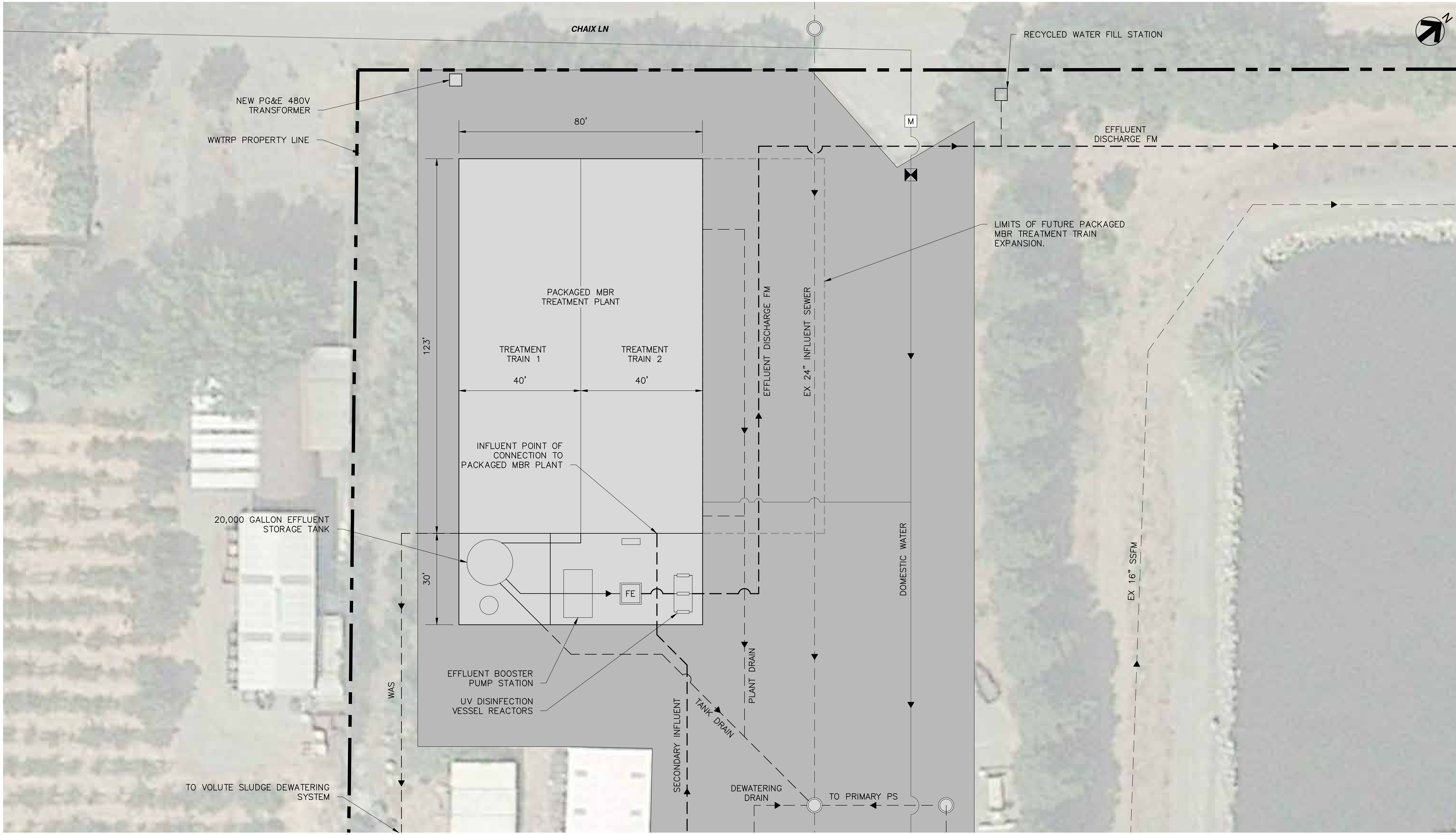
FIGURE 4-4
CITY OF ST. HELENA
WWTRP CONCEPTUAL DESIGN REPORT
CONCEPTUAL PACKAGED MBR PROCESS FLOW DIAGRAM



PLAN VIEW

SCALE: 1" = 30'

HydroScience

FIGURE 4-5

THE CITY OF ST. HELENA

WWTRP CONCEPTUAL DESIGN REPORT

CONCEPTUAL PACKAGED MBR TREATMENT PLANT SITE PLAN

4.2 SBR with Tertiary Filtration

The SBR is a fill-and-draw activated sludge system for wastewater treatment. In this process, equalization, aeration, and clarification are all achieved using a single batch reactor. All SBR systems have five common treatment steps that occur in the following sequence: (1) fill, (2) react (aeration), (3) settle (sedimentation/clarification), (4) draw (decant), and (5) idle. Additional phases can be included to provide anoxic phases for nitrogen removal.

For continuous flow applications, at least two SBR tanks must be provided so that one tank receives flow while the other completes its treatment cycle. In order to meet tertiary treatment standards, an SBR system must be coupled with a filtration process. Provided is a discussion of a conceptual SBR process and tertiary filtration.

Screening: SBR treatment systems do not require fine screening of influent solids due to the solids settling characteristics of the process clarification stage. Screening associated with the common improvements will be the only required screening for the SBR. The screen will be sized remove solids in excess of 2 millimeters which is commonly recommended by SBR manufacturers to remove large debris before it enters the SBR. Solids removed by the screens will be captured and separated into bags and collected in dumpsters for permanent disposal.

The preliminary design criteria for the coarse screening system is presented in **SECTION 5**.

Distribution Box: Screened influent will be pumped to a distribution box which will automatically modulate the distribution of wastewater to the SBR basins. Modulation will be based upon the drain and fill sequencing of each basin. Since RAS recirculation is not required for SBR systems, hydraulic sizing of the distribution box for an SBR is smaller than the MBR distribution box.

The hydraulic profile of the distribution box will be determined based upon the operational water levels required by the SBR process. Influent wastewater flow control to the SBR will include automated control valves and continuous water level monitoring. The emergency overflow system will be designed to automatically overflow wastewater to the emergency storage and equalization system when the distribution box water level breaches the maximum water level in the SBR tanks and influent flow rates exceed the identified peak flow condition.

SBR Basins: Screened influent will enter one of the two SBR basins based upon a time controlled fill and draw sequence. Each basin will have an approximate footprint of approximately 44 x 88 feet and a total volume of between 420,000 to 522,000 gallons, representing the low level and high-high process levels, respectively.

Construction of the SBR basin walls, floor, and ceiling would be performed using cast-in-place concrete basins. Each SBR basin would include a decanter, solids wasting system, and a jet aeration system manifold to provide air. The jet aeration manifold will be connected to a 33 hp positive displacement blower capable of providing air at a rate of 2,000 cfm.

The tank contents are re-circulated by the pump through the primary mixing nozzle. Low pressure air is mixed with the liquid in the outer secondary nozzle creating fine bubbles. The aeration system will be equipped with three, 60 hp blowers for aeration and a comprehensive control system. By turning off the blower, anoxic conditions can be achieved to promote biological nutrient removal.

Effluent from the batch reactors will enter the solids excluding decanter which flows directly to 150,000 gallon SBR equalization basin. Secondary effluent would be pumped from this equalization basin to the tertiary filtration process.

The SBR basins will be designed to accommodate future flow capacities with mechanical connections for additional aeration headers and discharge pumps if required.

Table 4-5 provides the preliminary design criteria for the conceptual SBR treatment system. A process flow diagram for the SBR system is provided in **Figure 4-6**. A conceptual site plan illustrating the SBR system is provided in **Figure 4-7**. Conceptual SBR proposals were received from Fluidyne and Aqua-Aerobic Systems, and are included in **Appendix G.** Approximate capital costs associated with the construction of the SBR are presented in **Table 4-9.**

Table 4-5: Preliminary SBR Design Criteria

Criteria	Parameter
Batch Reactors	
Number of Basins	2
Total SBR Volume	1.2 MG
Basin Dimensions	88' L x 44' W x 20' D
Hydraulic Retention Time	18-25 hrs
Decant Rate	2,400 gpm
MLSS Concentration	4,500 mg/L
Waste MLSS Concentration	2,750 mg/L
F/M Ratio	0.115 lb Was/ lb BOD
Actual Oxygen Required	5,000 lbs/ Day
Effluent Equalization Basin	
Number of Basins	1
Tank Volume	150,000 gallons

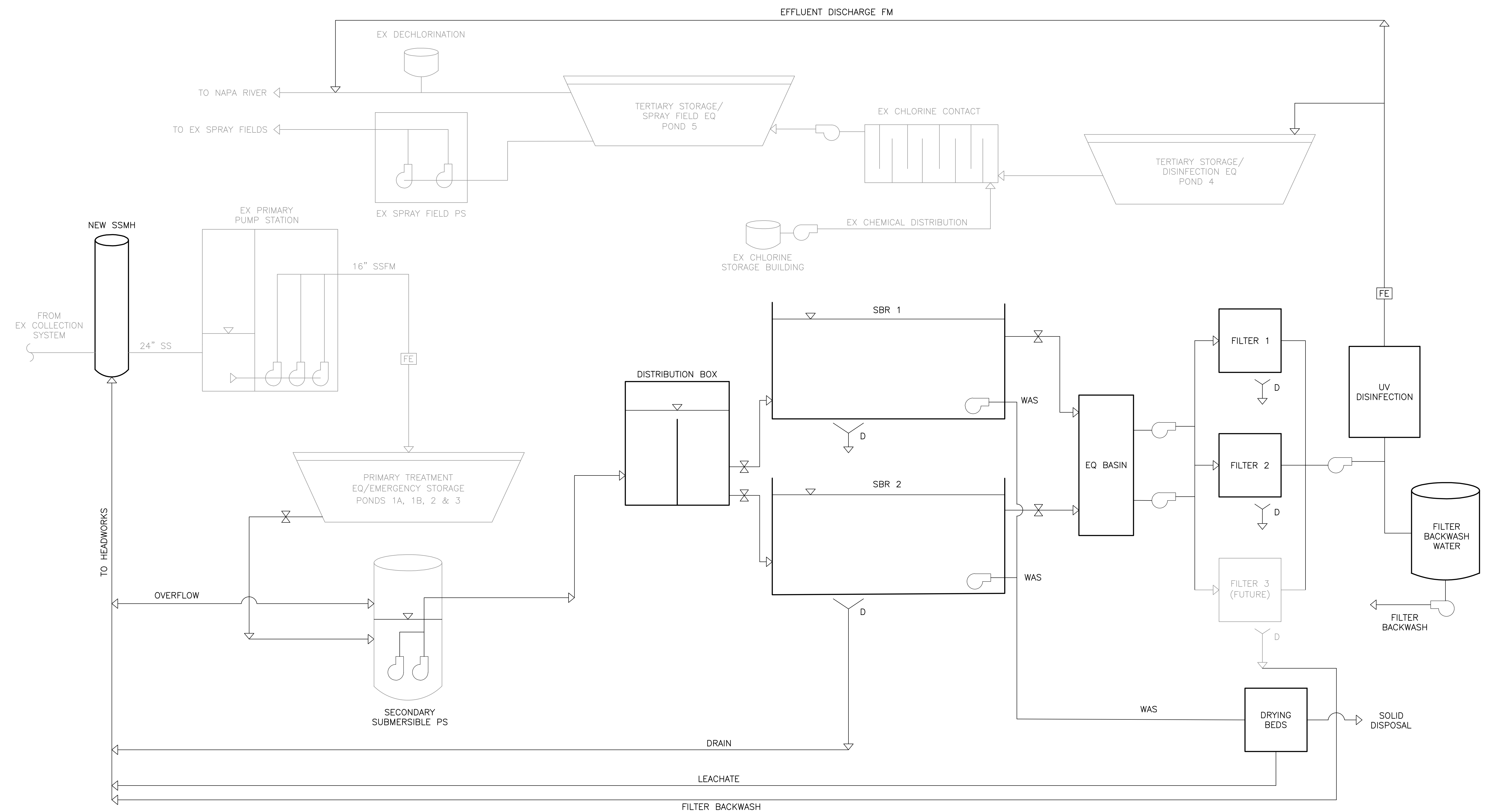


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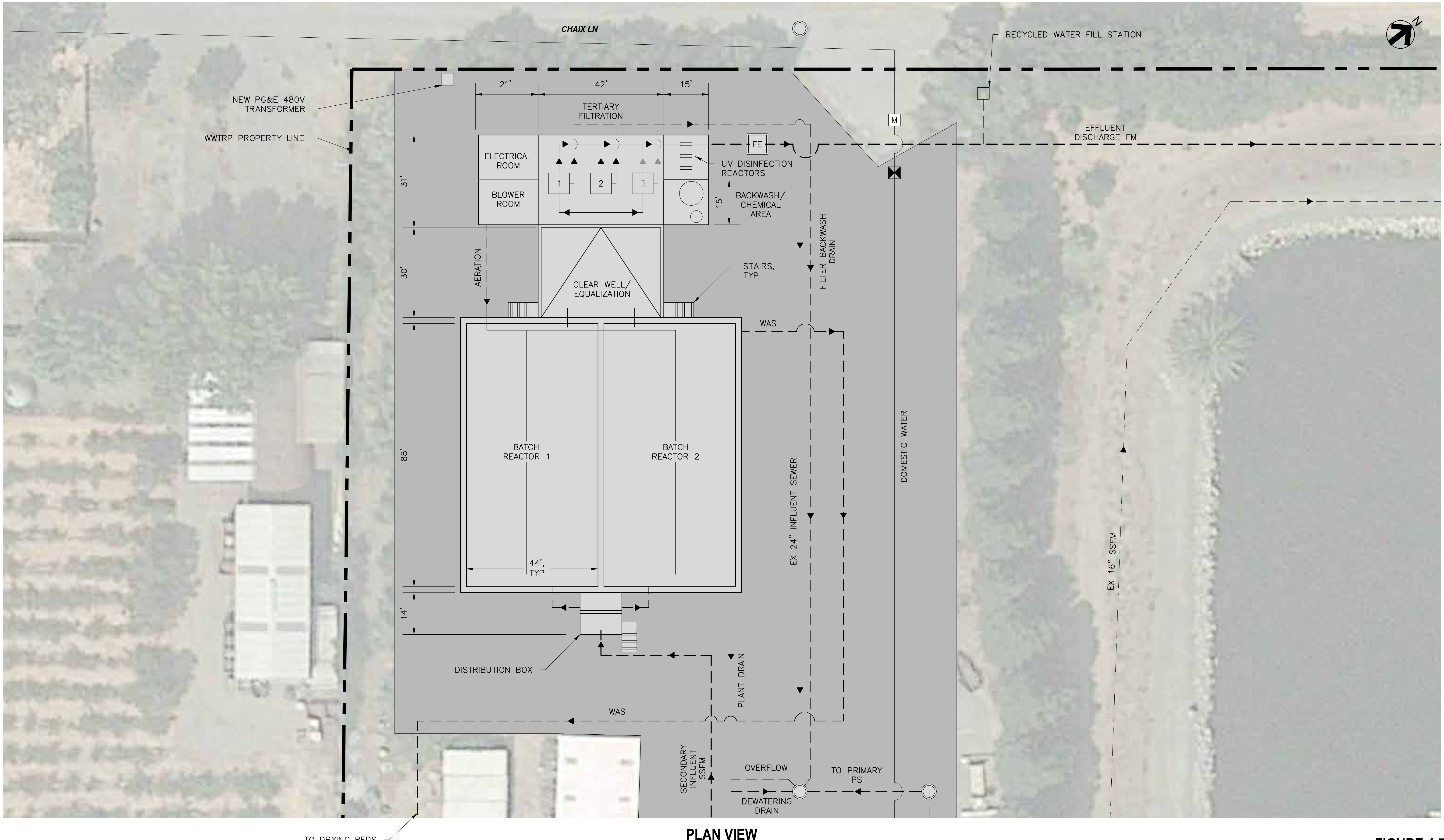
FIGURE 4-6
CITY OF ST. HELENA
WWTRP CONCEPTUAL DESIGN REPORT
CONCEPTUAL SBR PROCESS FLOW DIAGRAM



PLAN VIEW

SCALE: 1" = 30'

HydroScience

FIGURE 4-7
THE CITY OF ST. HELENA
WWTRP CONCEPTUAL DESIGN REPORT
CONCEPTUAL SBR TREATMENT PLANT SITE PLAN

4.2.1 Tertiary Filtration

SBR treatment systems require tertiary filtration to meet the filtration requirements in Title 22 a disinfected tertiary recycled water. Decanted effluent from the SBR equalization basin will be pumped to the tertiary filtration process. The tertiary filtration system will include a set of parallel synthetic media depth filtration units (Fuzzy Filters), individually designed to meet the Maximum Day Phase 1 flow and loading conditions with spatial consideration and mechanical connections for a future installation.

Each media filtration unit will have the ability to continuously operate in parallel or sequentially alternate operation during backwash cycles. The filtration units will be manufactured in above grade stainless steel enclosures and require a system of process backwash blowers, mechanical air scour system, actuated control valves, and local controls. Fuzzy Filters utilize air scouring during the wash cycle to clean the media. Backwash water will be rerouted to the influent gravity sewer for processing. Preliminary design parameters of the tertiary filters are provided in **Table 4-6**.

Table 4-6: Preliminary Tertiary Filtration Design Criteria

Criteria	Parameter
Type of Media Filter	Synthetic Media (Fuzzy Filter)
Solid Size Range	0.2 mm - 3 mm
Number of Filtration Units	2
Flow Condition	Upward
Unit Dimensions	5' L x 5' W x 15'H
Media Layer Thickness	2-3 ft
Media Layer Porosity	94 - 96%
Operation	Semi-Continuous

4.3 Ultraviolet Disinfection

Filtered effluent will be directed to the closed-vessel UV disinfection process with the capacity to treat the maximum day peak flow condition with a redundant process train. Conceptual design assumes that a low pressure high output UV lamp would be used, though a medium pressure system is likely to also be feasible. The preliminary design criteria for the disinfection system is provided in **Table 4-7**.

The required dose and transmittance for a UV disinfection process will differ depending on the upstream treatment process. Typically, an MBR process will produce a higher transmittance and require a lower dose than a tertiary filtration process common for SBR systems.

Table 4-7: Preliminary UV Disinfection Design Criteria

Criteria	MBR[1]	SBR with Filtration
% UV Transmittance	65	55
Dose	80 mJ	100 mJ/cm2
Number of Reactors	1 duty, 1 standby	2 duty, 1 standby
Number of Lamps per Reactor	72	72
Peak Power Draw	11 kW	15 kW

Notes:
1. Applies to both Conventional and Packaged MBR conceptual design alternatives.

4.4 Comparison of Treatment Alternatives

This section provides a comparative analysis of the conceptual treatment alternatives under consideration for this project. This evaluation will be used for selection of the recommended wastewater treatment alternative that best fits the City's needs.

The comparative analysis analyzed the considerations of each conceptual treatment alternative with respect to three separate criterion:

- Effluent quality
- Operations and maintenance (O&M), and
- Cost

A detailed discussion comparing the conceptual alternatives is presented below.

4.4.1 Effluent Quality

Both the SBR (with filtration) and MBR treatment trains would be expected to meet or exceed the NPDES Permit effluent limitations. The projected effluent quality for each process train is presented in **Table 4-8**. It is expected that either a conventional or packaged MBR system will provide the City with a slightly better effluent water quality when compared to the SBR (with filtration) process train.

Table 4-8: Comparison of SBR and MBR Effluent Quality

Parameter	MBR Effluent[1,2]	SBR Effluent (after filtration)[1]	2016 NPDES Permit Effluent Limitations
BOD_5	≤ 5 mg/L	≤ 10 mg/L	≤ 15 mg/L
TSS	≤ 1 mg/L	≤ 5 mg/L	≤ 15 mg/L
Ammonia	≤ 10 mg/L	≤ 16 mg/L	≤ 16 mg/L
Total Coliform	< 2.2 MPN/100 mL	< 10 MPN/100 mL	< 23 MPN/100 mL

Notes:
1. Expected effluent quality is based on expected process effectiveness for typical MBR or SBR (with filtration) treatment systems.
2. Applies to both conventional and packaged MBR conceptual design alternatives.

MBR systems are generally less susceptible to shock loads due to the increased volume of biomass present in the system and the solids mitigation effectiveness without clarification processes. Since MBR systems maintain suspended biomass throughout the entire process, MBR systems are expected to have the capability to better mitigate flow disruptions and maintain continuous reduction effectiveness and operation more reliably than the SBR alternative.

It was noted that since the MBR produces a clearer effluent than a SBR (with filtration), a higher UV transmittance can be assumed. This will reduce the required UV dose for tertiary effluent.

It is expected that both systems will reliably be able to meet NPDES effluent limitations and produce recycled water suitable for unrestricted reuse.

4.4.2 Operations & Maintenance

It was noted that the construction of either a MBR or an SBR plant will require the City to have a Grade III Operator. Both treatment alternatives are expected to be more complex to operate than the existing AIPS treatment pond system.

The process complexity of MBR systems is more technically demanding than SBR's, which is expected to slightly increase under the consideration of a packaged MBR treatment system. The overall complexity of MBR is primarily due to quantity of moving parts and process facilities associated with the system. MBR ultrafiltration membranes also require an increased level of operator attention and monitoring to prevent frequent loss of effluent quality, reduced hydraulic capacities or failure and replacement. The membranes also need to be periodically backwashed with chemicals that require onsite storage and containment. CIP backwashing systems also need to be scheduled based on flux rates which are expected to vary depending upon the influent flow and loading conditions to the plant.

In SBR, sludge bulking can occur if the sludge to volume index (SVI) of the sludge is high or septic conditions occur. These conditions can result in compromised effluent quality if not fixed.

The SBR system requires a separate filtration process in addition to the SBR basins. Operating a separate filtration process requires additional chemicals to promote coagulation, additional pumping, and maintenance of the SBR clearwell.

MBR systems will also produce less waste than an SBR system due to the system's ability to operate at a much higher sludge retention time. Reductions in sludge wasting volumes translates to reduced solids handling and disposal which eases process O&M.

4.4.3 Cost

A comparison of the projected capital costs for the conceptual MBR and SBR treatment alternatives is presented in **Table 4-9.** These costs represent the expected costs of materials, equipment, deliveries, and construction necessary for each respective treatment alternative. Costs associated with mobilization, testing, common upgrades, soft costs and contingencies will be considered for the preferred alternative in a separate section.

Table 4-9: Cost Comparison of MBR vs SBR Treatment Alternatives

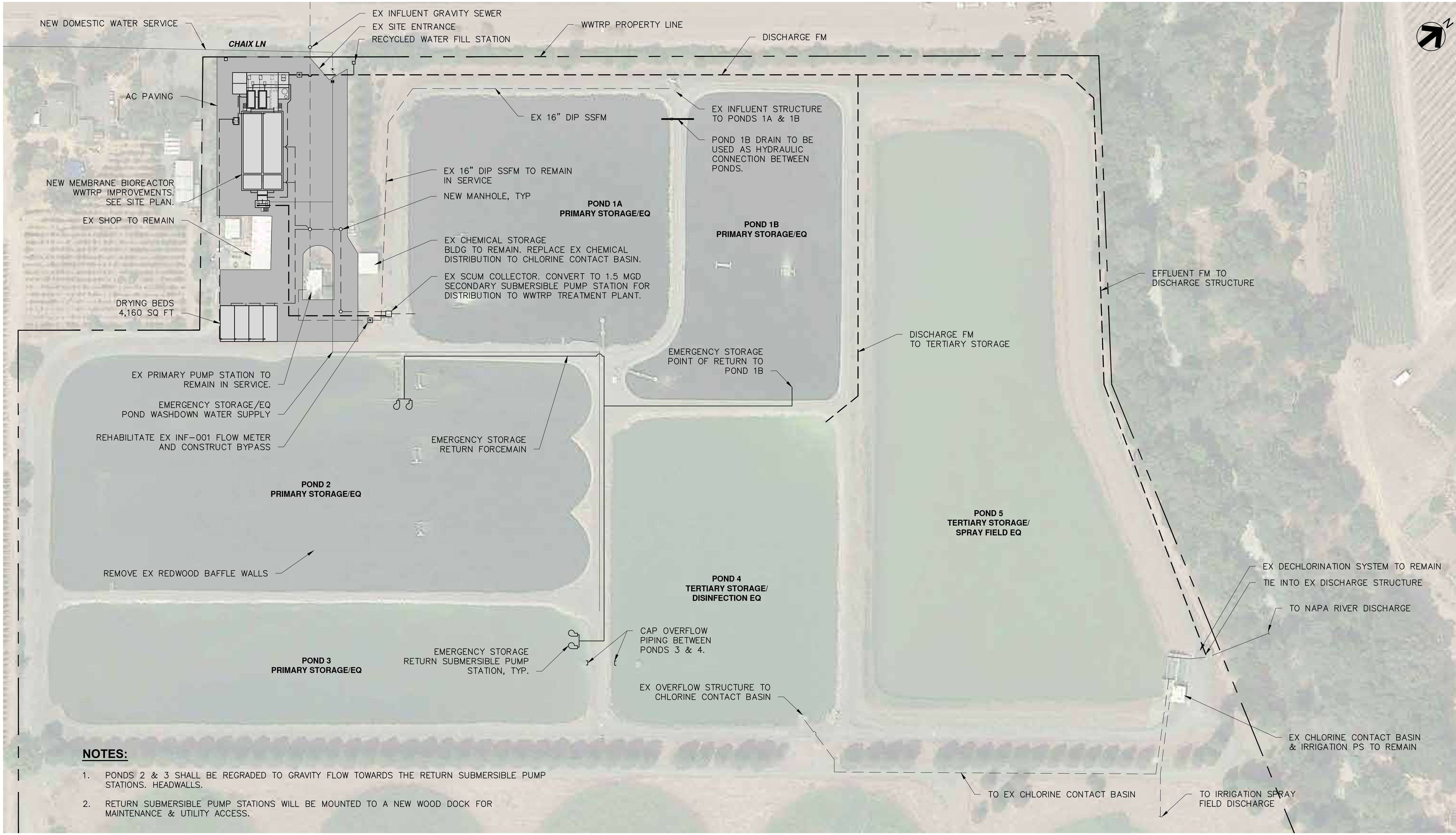
Cost Parameter	Conventional MBR	Packaged MBR	SBR w/Filtration
Civil			
Earthwork, Sheeting & Shoring, Grubbing	$385,000	$254,000	$260,000
AC Pavement	$150,000	$150,000	$150,000
Civil Site Features (Striping, Curbs, Gutters)	$55,000	$45,000	$55,000
Temporary Facilities (Bypassing & Dewatering)	$350,000	$100,000	$300,000
Structural			
Cast-in-Place Concrete Structures	$1,913,000	N/A	$2,408,000
Cast-in-Place Concrete Slabs	$179,000	$489,000	$133,000
Electrical/Blower Building	$198,000	N/A	$198,000
Protective Coatings	$150,000	N/A	$150,000
CIP Tank	$50,000	N/A[3]	N/A
Mechanical			
Fine Screening	$800,000	$6,100,000[4]	$600,000
Secondary Treatment Process	$2,950,000		$1,500,000
Tertiary Filtration	N/A[2]		$600,000
Disinfection	$540,000		$810,000
Effluent Discharge PVC Piping	$300,000	$294,000	$300,000
Yard Piping, Process Equipment and Mechanical	$745,000	$395,000	$555,000
Electrical			
New PG&E 480V, 3-Phase Service Connection	$100,000	$100,000	$100,000
480V, 3-Phase Standby Generator	$250,000	$250,000	$250,000
Electrical Distribution, Communication, Integration	$1,534,000	$360,000	$1,266,000
Approximate Cost of Construction	**$10,649,000**	**$8,537,000**	**$9,635,000**

Notes:
1. All costs rounded to nearest $1,000.
2. Membrane Ultrafiltration System included in cost of Secondary Treatment Process.
3. Packaged MBR CIP Tank included in cost of Packaged MBR Treatment Plant.
4. Packaged MBR Treatment Plant is all inclusive cost that includes fine screening, secondary treatment process equipment, filtration, disinfection, structural basins, wiring, mechanical, and other facilities required for fully functioning tertiary treatment process. See preliminary packaged MBR treatment plant proposal in **Appendix G** for the complete scope of supply.

SECTION 5 – COMMON WWTRP FACILITY IMPROVEMENTS

This section presents WWTRP improvements common to each treatment process train configuration, sorted by process element. This supplemental set of common improvement recommendations will address the deficiencies related to existing facilities necessary for Phase 1 WWTRP upgrades and future CIP improvement projects. **Figure 5-1**, through **Figure 5-3** present the overall improvement plans for each proposed WWTRP upgrade alternative. The project elements addressed in this section were acquired from discussions with WWTRP operators and recent facilities master planning. The common improvements recommended for the Phase 1 WWTRP improvements include the following:

- Construction of secondary lift station and rehabilitate existing scum collector;
- Rehabilitation of existing headworks & primary pump station;
- Temporary relocation of WWTRP operations, control, and sanitary building facilities,
- Treatment pond retrofit for emergency storage/equalization system;
- Construction of a sludge dewatering and disposal system;
- Site improvements;
- Rehabilitation of existing INF-001 flow meter;
- Sodium Hypochlorite disinfection system and effluent pump station improvements;
- Construction of domestic water system tie-in and distribution;
- Electrical upgrades;
- Upgrades to instrumentation and control system.

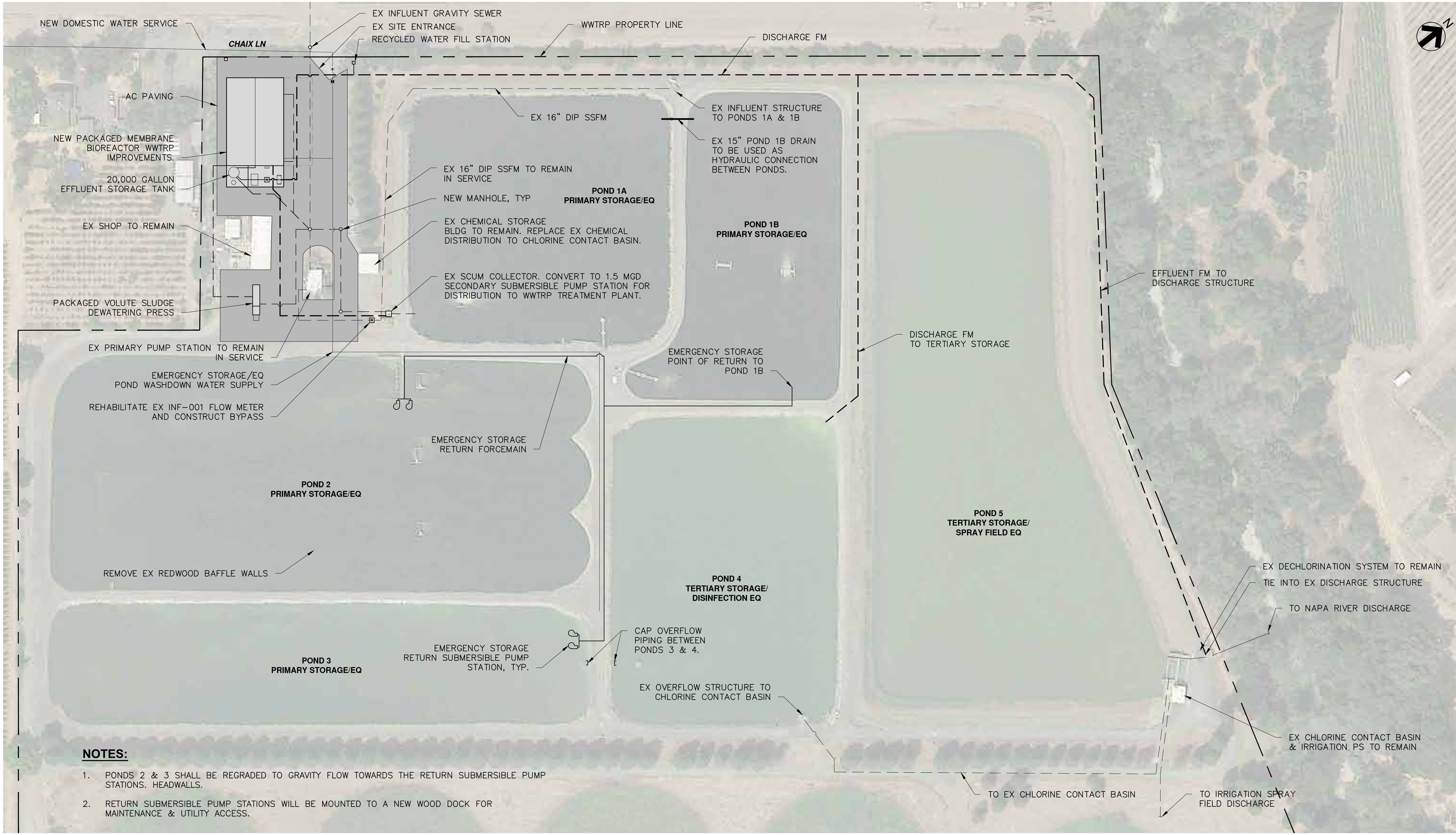


NOTES:

1. PONDS 2 & 3 SHALL BE REGRADED TO GRAVITY FLOW TOWARDS THE RETURN SUBMERSIBLE PUMP STATIONS. HEADWALLS.
2. RETURN SUBMERSIBLE PUMP STATIONS WILL BE MOUNTED TO A NEW WOOD DOCK FOR MAINTENANCE & UTILITY ACCESS.

HydroScience

FIGURE 5-1
THE CITY OF ST. HELENA
WWTRP CONCEPTUAL DESIGN REPORT
OVERALL CONVENTIONAL MBR IMPROVEMENT PLAN



NOTES:

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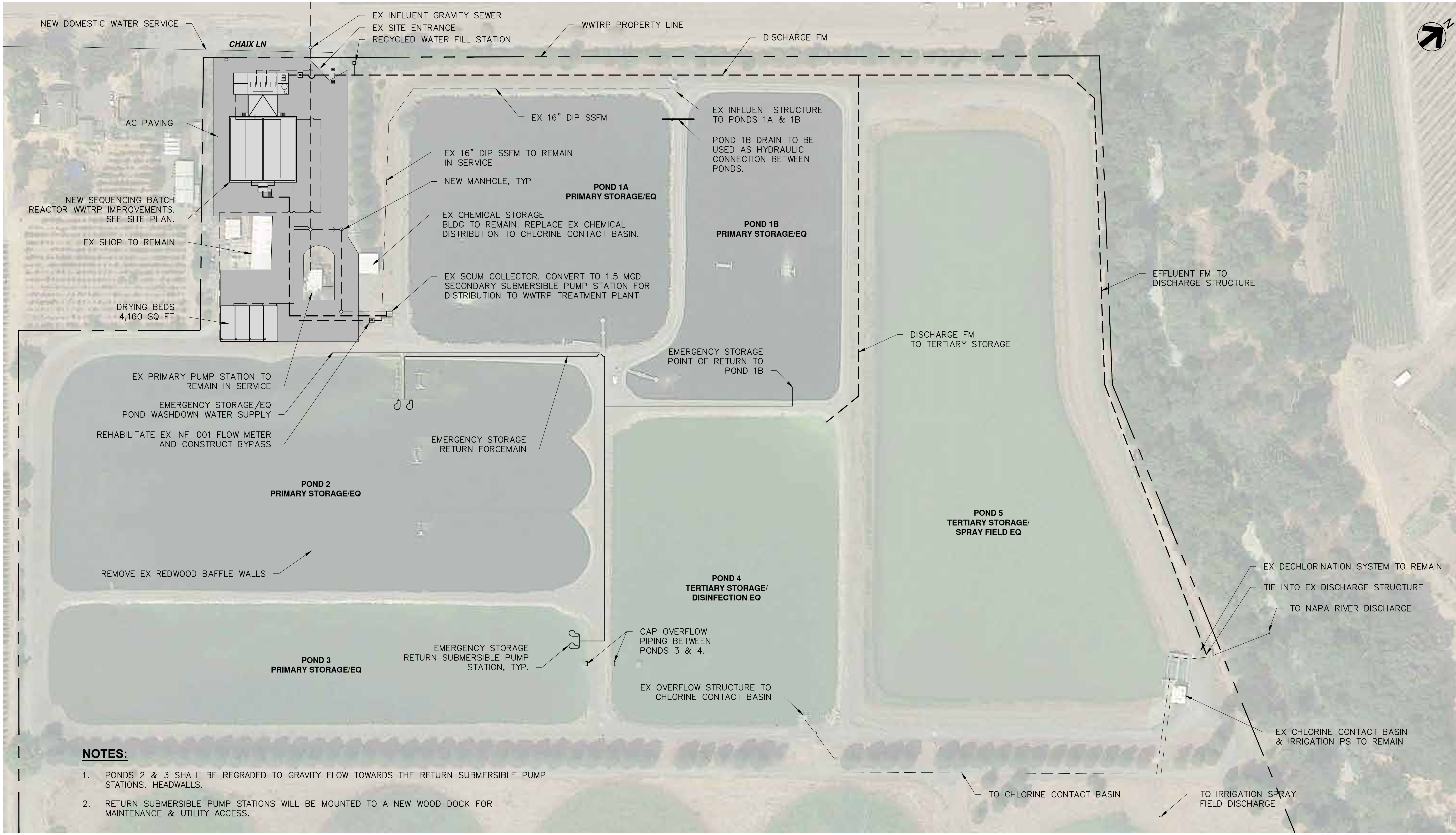
2. RETURN SUBMERSIBLE PUMP STATIONS WILL BE MOUNTED TO A NEW WOOD DOCK FOR MAINTENANCE & UTILITY ACCESS.

HydroScience

FIGURE 5-2
THE CITY OF ST. HELENA
WWTRP CONCEPTUAL DESIGN REPORT
OVERALL PACKAGED MBR IMPROVEMENT PLAN



HydroScience

FIGURE 5-3
THE CITY OF ST. HELENA
WWTRP CONCEPTUAL DESIGN REPORT
OVERALL SBR IMPROVEMENT PLAN

5.1 Headworks and Primary/Secondary WWTRP Distribution Improvements

The existing WWTRP headworks has been in operation as originally designed since 1965. The headworks structure is located within the existing operations building, and includes a below grade wet pit/dry pit influent pump station, electrical building, operations facility, and laboratory. The limited access to the below grade wet pit/dry pit, and the staircase access limits O&M flexibility.

For the Phase 1 Improvement Project, the WWTRP headworks facility will remain as constructed, underneath the existing operations building. The headworks system will maintain the operation of the existing in-channel comminutor, flow meter, and primary pump station. The existing headworks primary pump station will maintain operation as the principal means of influent distribution from the collection system to the existing pond system treatment facilities. Ponds 1A and 1B will remain as the primary point of entry to the City's WWTRP and will continuously operate as influent flow equalization and primary treatment for the proposed WWTRP Phase 1 upgrades.

Secondary WWTRP Distribution: Phase 1 improvements to the existing headworks will incorporate the construction of an overflow structure from existing treatment ponds 1A and 1B for hydraulic flow control and distribution between the primary treatment ponds and the new WWTRP secondary treatment plant. Ponds 1A and 1B will remain as constructed and provide influent flow equalization, storage, and primary wastewater reduction of solids and contaminants. Flow distribution from the primary treatment ponds to the new WWTRP will include the construction of a 1.5 MGD submersible lift station using the existing 6 x 6 concrete scum collector located in the southwestern corner of Pond 1A.

Since existing Ponds 1A and 1B are hydraulically connected by submerged piping, Ponds 1A and 1B will equalize influent wastewater in series prior to overflow and distribution to the new wastewater treatment facility. Pond 1A will operate as the final equalization basin prior to distribution to the new wastewater treatment facility. To control the hydraulic residence time of wastewater entering the equalization and pretreatment ponds, Pond 1B will be used as the primary point of entry to the ponds. A pneumatic weir gate will be installed on the existing scum collection structure which will control Pond 1A effluent as well as establish the water surface profile across Ponds 1A and 1B. A deep gravity sewer pipeline will also be installed between Pond 1A and the scum collector structure which will intersect the sump of Pond 1A and provide a means of pond drainage. Due to the spatial constraints of the existing scum collector, a second drainage control structural and submersible pump station can be constructed alongside the existing scum collector to provide redundant capacity as part of Phase 2 WWTRP upgrades and future plant capacity. Prior to design and implementation, a structural analysis of the existing scum collector is recommended.

The submersible lift station will be designed to operate at a range of influent flows between ADWF and Maximum Day conditions. The lift station will include a duplex set of Flygt submersible pumps, retrieval facilities, a precast concrete collection wet well and modernized mechanical, control and electrical systems. The lift station will operate on VFDs controlled by an ultrasonic transducer that will allow the system to modulate discharge flow rates according to the influent hydraulic conditions of the plant. Preliminary design criteria for the secondary lift station proposed for the Phase 1 Improvements is summarized in **Table 5-1**.

Table 5-1: Preliminary Design Criteria for Secondary Submersible Lift Station

Criteria	Parameter
Number of Submersible Pumps	1 Duty + 1 Standby
Single Pump Horsepower	12 hp
Single Pump Flow Capacity	1.5 MGD (1,040 GPM)
Single Pump TDH	29 feet
Wet Well Type	6' L x 17.5' H x 6' W Existing Scum Collector
Valve Vault Size	10' L x 6' H x 6' W
Discharge Piping Size	8 & 10 Inch
Electrical Service	480V, 3-Phase
Motor Drive Type	VFD

Primary Pump Station Improvements: Due to the operational age and condition of the existing dry pit submersible pumps, HydroScience recommends replacement of the pumping units, drives, and controls within 15-25 years to prevent mechanical failure. Original design criteria for the primary pump station's triplex pumping system was acquired from the existing pump data plates and is summarized in **Table 5-2**. The influent pump station has a combined capacity of 4,600 gpm (6.62 MGD) when all pumps are operating together at their design total dynamic head (TDH). Redundancy in the existing pump station is currently unavailable, if one pump were to be off-line or if one must operate in a standby condition.

Table 5-2: Existing Primary Pump Station Pump Data

Pump/Motor Information	Pump A	Pump B	Pump C
Pump Type	Solids Handling	Solids Handling	Solids Handling
Manufacturer	Chicago	Chicago	Allis Chalmers
Serial No.	9810182	-	831-37726-1-1
Model No.	LMC6	LMC6	300
Design Flow (GPM)	1,500	1,500	1,600
Design TDH (ft)	23	23	23
Drive Type	VFD	VFD	VFD
Motor Manufacturer	Baldor	Baldor	Baldor
HP	20	20	25
Volts	230/460	230/460	230/460
Frequency (Hz)	60	60	60
Speed (RPM)	1180	1180	-
Phase	3	3	3

Since the existing 16-inch primary pumps station force main no longer distribute to the original influent structure located in the southwest corner of Pond 1A, increased friction and static headlosses may have shifted each pump outside of their rated flow capacity of 1,200 GPM. A new distribution box positioned between Ponds 1A and 1B received all influent flows to the

WWTRP and is approximately 700 linear feet from the original influent structure. During a visual inspection of the primary pumps station dry pit during May 2019, each of the influent pumps were in relatively poor condition. A future condition assessment is recommended to determine the actual hydraulic capacity of each existing primary pump and develop an improvement plan based upon each pumps remaining operational life.

Existing Headworks Improvements: The City should also analyze the feasibility of retrofitting the existing headworks facility compared with constructing a new headworks that replaces the existing structure. The influent wet pit currently transitions wastewater flow from the influent 24-inch gravity sewer pipeline to a concrete open-channel that splits apart for influent flow channel capacity redundancy during high flow events. Channel isolation is manually operated. Condition assessment performed determined that the open channel configuration leaves the wet pit structure vulnerable to overflow events during pump outages and surges. Since surcharging of the influent wet pit is dependent upon the primary pump station, surcharging of the influent channels produces immediate flooding which would otherwise be contained if influent flow was fully contained in pipes. Overflow events at the headworks were reported by City staff to have occurred as recently as 2005.

Based upon conversations with City Staff, Phase 1 Improvements will also include the relocation of the operations, control and laboratory rooms to a new double wide trailer or masonry building to separate the existing headworks facility from onsite staff office space. Future improvements will include a comprehensive retrofit of the existing operations building to modernize the primary pump station and influent headworks structure to eliminate operator hazards and improve accessibility for materials and equipment.

Based upon the results of the condition assessment and conversation with City maintenance staff, recommended Phase 1 and future upgrades are summarized below.

Phase 1 Upgrades:

- Construct Pond 1A and 1B discharge flow structure for flow transition to 20 ft deep open channel;
- Construct coarse screen bar rack system and solids disposal area;
- Construct 1.5 MGD submersible pump station, mechanical sanitary sewer forcemain and electrical system for pressurized wastewater delivery to WWTRP improvements;
- Perform condition assessment of existing primary pump station ductile iron force main piping and replace corroded materials and operationally deficient equipment within dry pit pump room;
- Perform a comprehensive structural analysis on the influent structure wet well to determine coating condition, mechanical piping, and condition of concrete;
- Enclose influent channels using pipes and replace channel grinders within inline pipe grinders;
- Install new double wide trailer and trailer foundation as temporary replacement for operations building, control room, laboratory, and sanitary facilities.

Future Upgrades:

- Retrofit or replacement of parallel, triplex dry-pit submersible style Pumps A, B, & C with a duplex pumping system with fully redundant standby pump. The pumping system hydraulics estimated for the new process train will be designed to accommodate the following hydraulic design conditions:

- One Pump Operating:
  - Flow: 3 MGD
  - TDH: 33 feet
- Two Pumps Operating:
  - Flow: 6 MGD
  - TDH: 48 feet
- Three Pumps Operating:
  - Flow: 7.2 MGD
  - TDH: 57 feet
- Pumping system shall include new VFD’s to accommodate various influent flow conditions.
- Further evaluation will be explored regarding pump redundancy and mechanical upgrades.

- Rebuild controls and electrical system for Pumps A, B, & C and consult with the pump manufacturers to determine various pump upgrades necessary to extend the existing pump facility lifespan by 30 years;
- Perform feasibility study to analyze replacement/rehabilitation of operations building to modernize operator safety and accessibility;
- Retrofit existing building with crane access hoist for installation and removal of equipment to influent structure and primary pump station;
- Modernize electrical distribution and equipment electrical panels;
- Install redundant pump level control;
- Construct a permanent operations building.

5.2 Pond Retrofit

Replacement of the AIPS pond treatment system with either an SBR or MBR treatment process train will allow ponds 2 and 3 to be removed from the treatment process. Following conversion of the process to the new process train, the ponds shall be repurposed for flow equalization and emergency storage.

As previously stated, Ponds 1A and 1B will remain as primary treatment and flow equalization storage prior to distribution to the Phase 1 WWTRP Improvements. During low flow periods, operators can extend hydraulic residence times in primary ponds 1A and 1B by reducing influent flows to the WWTRP improvements and maintain elevated water levels in the ponds. When influent flow rates exceed the WWTRP capacity (1.3 MGD), existing Ponds 1A through 3 will provide the WWTRP with approximately 25.9 MG of flow equalization and emergency storage, as summarized in **Section 2.1.2**. WWTRP treatment capacities will be limited by the capacity of the biological process, therefore, peak flow events above the plant's rated capacity is expected to require flow equalization.

Since the existing pond treatment process is hydraulically connected via overflow structures and open channel pipes, the ponds will be designed to overflow in series. The emergency storage ponds will be allowed to fill sequentially from Ponds 1A/1B to Pond 3, controlled by the overflow weirs, as primary influent flow exceeds the capacity of the phase 1 WWTRP improvements. Since emergency overflow controls distribution through the pond system, wastewater will not be required to flow through each pond. Only ponds that are filled due to peak flows will be utilized.

When flows decrease and wet weather conditions subside, drainage of the stored wastewater will be returned to Ponds 1A and 1B through a system of submersible sewage pumps at the operator's discretion. Pond water surface elevations during peak storm events and redistribution to the WWTRP for processing during low flow periods of the wet weather season will be an important aspect of the wastewater treatment plant's updated operational strategies. Phase 1 improvements will include the construction of discrete submersible pumping systems designed to individually drain Ponds 2 and 3 at a rate of 1.3 MGD. The submersible pumps will be mechanically connected to an above grade common discharge header designed to remove wastewater from the emergency storage ponds and return wastewater back into equalization ponds 1A and 1B. Wood piers will extend from the existing dikes of Ponds 2 and 3 which will provide access to the submersible pumps for retrieval, maintenance, and utility connections. Each pumping system will include a duty plus standby pump configuration with remote control via SCADA for manual operation. Operators will have the ability to draw down each flooded storage basin individually in response to variable influent flow conditions.

Future WWTRP improvements can include the construction of a permanent gravity sewer system designed to gravity return wastewater to the WWTRP treatment plant. Gravity distribution will simplify wastewater return and eliminate the electrical demand of mechanical pumping systems and risks associated with electrical power loss. The gravity return and pond drainage system can include the implementation of concrete headwalls in the sump of each storage pond to establish a permanent point of sewage return. Gravity return to the treatment plant can be controlled via manually or pneumatically operated isolation valves and sluice gates which will isolate each pond for containment during overflows. Future improvements can also include the construction of impermeable linings for existing storage Ponds 1A – 5. Consolidation of Ponds 2 & 3 to one large basin dedicated to emergency overflow. Maintenance of the emergency storage and equalization pond system will also require a high capacity water distribution system for pond wash down and cleaning.

Ponds 4 and 5, designated for tertiary storage and disposal equalization, will continue to operate in series prior to chemical disinfection. Pond 4 will be isolated from Pond 3 and provisions will be included for Pond 4 and Pond 5 to fill and drain simultaneously through a system of continuously submerged pipe connections and isolation valves. As part of future upgrades, Ponds 4 and 5 will also tie into the overflow gravity return collection system to provide City operations staff the capability of manual drawdown and maintenance.

Conceptual design of the overflow system includes the construction of a pressurized distribution system designed to recirculate stored wastewater back to the point of entry to the Phase 1 treatment plant. Once drained, final construction of the overflow and equalization system will include regrading of the pond floor to drain towards a discrete drainage inlet headwall structure.

Based upon a conceptual level design, the Phase 1 and future improvements recommended for the Emergency Overflow and Equalization System are as follows:

Phase 1 Upgrades:

- Construction of a submersible pump drainage system in Ponds 2 and 3 designed to discharge into a common header for distribution to Pond 1A or 1B;
- Construction of wood piers for maintenance and utility access to the submersible pump station;
- Construction of concrete pads at the sump of Ponds 2 & 3 for submersible pump mounting;
- Re-grading of existing pond basin floors to slope towards new discharge points;
- Construction of new high capacity water distribution system for basin wash down.

Future Upgrades:

- Construction of a gravity sewer collection system for overflow and equalization return from Ponds 1A through 5. Gravity piping will be isolated by a main sluice gates which can be manually or automatically operated by City Staff. Stored wastewater will be returned to the plant headworks influent sewer;
- Construction of headwall structures for pond drainage and overflow inlet structures for pond filling in series;
- Consolidation of Ponds 2 & 3 into one basin dedicated to emergency overflow;
- Construction of basin liners;
- Rehabilitation of existing overflow structures and submerged pipelines;
- Replacement of existing isolation sluice/weir gates.

5.3 Solids Handling

A dewatering and solids handling process will be introduced to sufficiently dispose of waste sludge from the new treatment system. The City does not currently operate a continuous solids handling program since AIPS treatment systems factor the necessary capacity to permit multiple years of sludge accumulation. The future objective of the solids handling process will be to minimize the City's operational labor effort through automation and the construction of advanced sludge dewatering units and maximize the viability of establishing a Class A solids handling program for distribution and retail.

The Phase 1 solids handling process alternatives evaluated for this study include a low cost solution to the mitigation and disposal of waste activated sludge from the MBR or SBR project alternatives. To mitigate the relatively high equipment and construction costs associated with mechanical dewatering and disposal mechanisms, the conventional MBR and SBR alternatives will include the construction of a drying bed dewatering system designed to receive approximately 30,000 gpd of waste activated sludge (WAS) from the secondary treatment process. Drying beds are the recommended alternative due to the low capital and annualized costs associated with the system.

The packaged MBR treatment alternative will include a solids handling volute dewatering press and WAS storage tank designed to receive approximately 16,000 gallons per day of WAS. For both alternatives, a polymer injection and mixing system will also be constructed to coagulate suspended solids and increase the particle size of solid materials to prevent solids loss to through the filtration system.

Drying Beds: The sludge drying beds will provide a low-tech means of solids dewatering which relies on gravity and evaporation as the primary drying mechanism. The drying bed system will be positioned southwest of the existing operations building, and include the construction of three concrete basins, WAS piping, synthetic media blankets, polymer injection system, housing and ventilation. The drying beds will be covered by an overhead canopy to prevent rainwater from disrupting the drying process. The concrete drying beds will also include sidewalls, partitions, distribution systems, and in some installations, wheel runways and/or enclosures.

The drying period is expected to be approximately 2 – 3 days, depending upon humidity and temperature, and the moisture content of the dry sludge cake is expected to be approximately 80%. After drying, the sludge cake is removed manually by shoveling into wheel-barrows, trucks, scraper or front-end loader, or by special mechanical sludge removal equipment. Clearance for a truck to pull up alongside the drying beds should be provided. The dried sludge will be disposed of in a landfill. Underdrains will return leachate to the WWTRP influent headworks for continued processing. The conceptual drying bed design assumes three days of solid loadings at 2,000 lb/day sludge production. The preliminary design criteria for the solids handling system is provided in **Table 5-3**.

Table 5-3: Preliminary Drying Bed Design Criteria for Conventional MBR & SBR

Criteria	Parameter
Initial % Dry Solids	1-3%
Final % Dry Solids (after 24 hours)	14%
Solids Recovery	98%
Number of Basins	4
Filtration Type	Synthetic Tile Media
Surface Area of each Basin	1,040 sq ft

Volute Dewatering System: The volute dewatering press will be a packaged system designed and constructed to achieve both thickening and dewatering of waste sludge to produce cake solids at approximately 25% solids or better. This system will be included within the scope of supply for the packaged treatment plant. This packaged dewatering system will include a mounted volute dewatering press, feed pumps and polymer system, progressive cavity pumps, mixing and flocculation, and positive displacement blowers. Dewatered sludge will fall from the volute dewatering press at an average production rate of approximately 500 dry pounds per hour to disposal via dumpster or pond application. The preliminary design criteria for the solids handling system is provided in **Table 5-4.**

Table 5-4: Preliminary Volute Dewatering System Design Criteria for Packaged MBR

Criteria	Parameter
Initial % Dry Solids	0.2-8%
Final % Dry Solids (after 24 hours)	25%
Solids Recovery	99%
Number of Basins	2 (Aeration Basin + Flocculation Tank)
Filtration Type	Mechanical Screw Press
Number of Dewatering Units	1 Duty + 1 Standby
Cake Production	~500 dry lb/hr

For the production of a Class A biosolids program, the future solids handling system will require the addition of an upstream sludge digester or sludge holding tank, reconfiguration of the polymer injection system, and the construction of a parallel volute dewatering screw press system. The drying beds constructed as part of Phase 1 would then provide further water reduction and containment for dewatered solids storage prior to disposal.

Based upon a conceptual level design, the Phase 1 and future improvements recommended for the Solids Handling System are as follows:

Phase 1 Upgrades:

- Construct sludge dewatering system for landfill or pond disposal (drying beds or volute dewatering packaged system);
- Construct polymer feed system and waste activate sludge pumping system.

Future Upgrades:

- Upgrade solids handling system to produce Class A biosolids for retail.

5.4 Site Improvements

The area proposed to locate the WWTRP improvements is currently used as a storage laydown yard for the City Public Works Department. The site is currently graded flat has a variety of equipment, a building, sparse vegetation, and existing redwood trees. Common site improvements for Phase 1 WWTRP upgrades are expected to include paving, striping, storm collectors, bollards, fencing, gates and security. The existing shop will be protected during construction and pavement will be extended to create a shop entrance.

Proposed WWRTP upgrades will maintain the existing facility entrance through the main access gate. The gate will be reconstructed to include an automatic operator. A new 6-foot chain link fence will be constructed after construction to enclose the WWRTP property. Trees located on the west property boundary will be protected to mitigate the visual impacts of the new facility from the surrounding residential/commercial community and provide screening from the public. Chaix Lane will remain as the primary access corridors to the WWRTP site and will likely necessitate repaving after construction due to the impacts related to heavy machinery and deliveries.

New asphalt will be placed around the new WWTRP facilities to provide vehicular access to all sides of the treatment facilities, operations building, shop, and process equipment with access corridors with a minimum drivable road clearance of 14 feet. Pavement will be striped in accordance with the City standards. The location and sizing of the paved areas will maximize the available space within the WWRTP site and include curb and berm and storm water catchment and isolation. The site will have storm water catch basins that will drain by gravity to the influent pump station. Common improvements will also include protective bollards surrounding new electrical and wastewater treatment equipment against traffic.

5.5 Flow Meter Reconstruction

The WWTRP has an operational influent magnetic flow meter downstream of the influent pump station on the 16-inch force main. The flow meter currently operates as the WWTRP influent monitoring location INF-001, which formally reports influent flows to the RWQCB. Visual inspection of the flow meter indicated the existing flow meter was designed with insufficient straight lengths of pipe upstream and downstream of the measuring instrument. Straight pipe reduces flow turbulence, which enhances measurement accuracy and is typically specified by all magnetic flow meter manufacturers. Instead, the existing configuration includes two 16-inch by 8-inch pipe reducers installed immediately upstream and downstream of the 8-inch flow meter. The flow meter also does not have an operational bypass to permit calibration and maintenance. The flow meter has been in operation for approximately eighteen years.

Recosntruction of the influent flow meter will provide the WWTRP with more accurate flow measurements which enhances system characterization for future improvements. A second flow meter will be constructed on the effluent force main after disinfection. Since the sanitary sewer force main is being reconfigured to accommodate the new WWTRP, the flow meter should be replaced and mechanically reconstructed as part of the common improvements.

Phase 1 Upgrades:

- Replace existing INF-001 magnetic flow meter due to operational age;
- Reconstruct flow meter mechanical assembly with permanent bypass in new below grade vault to include manufacturer's recommended lengths of straight influent and effluent piping surrounding the instrument;
- Construct new flow meter on effluent force main;
- Redistribute electrical and control system and integrate instrumentation to SCADA.

5.6 Chlorine Disinfection System and Effluent Pump Station

The WWTRP improvements are expected to reconfigure the City's existing disinfection process.

Wastewater stored in Pond 4 is continuously distributed to the existing chlorine contact basin based upon variable influent WWTRP flow conditions. An existing 60 HP vertical turbine pump located at the end of the chlorine contact basin is currently setup to distribute disinfected wastewater to Pond 5 on variable frequency speed control based upon input from an ultrasonic flow meter on the influent pipeline to the chlorine contact basin.

Sodium Hypochlorite is fed from the existing chemical feed building and distributed directly into the chlorine contact basin from chemical feed pumps located inside the existing chemical storage building, located adjacent to the existing operations building. The existing sodium hypochlorite chemical monitoring system and ascorbic acid declorination chemical feed stations located in the ground floor of the effluent pump station and river discharge structure were constructed by City staff as temporary facilities and require upgrades in accordance with relevant standards related to chemical distribution systems.

Sodium hypochlorite is distributed to secondary treated wastewater through a system of diffusers in the chlorine contact chamber and disinfected effluent is pumped from the contact chamber to the north end of Pond 5 using the 60 HP pumps. During periods that the City discharges to the Napa River, the City has reported problems with insufficient Ascorbic Acid contact time in the discharge channel, which is manually operated by maintenance staff.

Since a new UV disinfection system will be constructed as part of the Phase 1 WWTRP upgrades, the existing chlorine contact basin will no longer operate as the primary means of effluent disinfection. The chlorine contact basin and chemical distribution system will remain for the purpose of redundant disinfection prior to spray field disposal. Since effluent discharged to the Napa River will no longer need to go through Pond 5, it is expected that the chlorination process will be significantly modified from its current state. Dechlorination will still be required for the occasional periods when Staff want to discharge effluent from Pond 5 to the Napa River. The existing irrigation spray field pump station will remain in operation, as configured, and will be subject to future improvements as part of separate CIP.

Phase 1 and future upgrades to the existing chlorine disinfection system and effluent pump station are as follows:

Phase 1 Upgrades:

- Relocate the existing ascorbic acid dechlorination chemical feed pumps and controls to a permanent chemical containment area in the effluent pump station;
- Reconstruct the existing sodium hypochlorite chemical monitoring equipment in accordance with relevant regulatory standards for chemical distribution systems for a permanent and modernized dechlorination system;
- Automate the chlorine injection system using continuous flow paced methods and based upon free ammonia concentrations entering the chlorine contact chamber;
- Replace existing chemical feed pipelines from the existing chemical storage building to the effluent pump station with new piping that meets secondary containment and leak detection requirements;
- Increase chemical feed lines from 1 inch to 1.5 inches in nominal diameter;
- Rehabilitate chlorine contact basin baffles;
- Connect new WWTRP Phase 1 effluent force main to chlorine contact basin;
- Perform comprehensive condition assessment on existing irrigation spray field pumps and force main system;
- Perform comprehensive condition assessment on Pond 5 chlorine contact basin discharge vertical turbine pumps;

- Replace water source to chlorine dosing system.

Future Upgrades:

- Rehabilitate the existing irrigation spray field pump station and modernize the electrical equipment;
- Rehabilitate the existing 60 HP chlorine contact basin discharge vertical turbine pumps and modernize the electrical equipment;
- Relocate the chlorine storage building adjacent to the effluent pump station and reconstruct the chemical distribution system and monitoring equipment.
- Demolish the existing chlorine storage building or retrofit for maintenance use.

5.7 Domestic Water System

The WWTRP does not currently have a potable water supply for domestic uses. All water uses within the WWTRP is non-potable and pumped from an on-site well. The well water system also includes an existing hydropneumatic pressure control system which was originally constructed in 1965. The hydropneumatic pressure tank and controls are original and indicate significant corrosion. Potable water service to the existing operations building is supplied by water delivered and stored in a 3,000 gallon polyethylene tank. The operations building maintains pressurized water service using a Flotec pressure tank and booster pump.

Well water from a nonpotable water supply well is used for process water, feed water for chlorination and dechlorination, and for fire protection.

The existing well was recently retrofitted with a new sanitary seal to protect against contamination to the groundwater aquifer. However, the water quality in the groundwater well is not suitable for potable use due to recent pond overflow contamination and internal structural deficiencies.

City staff are concerned that the hydropneumatic tank is subject to failure due to severe corrosion. Since the hydropneumatic tank is a critical component for pressure regulation in the WWTRP's existing water distribution system, failure would shut down the City's ability to effectively clean process equipment and perform routine maintenance. Phase 1 improvements are also expected to increase water demands associated with routine maintenance and process equipment. Therefore, the City needs to install a domestic water service connection sized to 1) supply the operations building with fire and potable water, 2) process water distribution system for 2W and 3W use for various plant operations such as disinfection system dosing, and 3) emergency storage basin washdown.

Phase 1 and future water system improvements should include the following:

Phase 1 Upgrades:

- Construct a domestic water connection for existing operations building and/or new modular building;
- Construct 2W and 3W distribution system and replace current WWTRP maintenance water source;

- Construct distribution system for emergency storage basin washdown.

Future Upgrades:

- Decommission existing well in accordance under regulatory requirements;
- Demolish existing hydropneumatic tank and controls;
- Install booster pump station for emergency storage pond washdown system.

5.8 Electrical Improvements

The electrical system will be designed to meet the most current design criteria adopted by the City and Napa County. The electrical system will also satisfy the requirements of the Electrical Safety Order of the California Code of Regulations and National Fire Protection Association No. 70, the National Electrical Code.

The Project will have 480 volt, 3-phase power as provided by Pacific Gas & Electric (PG & E). Power requirements and transformer sizing is subject to further evaluation based upon the recommended WWTRP treatment process alternative. The existing WWTRP service connection will remain intact to prevent operational disruption during construction. Future projects can include the combination of existing facilities to one common service connection sized according to the electrical demand of all existing and newly constructed site features.

Telephone service and fiber optics will be supplied to the site by local communications utility service providers. Communication services will facilitate future data distribution and facility monitoring by the City's future SCADA mainframe. Interim telemetry will be accommodated as required by the City's Public Works Department.

Electrical distribution throughout the WWTRP will include site lighting at each of the various treatment train facilities for security and emergency maintenance. Pole mounted light fixtures will serve as task lights to allow staff to work on the treatment equipment or for access to local control boxes. The pole mounted light fixtures will be equipped with individual manual on/off switches as well as "night light" operators using photocell control. These light fixtures will be on at dusk and off at dawn.

Security measures will be limited to magnetic contacts at each door of the operations, electrical, and maintenance buildings. These magnetic contacts will be tied into the PLC for alarming purposes only and directly report back to City SCADA and emergency response services. Video surveillance and perimeter security measures will be incorporated into the site improvements at the City's discretion.

The critical need of retrofitting essential plant components such as existing electrical systems, utility services, switchgear, and emergency power generating equipment will be subject to further evaluation based upon the recommended WWTRP treatment process alternative presented in this report.

5.9 Instrumentation and Controls

The existing WWTRP has a Supervisory Control and Data Acquisition (SCADA) system installed on a local computer located in the operations building. The SCADA system was constructed to monitor and control various automated process components within the plant. SCADA components include programmable logic controllers (PLC) located within the existing operations building and effluent pump station control cabinets, HMI software, and WIN 911 alarm software. The year the SCADA equipment was installed is unknown, and City staff believe that the existing SCADA system capabilities is insufficient.

A comprehensive condition assessment of the existing SCADA system was performed as part of the 2018 Facilities Master Plan which identified the following deficiencies:

- Existing SCADA software is limited in the number of data points that can be monitored.
- WWTRP staff have raised concerns related to the SCADA system's ability to properly alarm emergency response or personnel. WIN 911 auto dialer software often transmits alarms after a long time delay, or sometimes not at all which can result in catastrophic circumstances and violations of regulatory permit requirements.
- Programming modifications to existing PLCs are outstanding.

Since the existing SCADA system is believed to be deficient for the current WWTRP process, the WWTRP upgrades are expected to result in the construction of a new SCADA system. The new SCADA system will be compatible with process analyzers while also improving the systems data acquisition capacity and redundancy for future expansion. Common and future upgrades to the WWTRP SCADA system are as follows:

Phase 1 Upgrades:

- Replace existing iFIX HMI Software with new software package suited for Phase 1 upgrades and existing SCADA components;
- Integrate all new Phase 1 WWTRP upgrades into SCADA for full automation, monitoring and control;
- Replace Win 911 and refurbish the SCADA autodialer emergency alarm system;
- Reprogram and upgrade all existing PLCs;
- Perform condition assessment on existing pump station MCC's, control cabinets, VFD's, and RTU's to determine improvement priority.

Future Upgrades:

- Replace existing MCC's, control cabinets, VFD's and RTU's as necessary;
- Relocate main electrical distribution, MCC's and influent VFDs to a dedicated main electrical building;
- Relocate SCADA main computer to new control room.

SECTION 6 – PREFERRED ALTERNATIVE

This section presents the final recommendations and engineers preliminary opinion of probable cost for the WWTRP Phase 1 upgrades. Available funding options and state funding programs available to facilitate the project are also summarized in this section.

6.1 Final Recommendations

Based upon the results of the comparative analysis and the City's future goals for reuse and distribution, the preferred WWTRP upgrade alternative is the packaged MBR treatment system and associated common upgrades. This system is expected to provide the City with a reliable and cost effective wastewater treatment plant process alternative that can meet the water quality effluent limitations of the City's NPDES Permit during peak wet weather periods. This system will also provide expandability and modern automation to reduce the level of operator troubleshooting during emergency events. While the packaged MBR system is expected to be mechanically complex, biological process complexity is expected to be relatively low.

The recommended treatment system will be designed for a Phase 1 average dry weather flow of 0.5 MGD with the hydraulic capability to treat a maximum day event of 1.5 MGD. Above grade stainless steel structures will be designed to accommodate the near term design condition with space dedicated to future rete facilities. Two separate treatment trains will be designed according to the volumetric requirements of the biological treatment process and provide operational redundancy.

The recommended system will utilize the existing primary pump station for influent distribution to the primary treatment ponds which distributes to a new secondary pump station for distribution to the Phase 1 WWTRP improvements. The Phase I WWTRP improvements will include fine screening, MBR, UV Disinfection, effluent storage and pumping, dewatering with a screw press, and a series of common improvements.

6.2 Engineer's Preliminary Opinion of Probable Cost – Phase 1 Upgrades

Table 6-1 summarizes the Engineer's opinion of probable costs for the recommended WWTRP treatment improvements and common upgrades. Unit costs are all inclusive of materials, labor, equipment, deliveries and contractor's overhead and profit. The costs of equipment and materials are vetted through coordination with various outside vendors and industry leading subcontractor's for quality assurance purposes. These preliminary estimates also include soft costs and construction contingencies.

Table 6-1: Engineers Preliminary Opinion of Probable Cost – Phase 1 Upgrades

Cost Parameter	MBR
General	
Mobilization/Demobilization[1]	$540,000
Geotechnical Investigation	$50,000
Startup and Commissioning	$50,000
Civil	
Earthwork, Sheeting & Shoring, Clearing	$254,000
AC Pavement	$150,000
Civil Site Features (Striping, Curbs, Gutters)	$45,000
Temporary Facilities (Bypassing & Dewatering)	$100,000
Structural	
Cast-in-Place Concrete Slabs	$489,000
Mechanical & Treatment Equipment	
0.5 MGD Packaged MBR Treatment Plant	$6,100,000
Effluent Discharge PVC Piping (2,600 LF)	$294,000
Yard Piping, Process Equipment and Mechanical	$395,000
Electrical	
New PG&E 480V, 3-Phase Service Connection	$100,000
480V, 3-Phase Standby Generator	$250,000
Electrical Distribution, Communication, Integration	$360,000
Common Upgrades	
Pond Retrofit & Storage System	$550,000
1.5 MGD Secondary Pump Station	$650,000
Sludge Dewatering System	$650,000
Sodium Hypochlorite Improvements	$60,000
Domestic Water Improvements	$25,000
INF-001 Flow Meter Rehabilitation	$50,000
Operations Building Double Wide Trailer	$100,000
Primary Pump Station Improvements	$65,000
Existing Electrical/Instrumentation Rehabilitation & Upgrades	$75,000
Total Cost of Construction	$11,402,000
Design and Construction Contingencies (10%)	$1,140,000
Total Project Cost (2019 Dollars)	**$12,452,000**

Notes:
1. 5% of Total Cost of Construction.
2. All costs rounded to nearest $1,000.
3. Owner’s representative services are not included in the total project cost.

6.3 Funding Options

The City may consider State and Federal funding options for its WWTRP improvements project. While the City may fund a large portion of its project through loans, competitive grant opportunities are available. Grant programs, and some loan programs, are competitive. Projects with multiple benefits score well and can be successful in competing for funding.

In addition to meeting more stringent regulatory requirements of the NPDES Permit, the Project will produce disinfected tertiary recycled water that is suitable for unrestricted use to conserve local water supplies and allow the City to take a step towards its future plans to serve portions of its non-potable water demands with recycled water. Because of the multiple benefits that this Project provides, the City may be eligible to compete for external funding.

In this section, loan and grant funding options for the City are discussed.

6.3.1 State Funding Programs

Many of the State's funding programs base eligibility on the applicant type, project type and their funding source. The community's size and median household income (MHI) factor in the State's funding priorities, with small disadvantaged communities with MHI of less than 80% of the statewide MHI of $67,169 and populations less than 20,000. The 2013-2017 American Community Survey 5-year estimates that the City population is 6,056 with an MHI of $85,663.[1] Thus, the City may not receive priority funding.

Nonetheless, many communities are able to successfully obtain funding for their projects. Specific programs that the City may consider are briefly discussed below.

1. State Water Board's Clean Water State Revolving Fund (CWSRF) Program: This loan program has a sustainable loan capacity of $1.0 Billion per year, and provides low interest loans for wastewater, stormwater, and recycled water projects. This program provides full or partial funding of a project with a CWRSRF loan and, if the project and the community is eligible projects, grants. The program funds project costs associated with planning, design, construction, construction management, and administration. The financing term is up to 30 years, with an interest rate that is 50% of the most recent General Obligation bond Sale at the time of funding commitment. In recent years, the interest rate has been less than 2%. At the time of preparation of this report, the interest rate is 1.99%.

   The application process may take up to a year for submittals, review, and approvals. Projects undergoing the application process are ranked and added to the Fundable List, which is incorporated in the State Water Board's annually adopted Intended Use Plan. Only projects on the Fundable List are funded during the fiscal year for which it was adopted.

[1] https://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml

Priority projects may be added to the Fundable List at any if a community meets the small disadvantaged community definition or if it meets the State Water Board's priority criteria, where a small community with average wastewater bill greater than 4% of its MHI. For the City, the average monthly wastewater bill would need to be over $285.54 to receive high priority grant and low-interest funding. Alternatively, the project must be a public health project, where the responsible health authority has certified that a health problem exists and the State Water Board or a Regional Water Board has (a) adopted a discharge prohibition, (b) approved a moratorium, or (c) adopted a cease and desist order. Alternatively, a project may be a public health project when it is required to comply with a prohibition, posting, limitation, or warning that has been imposed by a responsible health authority and the State Water Board or a Regional Water Board has concurred with the health authority's determination and established a time schedule for correction or elimination of the problem.

2. Water Recycling Funding Program: This combination of loan and grant program is administered by the State Water Board and complements the CWSRF program discussed above. This program funds recycled water projects, including treatment plants. The financing term is up to 30 years, with an interest rate that is 50% of the most recent General Obligation bond Sale at the time of funding commitment.

3. Green Project Reserve Principal Forgiveness Loan Program: This program provides loans for green CWSRF projects that address water or energy efficiency, mitigate stormwater runoff, or encourage sustainable project planning, design and construction. Green projects include recycled water projects, which may receive a maximum of $2.5 Million in funds. This loan program complements CWSRF loans and is administered by the State Water Board's CWSRF. The loan is typically forgiven at the end of the project.

4. Integrated Regional Water Management (IRWM) Grant Program: This competitive grant program, administered by the State Department of Water Resources (DWR), provides proposition grants for regional water resource projects. To be eligible, a project must be listed under a regional integrated water management plan. For the City, the Project must be added to the Bay Area Regional Water Management Plan, which is updated by the Bay Area IRWM Coordinating Committee as needed, typically in preparation for a regional application. The City must advocate for its projects as the Bay Area IRWM Coordinating Committee vet projects for inclusion in the regional application for IRWM proposition grants. The successful application must demonstrate a combination of projects that present regional benefits. Recently, DWR has released the first round of funding opportunities to implement Proposition 1.

5. Infrastructure State Revolving Fund Program: This program is offered by the California Infrastructure and Economic Development Bank (I-Bank) as a loan program for public borrowers for infrastructure and economic development projects. Unlike the CWSRF, this program does not have competitive ranking. The program provides up to $25 Million in loans, for the term of the useful life of the project, up to 30 years. The interest rate is benchmarked to Thompson Reuters Municipal Data Index. Interest rates have averaged 3.5%.

6.3.2 Federal Funding Programs

Federal financial assistance opportunities include loans and competitive grant programs. Some programs have eligibility criteria similar to the State's, with priority funding for small disadvantaged communities and tribal lands. Projects receiving federal funding must have the additional planning step of undergoing National Environmental Policy Act (NEPA) compliance. Federal agencies release their funding opportunity announcements (FOA) at a central federal website, www.grants.gov. Specific federal programs that the City may consider are briefly discussed below.

1. Water & Waste Disposal Loan & Grant Program: The United States Department of Agriculture Rural Development, which has a goal to improve the economy and quality of life in communities, administers this program. This program provides loans and grants for water and wastewater projects for small rural communities, with populations less than 10,000.

   The City is within the USDA Rural Development eligible area and small community population criteria. Based on the City's MHI, loan interest rates would be at market rate (currently 4.25%) for a term up to 40 years, based on the useful life of the project. Grants are prioritized for small, disadvantaged communities and tribal lands. However, grants may potentially be available if the agency has limited response for its FOA. The City may discuss eligibility for grants with the California program contact.

2. Miscellaneous United States Bureau of Reclamation (Bureau) Grant Programs: The benefit of producing recycled water for unrestricted non-potable use allows the Project to be eligible for several Bureau grant programs. These programs seek to help communities and agricultural areas improve water supply reliability. The Project may compete for the following programs:
   - Bay-Delta CALFED Water Use Efficiency,
   - Agricultural Water Use Efficiency,
   - WaterSMART Grants,
     - Water and Energy Efficient Grants, and
     - Drought Resiliency Project Grants.

   Most of these grants fund up to 50% of the project's cost, and no more than $5 Million. Awards are made through a competitive scoring process.

SECTION 7 – REFERENCES

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USEPA (2006). Emerging Technologies for Biosolids Management, EPA 832-R-06-005

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USEPA (1999). Wastewater Technology Fact Sheet: Sequencing Batch Reactors, EPA 932-F-99-073, September.

APPENDIX A

NPDES PERMIT NO. CA0038016 (ORDER NO. R2-2016-0003)

CALIFORNIA
Water Boards

EDMUND G. BROWN JR.
GOVERNOR

MATTHEW RODRIQUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

San Francisco Bay Regional Water Quality Control Board

ORDER No. R2-2016-0003
NPDES No. CA0038016

The following discharger is subject to waste discharge requirements (WDRs) set forth in this Order:

Table 1. Discharger Information

Discharger	City of St. Helena
Facility Name	City of St. Helena Wastewater Treatment and Reclamation Plant and its wastewater collection system
Facility Address	1 Chaix/Thomann Lane St. Helena, CA 94574 Napa County
CIWQS Place Number	258386

Table 2. Discharge Location

Discharge Point	Effluent Description	Discharge Point Latitude (North)	Discharge Point Longitude (West)	Receiving Water
001	Secondary-treated municipal wastewater	38.502778	-122.437500	Napa River

Table 3. Administrative Information

This Order was adopted on:	January 13, 2016
This Order shall become effective on:	March 1, 2016
This Order shall expire on:	February 28, 2021
CIWQS Regulatory Measure	404297
The Discharger shall file a Report of Waste Discharge as an application for reissuance of WDRs in accordance with California Code of Regulations, title 23, and an application for reissuance of a National Pollutant Discharge Elimination System (NPDES) permit no later than:	June 1, 2020
The U.S. Environmental Protection Agency (U.S. EPA) and the California Regional Water Quality Control Board, San Francisco Bay Region, have classified this discharge as follows:	Minor

I, Bruce H. Wolfe, Executive Officer, do hereby certify that this Order with all attachments is a full, true, and correct copy of the Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on the date indicated above.

Bruce H. Wolfe

Digitally signed by Bruce H. Wolfe
DN: cn=Bruce H. Wolfe,
o=SWRCB, ou=Region 2,
email=bwolfe@waterboards.ca.g
ov, c=US
Date: 2016.01.14 11:33:49 -08'00'

Bruce H. Wolfe, Executive Officer

Contents

I. Facility Information 3
II. Findings 3
III. Discharge Prohibitions 3
IV. Effluent Limitations and Discharge Specifications 4
V. Receiving Water Limitations 6
VI. Provisions 7
  A. Standard Provisions 7
  B. Monitoring and Reporting 7
  C. Special Provisions 7
    1. Reopener Provisions 7
    2. Effluent Characterization Study and Report 8
    3. Receiving Water Characterization Study and Report 9
    4. Pollutant Minimization Program 9
    5. Special Provisions for Municipal Facilities 12
    6. Standard Operating Procedures for Resource Recovery 13

Tables

Table 1. Discharger Information 1
Table 2. Discharge Locations 1
Table 3. Administrative Information 1
Table 4. Effluent Limitations 4

Attachments

Attachment A – Definitions A-1
Attachment B – Facility Map B-1
Attachment C – Process Flow Diagram C-1
Attachment D – Federal Standard Provisions D-1
Attachment E – Monitoring and Reporting Program (MRP) E-1
Attachment F – Fact Sheet F-1
Attachment G – Regional Standard Provisions and Monitoring and Reporting Requirements G-1

I. FACILITY INFORMATION

Information describing the City of St. Helena Wastewater Treatment and Reclamation Plant and its wastewater collection system (Facility) is summarized in Table 1 and in Fact Sheet (Attachment F) sections I and II.

II. FINDINGS

The California Regional Water Quality Control Board, San Francisco Bay Region (Regional Water Board), finds:

A. **Legal Authorities.** This Order serves as WDRs pursuant to California Water Code article 4, chapter 4, division 7 (commencing with § 13260). This Order is also issued pursuant to federal Clean Water Act (CWA) section 402 and implementing regulations adopted by U.S. EPA and Water Code chapter 5.5, division 7 (commencing with § 13370). It shall serve as an NPDES permit for point source discharges from the Facility to surface waters.

B. **Background and Rationale for Requirements.** The Regional Water Board developed the requirements in this Order based on information the Discharger submitted as part of its application, information obtained through monitoring and reporting programs, and other available information. The Fact Sheet (Attachment F) contains background information and rationale for the requirements in this Order and is hereby incorporated into and constitutes findings for this Order. Attachments A through E and G are also incorporated into this Order.

C. **Provisions and Requirements Implementing State Law.** Provision VI.C.5.c is included to implement State law only (California Water Code section 13241). This provision is not required or authorized under the federal CWA; consequently, violations of this provision are not subject to the enforcement remedies available for NPDES violations.

D. **Notification of Interested Parties.** The Regional Water Board notified the Discharger and interested agencies and persons of its intent to prescribe these WDRs and provided an opportunity to submit written comments and recommendations. The Fact Sheet provides details regarding the notification.

E. **Consideration of Public Comment.** The Regional Water Board, in a public meeting, heard and considered all comments pertaining to the discharge. The Fact Sheet provides details regarding the public hearing.

THEREFORE, IT IS HEREBY ORDERED that Order No. R2-2010-0105 is rescinded upon the effective date of this Order except for enforcement purposes, and, in order to meet the provisions of Water Code division 7 (commencing with § 13000) and regulations adopted thereunder and the provisions of the CWA and regulations and guidelines adopted thereunder, the Discharger shall comply with the requirements in this Order. This action in no way prevents the Regional Water Board from taking enforcement action for past violations of the previous order.

III. DISCHARGE PROHIBITIONS

A. Discharge of treated wastewater at a location or in a manner different from that described in this Order is prohibited.

B. Discharge at Discharge Point No. 001 is prohibited unless the river flow-to-effluent flow ratio is at least 50:1.

C. The bypass of untreated or partially-treated wastewater to waters of the United States is prohibited, except as provided for in Attachment D sections I.G.2 and I.G.3.

D. Average dry weather influent flow from the treatment plant in excess of 0.50 MGD is prohibited. Average dry weather influent flow shall be determined from three consecutive dry weather months each year, with compliance measured at Monitoring Location REC-001 as described in the Monitoring and Reporting Program (MRP, Attachment E).

E. Any sanitary sewer overflow that results in a discharge of untreated or partially-treated wastewater to waters of the United States is prohibited.

F. Discharge to the Napa River is prohibited during the dry season each year, from June 1 through October 31. The need to discharge during the dry season may arise as a result of early or late season storms. As soon as possible after determining that discharge will be necessary, the Discharger shall notify the Regional Water Board case manager by phone or email and provide information supporting its determination. Unless the case manager objects, the Discharger may commence discharge but only when absolutely necessary and only to the extent necessary for the reason stated above. The discharge shall be monitored and meet limitations and shall consist of fully treated effluent.

For each dry season discharge event, the Discharger shall submit a report within five business days after the end of the discharge that describes the reasons for the need to discharge, with supporting information, and describe the discharge flow volume, duration, and estimated dilution within the receiving water. In accordance with the Monitoring and Reporting Program (Attachment E), the discharge quality shall be reported in the next monthly self-monitoring report.

IV. EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS

A. Discharges at Discharge Point No. 001 shall comply with the following effluent limitations, with compliance measured at Monitoring Locations EFF-001 as described in the MRP:

Table 4. Effluent Limitations

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Biochemical Oxygen Demand, 5-day @ 20°C (BOD_5)	mg/L	15	25	---	---	---
Total Suspended Solids (TSS)	mg/L	15	20	---	---	---
Oil and Grease	mg/L	10	---	20	---	---
pH [1]	standard units	---	---	---	6.5	8.5
Total Residual Chlorine	mg/L	---	---	---	---	0.0 [2]
Copper, Total	µg/L	8.3	---	17	---	---
Cyanide, Total	µg/L	15	---	30	---	---
Ammonia, Total	mg/L as N	16	---	39	---	---

Unit Abbreviations:

mg/L = milligrams per liter
µg/L = micrograms per liter

Footnote:

[1] If the Discharger monitors pH continuously, pursuant to 40 C.F.R. section 401.17, the Discharger shall be in compliance with this pH limitation provided that both of the following conditions are satisfied: (i) the total time during which the pH is outside the required range shall not exceed 7 hours and 26 minutes in any calendar month; and (ii) no individual excursion from the required pH range shall exceed 60 minutes.

[2] The Discharger may elect to use a continuous on-line monitoring system for measuring or determining that residual dechlorinating agent is present. This monitoring system may be used to prove that anomalous residual chlorine exceedances measured by on-line chlorine analyzers are false positives because it is chemically improbable to have chlorine present in the presence of sodium bisulfite. If Regional Water Board staff finds convincing evidence that chlorine residual exceedances are false positives, the exceedances are not violations of this Order's total chlorine residual limit.

B. Percent Removal. The average monthly percent removal of biochemical oxygen demand (BOD_5) and total suspended solids (TSS) at Discharge Point No. 001 shall not be less than 85 percent (i.e., in each calendar month, the arithmetic mean of BOD_5 and TSS, by concentration, for effluent samples collected at Monitoring Location EFF-001 or REC-001 as described in the MRP, shall not exceed 15 percent of the arithmetic mean of the BOD_5 and TSS, by concentration, for influent samples collected at Monitoring Location INF-001 as described in the MRP at approximately the same times during the same period).

C. Total Coliform. Discharges at Discharge Point No. 001 shall comply with the following total coliform limitations, with compliance measured at Monitoring Location EFF-001 as described in the MRP:

1. The five-sample moving median shall not exceed 23 Most Probable Number (MPN)/100 mL.
2. The daily maximum shall not exceed 240 MPN/100 mL.

D. Whole Effluent Acute Toxicity. Discharges at Discharge Point No. 001 shall meet the following acute toxicity limitations, with compliance measured at Monitoring Location EFF-001 as described in the MRP:

1. A three-sample median value of not less than 90 percent survival; and
2. A single-sample maximum value of not less than 70 percent survival.

These acute toxicity limitations are defined as follows:

- **Three-sample median.** A bioassay test showing survival of less than 90 percent represents a violation of this effluent limit if one of the past two bioassay tests also shows less than 90 percent survival.

- **Single sample maximum.** A bioassay test showing survival of less than 70 percent represents a violation of this effluent limit.

If the Discharger can demonstrate that toxicity exceeding the levels cited above is caused by ammonia and that the ammonia in the discharge complies with the total ammonia effluent limitations in Table 4 of this Order, then such toxicity shall not constitute a violation of this effluent limitation.

V. RECEIVING WATER LIMITATIONS

A. The discharge shall not cause the following conditions to exist in receiving waters:

1. Floating material, including solids, liquids, foams, and scum, in concentrations that cause nuisance or adversely affect beneficial uses;

2. Alteration of suspended sediment in such a manner as to cause nuisance or adversely affect beneficial uses, or detrimental increase in the concentrations of toxic pollutants in sediments or aquatic life;

3. Suspended material in concentrations that cause nuisance or adversely affect beneficial uses;

4. Bottom deposits or aquatic growths to the extent that such deposits or growths cause nuisance or adversely affect beneficial uses;

5. Alteration of temperature beyond present natural background levels;

6. Changes in turbidity that cause nuisance or adversely affect beneficial uses, or increases from normal background light penetration or turbidity greater than 10 percent in areas where natural turbidity is greater than 50 nephelometric turbidity units;

7. Coloration that causes nuisance or adversely affects beneficial uses;

8. Visible, floating, suspended, or deposited oil or other products of petroleum origin; or

9. Toxic or other deleterious substances in concentrations or quantities that cause deleterious effects on wildlife, waterfowl, or other aquatic biota, or render any of these unfit for human consumption, either at levels created in the receiving waters or as a result of biological concentration.

B. The discharge shall not cause the following limitations to be exceeded in receiving waters at any place within one foot of the water surface:

1.	Dissolved Oxygen	7.0 mg/L, minimum The median dissolved oxygen concentration for any three consecutive months shall not be less than 80% of the dissolved oxygen content at saturation. When natural factors cause concentrations less than that specified above, the discharge shall not cause further reduction in ambient dissolved oxygen concentrations.
2.	Dissolved Sulfide	Natural background levels
3.	Nutrients	Waters shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses.

C. The discharge shall not cause a violation of any water quality standard for receiving waters adopted by the Regional Water Board or the State Water Resources Control Board (State Water Board) as required by the CWA and regulations adopted thereunder. If more stringent water quality standards are promulgated or approved pursuant to CWA section 303, or amendments thereto, the Regional Water Board may revise or modify this Order in accordance with the more stringent standards.

VI. PROVISIONS

A. Standard Provisions

1. The Discharger shall comply with all "Standard Provisions" in Attachment D.

2. The Discharger shall comply with all applicable provisions of the "Regional Standard Provisions, and Monitoring and Reporting Requirements for NPDES Wastewater Discharge Permits" (Attachment G).

B. Monitoring and Reporting

The Discharger shall comply with the MRP (Attachment E) and future revisions thereto and applicable sampling and reporting requirements in Attachments D and G.

C. Special Provisions

1. Reopener Provisions

The Regional Water Board may modify or reopen this Order prior to its expiration date in any of the following circumstances as allowed by law:

a. If present or future investigations demonstrate that the discharges governed by this Order have or will have a reasonable potential to cause or contribute to, or will cease to have, adverse impacts on water quality or beneficial uses of the receiving waters.

b. If new or revised water quality objectives or total maximum daily loads (TMDLs) come into effect (whether statewide, regional, or site-specific). In such cases, effluent limitations in this Order may be modified as necessary to reflect the updated water quality objectives and wasteload allocations in the TMDLs. Adoption of the effluent limitations in this Order is not intended to restrict in any way future modifications based on legally-adopted water quality objectives or TMDLs or as otherwise permitted under federal regulations governing NPDES permit modifications.

c. If translator, dilution, or other water quality studies provide a basis for determining that a permit condition should be modified.

d. If State Water Board precedential decisions, new policies, new laws, or new regulations are adopted.

e. If an administrative or judicial decision on a separate NPDES permit or WDRs addresses requirements similar to this discharge.

f. Or as otherwise authorized by law.

The Discharger may request a permit modification based on any of the circumstances above. With any such request, the Discharger shall include antidegradation and anti-backsliding analyses.

2. Effluent Characterization Study and Report

a. Study Elements. The Discharger shall continue to characterize and evaluate the discharge from the following discharge point to verify that the "no" or "unknown" reasonable potential analysis conclusions of this Order remain valid and to inform the next permit reissuance. The Discharger shall collect representative samples at the monitoring station set forth below, as defined in the MRP, at no less than the frequency specified below:

Discharge Point	Monitoring Location	Minimum Frequency
001	EFF-001 or REC-001	Once

The samples shall be analyzed for the pollutants listed in Attachment G, Table C, except for those pollutants with effluent limitations where the MRP already requires more frequent monitoring, and except for those pollutants for which there are no water quality criteria (see Fact Sheet Table F-6). Samples shall also be analyzed for the pollutants listed in Basin Plan Tables 3-5 and 3-6, except for odor and radioactivity (see Fact Sheet Table F-7). Compliance with this requirement shall be achieved in accordance with the specifications of Attachment G sections III.A.1 and III.A.2.

The Discharger shall evaluate whether concentrations of any of these pollutants significantly increase over past performance. The Discharger shall investigate the cause of any such increase. The investigation may include, but need not be limited to, an increase in monitoring frequency, monitoring of internal process streams, and monitoring of influent sources. The Discharger shall establish remedial measures addressing any increase resulting in reasonable potential to cause or contribute to an excursion above applicable water quality objectives. This requirement may be satisfied through identification of the constituent as a "pollutant of concern" in the Discharger's Pollutant Minimization Program, described in Provision VI.C.3.

b. Reporting Requirements

i. Routine Reporting. The Discharger shall, within 45 days of receipt of analytical results, report the following in the transmittal letter for the appropriate self-monitoring report:

(a) Indication that a sample for this study was collected; and

(b) Identity of pollutants detected at or above applicable water quality criteria (see Fact Sheet Tables F-6 and F-7) and the detected concentrations of those pollutants.

ii. Final Report. The Discharger shall submit a final report that presents all these data with the application for permit reissuance.

3. Receiving Water Characterization Study and Report

a. Study Elements. The Discharger shall characterize and evaluate the receiving water at the following discharge points to verify that the "no" or "unknown" reasonable potential analysis conclusions of this Order remain valid and to inform the next permit reissuance. The Discharger shall collect representative samples at the monitoring stations set forth below, as defined in the MRP, at no less than the frequency specified below:

Monitoring Location	Minimum Frequency
RSW-001	Once
RSW-900	Once

At Monitoring Locations RSW-001 and RSW-900, samples shall be analyzed for the pollutants listed in Attachment G, Table C, except for those pollutants for which there are no water quality criteria (see Fact Sheet Table F-6). At Monitoring Location RSW-900, the samples shall also be analyzed for the pollutants listed in Basin Plan Tables 3-5 and 3-6, except for odor and radioactivity (see Fact Sheet Table F-7). Compliance with this requirement shall be achieved in accordance with the specifications of Attachment G sections III.A.1 and III.A.2.

The Discharger may complete this study on its own or in collaboration with other Napa River dischargers (i.e., the City of Calistoga and the Town of Yountville).

b. Reporting Requirements

i. Routine Reporting. The Discharger shall, within 45 days of receipt of analytical results, report the following in the transmittal letter for the appropriate self-monitoring report:

(a) Indication that a sample for this study was collected; and

(b) Identity of pollutants detected at or above applicable water quality criteria (see Fact Sheet Tables F-6 and F-7) and the detected concentrations of those pollutants.

ii. Final Report. The Discharger shall submit a final report that presents all these data with the application for permit reissuance.

4. Pollutant Minimization Program

a. The Discharger shall continue to improve its existing Pollutant Minimization Program to promote minimization of pollutant loadings to the treatment plant and therefore to the receiving waters.

b. The Discharger shall submit an annual report no later than February 28 each year. Each annual report shall include at least the following information:

i. Brief description of treatment plant. The description shall include the service area and treatment plant processes.

ii. **Discussion of current pollutants of concern.** Periodically, the Discharger shall analyze its circumstances to determine which pollutants are currently a problem and which pollutants may be potential future problems. This discussion shall include the reasons for choosing the pollutants.

iii. **Identification of sources for pollutants of concern.** This discussion shall include how the Discharger intends to estimate and identify pollutant sources. The Discharger shall include sources or potential sources not directly within the ability or authority of the Discharger to control, such as pollutants in the potable water supply and air deposition.

iv. **Identification of tasks to reduce the sources of pollutants of concern.** This discussion shall identify and prioritize tasks to address the Discharger's pollutants of concern. The Discharger may implement the tasks by itself or participate in group, regional, or national tasks that address its pollutants of concern. The Discharger is strongly encouraged to participate in group, regional, or national tasks that address its pollutants of concern whenever it is efficient and appropriate to do so. An implementation timeline shall be included for each task.

v. **Outreach to employees.** The Discharger shall inform employees about the pollutants of concern, potential sources, and how they might be able to help reduce the discharge of these pollutants of concern into the treatment facilities. The Discharger may provide a forum for employees to provide input.

vi. **Continuation of Public Outreach Program.** The Discharger shall prepare a pollution prevention public outreach program for its service area. Outreach may include participation in existing community events, such as county fairs; initiating new community events, such as displays and contests during Pollution Prevention Week; conducting school outreach programs; conducting plant tours; and providing public information in newspaper articles or advertisements, radio or television stories or spots, newsletters, utility bill inserts, or web sites. Information shall be specific to target audiences. The Discharger shall coordinate with other agencies as appropriate.

vii. **Discussion of criteria used to measure Pollutant Minimization Program and task effectiveness.** The Discharger shall establish criteria to evaluate the effectiveness of its Pollutant Minimization Program. This discussion shall identify the specific criteria used to measure the effectiveness of each task in Provisions VI.C.3.b.iii, iv, v, and vi.

viii. **Documentation of efforts and progress.** This discussion shall detail all of the Discharger's Pollutant Minimization Program activities during the reporting year.

ix. **Evaluation of Pollutant Minimization Program and task effectiveness.** This Discharger shall use the criteria established in Provision VI.C.3.b.vii to evaluate the program and task effectiveness.

x. **Identification of specific tasks and timelines for future efforts.** Based on the evaluation, the Discharger shall explain how it intends to continue or change its tasks to more effectively reduce the amount of pollutants flowing to the treatment plant and, subsequently, in its effluent.

c. The Discharger shall develop and conduct a Pollutant Minimization Program as further described below when there is evidence that a priority pollutant is present in the effluent above an effluent limitation (e.g., sample results reported as detected but not quantified [DNQ] when the effluent limitation is less than the method detection limit [MDL], sample results from analytical methods more sensitive than those methods required by this Order, presence of whole effluent toxicity, health advisories for fish consumption, or results of benthic or aquatic organism tissue sampling) and either:

i. A sample result is reported as DNQ and the effluent limitation is less than the Reporting Level (RL); or

ii. A sample result is reported as not detected (ND) and the effluent limitation is less than the MDL, using definitions in Attachment A and reporting protocols described in the MRP.

d. If triggered by the reasons set forth in Provision VI.C.3.c, above, the Discharger's Pollutant Minimization Program shall include, but not be limited to, the following actions and submittals:

i. Annual review and semi-annual monitoring of potential sources of the reportable priority pollutants, which may include fish tissue monitoring and other bio-uptake sampling or alternative measures when source monitoring is unlikely to produce useful analytical data;

ii. Quarterly monitoring for the reportable priority pollutants in the influent to the Facility. The Executive Officer may approve alternative measures when influent monitoring is unlikely to produce useful analytical data;

iii. Submittal of a control strategy designed to proceed toward the goal of maintaining concentrations of the reportable priority pollutants in the effluent at or below the effluent limitation;

iv. Implementation of appropriate cost-effective control measures for the reportable priority pollutants, consistent with the control strategy; and

v. Inclusion of the following specific items within the annual report required by Provision VI.C.3.b above:

(a) All Pollutant Minimization Program monitoring results for the previous year;
(b) List of potential sources of the reportable priority pollutants;
(c) Summary of all actions undertaken pursuant to the control strategy; and
(d) Description of actions to be taken in the following year.

5. Special Provisions for Municipal Facilities

a. Sludge and Biosolids Management

i. All sludge and biosolids shall be disposed of, managed, or reused in a municipal solid waste landfill; through land application; as a Class A compost; through a waste-to-energy facility or another recognized and approved technology; in a sludge-only landfill; or in a sewage sludge incinerator in accordance with 40 C.F.R. part 503.

ii. Sludge and biosolids treatment, storage, and disposal, or reuse, shall not create a nuisance, such as objectionable odors or flies, or result in groundwater contamination.

iii. The sludge and biosolids treatment and storage site shall have facilities adequate to divert surface runoff from adjacent areas, to protect site boundaries from erosion, and to prevent any conditions that would cause drainage from the materials in the storage site. Adequate protection is defined as protection from at least a 100-year storm and the highest possible tidal stage that may occur.

iv. Sludge or biosolids disposed in a municipal solid waste landfill shall meet the requirements of 40 C.F.R. part 258.

v. This Order does not authorize permanent onsite sludge or biosolids storage or disposal. A Report of Waste Discharge shall be filed and the site brought into compliance with all applicable regulations prior to commencement of any such activity.

b. Collection System Management. The Discharger shall properly operate and maintain its collection system (see Attachment D section I.D). The Discharger shall report any noncompliance (see Attachment D sections V.E.1 and V.E.2) and mitigate any discharge from its collection system that violates this Order (see Attachment D section I.C).

The *Statewide General Waste Discharge Requirements for Sanitary Sewer Systems* (General Collection System WDRs), State Water Board Order No. 2006-0003 DWQ as amended by State Water Board Order No. WQ 2013-0058-EXEC, has requirements for operation and maintenance of separate sanitary sewer collection systems and for reporting and mitigating sanitary sewer overflows from the separate sanitary sewer portion of the Discharger's collection system. While the Discharger must comply with both the General Collection System WDRs and this Order, the General Collection System WDRs more clearly and specifically stipulate requirements for operation and maintenance and for reporting and mitigating sanitary sewer overflows. Implementation of the General Collection System WDRs for proper operation and maintenance and mitigation of sanitary sewer overflows will satisfy the corresponding federal NPDES requirements specified in Attachment D (as supplemented by Attachment G). Following the notification and reporting requirements in the General Collection System WDRs will satisfy the corresponding NPDES reporting requirements specified in Attachment D (as supplemented by Attachment G) for sanitary sewer overflows from the separate sanitary sewer portion of the collection system.

c. **Wastewater Impoundment Integrity.** The Discharger shall take measures necessary to ensure that any impoundment the Discharger uses for storage or treatment of untreated or partially-treated wastewater is sufficiently water tight to prevent leakage of wastewater to groundwater. This shall include inspection and testing of liner integrity prior to putting back into service any impoundment that has been out of service and dry for one month or longer and any necessary routine maintenance and inspection of impoundments while in service.

d. **Standard Operating Procedures for Resource Recovery.** If the Discharger receives hauled-in anaerobically-digestible material for injection into an anaerobic digester, the Discharger shall notify the Regional Water Board and develop and implement Standard Operating Procedures for this activity. The Standard Operating Procedures shall be developed prior to initiation of hauling. The Standard Operating Procedures shall address material handling, including unloading, screening or other processing prior to anaerobic digestion, and transportation; spill prevention; spill response; avoidance of the introduction of materials that could cause interference, pass through, or upset of the treatment processes; avoidance of prohibited material; vector control; odor control; operation and maintenance; and the disposition of any solid waste segregated from introduction to the digester. The Discharger shall train its staff on the Standard Operating Procedures and maintain records for a minimum of three years for each load received, describing the hauler, waste type, and quantity received. In addition, the Discharger shall maintain records for a minimum of three years for the disposition, location, and quantity of cumulative pre-digestion segregated solid waste hauled offsite.

ATTACHMENT A – DEFINITIONS

Arithmetic Mean (μ)
Also called the average, the sum of measured values divided by the number of samples. For ambient water concentrations, the arithmetic mean is calculated as follows:

Arithmetic mean = $\mu = \Sigma x / n$ where: Σx is the sum of the measured ambient water concentrations, and n is the number of samples.

Average Monthly Effluent Limitation (AMEL)
The highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.

Average Weekly Effluent Limitation (AWEL)
The highest allowable average of daily discharges over a calendar week (Sunday through Saturday), calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week.

Bioaccumulative
Taken up by an organism from its surrounding medium through gill membranes, epithelial tissue, or from food and subsequently concentrated and retained in the body of the organism.

Carcinogenic
Known to cause cancer in living organisms.

Coefficient of Variation
Measure of data variability calculated as the estimated standard deviation divided by the arithmetic mean of the observed values.

Daily Discharge
Either: (1) the total mass of the constituent discharged over the calendar day (12:00 am through 11:59 pm) or any 24-hour period that reasonably represents a calendar day for purposes of sampling (as specified in the permit) for a constituent with limitations expressed in units of mass; or (2) the unweighted arithmetic mean measurement of the constituent over the day for a constituent with limitations expressed in other units of measurement (e.g., concentration).

The daily discharge may be determined by the analytical results of a composite sample taken over the course of one day (a calendar day or other 24-hour period defined as a day) or by the arithmetic mean of analytical results from one or more grab samples taken over the course of the day.

For composite sampling, if 1 day is defined as a 24-hour period other than a calendar day, the analytical result for the 24-hour period is considered the result for the calendar day in which the 24-hour period ends.

Detected, but Not Quantified (DNQ)
Sample result less than the RL, but greater than or equal to the laboratory's MDL. Sample results reported as DNQ are estimated concentrations.

Dilution Credit
Amount of dilution granted to a discharge in the calculation of a water quality-based effluent limitation, based on the allowance of a specified mixing zone. It is calculated from the dilution ratio or determined by conducting a mixing zone study or modeling the discharge and receiving water.

Effluent Concentration Allowance (ECA)
Value derived from the water quality criterion/objective, dilution credit, and ambient background concentration that is used, in conjunction with the CV for the effluent monitoring data, to calculate a long-term average (LTA) discharge concentration. The ECA has the same meaning as waste load allocation (WLA) as used in U.S. EPA guidance (*Technical Support Document For Water Quality-based Toxics Control*, March 1991, second printing, EPA/505/2-90-001).

Enclosed Bay
Indentation along the coast that encloses an area of oceanic water within a distinct headlands or harbor works. Enclosed bays include all bays where the narrowest distance between the headlands or outermost harbor works is less than 75 percent of the greatest dimension of the enclosed portion of the bay. Enclosed bays include, but are not limited to, Humboldt Bay, Bodega Harbor, Tomales Bay, Drake's Estero, San Francisco Bay, Morro Bay, Los Angeles-Long Beach Harbor, Upper and Lower Newport Bay, Mission Bay, and San Diego Bay. Enclosed bays do not include inland surface waters or ocean waters.

Estimated Chemical Concentration
Concentration that results from the confirmed detection of the substance below the ML value by the analytical method.

Estuaries
Waters, including coastal lagoons, located at the mouths of streams that serve as areas of mixing for fresh and ocean waters. Coastal lagoons and mouths of streams that are temporarily separated from the ocean by sandbars are considered estuaries. Estuarine waters are considered to extend from a bay or the open ocean to a point upstream where there is no significant mixing of fresh water and seawater. Estuarine waters include, but are not limited to, the Sacramento-San Joaquin Delta, as defined in Water Code section 12220, Suisun Bay, Carquinez Strait downstream to the Carquinez Bridge, and appropriate areas of the Smith, Mad, Eel, Noyo, Russian, Klamath, San Diego, and Otay rivers. Estuaries do not include inland surface waters or ocean waters.

Inland Surface Waters
All surface waters of the state that do not include the ocean, enclosed bays, or estuaries.

Instantaneous Maximum Effluent Limitation
Highest allowable value for any single grab sample or aliquot (i.e., each grab sample or aliquot is independently compared to the instantaneous maximum limitation).

Instantaneous Minimum Effluent Limitation
Lowest allowable value for any single grab sample or aliquot (i.e., each grab sample or aliquot is independently compared to the instantaneous minimum limitation).

Maximum Daily Effluent Limitation (MDEL)
Highest allowable daily discharge of a pollutant, over a calendar day (or 24-hour period). For pollutants with limitations expressed in units of mass, the daily discharge is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurement, the daily discharge is calculated as the arithmetic mean measurement of the pollutant over the day.

Median
Middle measurement in a set of data. The median of a set of data is found by first arranging the measurements in order of magnitude (either increasing or decreasing order). If the number of measurements (n) is odd, then the median = $X_{(n+1)/2}$. If n is even, then the median = $(X_{n/2} + X_{(n/2)+1})/2$ (i.e., the midpoint between n/2 and n/2+1).

Method Detection Limit (MDL)
Minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero, as defined in in 40 C.F.R. part 136, Attachment B, revised as of July 3, 1999.

Minimum Level (ML)
Concentration at which the entire analytical system gives a recognizable signal and acceptable calibration point. The ML is the concentration in a sample that is equivalent to the concentration of the lowest calibration standard analyzed by a specific analytical procedure, assuming that all the method specified sample weights, volumes, and processing steps have been followed.

Mixing Zone
Limited volume of receiving water allocated for mixing with a wastewater discharge where water quality criteria can be exceeded without causing adverse effects to the overall water body.

Not Detected (ND)
Sample results less than the laboratory’s MDL.

Persistent Pollutants
Substances for which degradation or decomposition in the environment is nonexistent or very slow.

Pollutant Minimization Program
Program of waste minimization and pollution prevention actions that include, but are not limited to, product substitution, waste stream recycling, alternative waste management methods, and education of the public and businesses. The goal of the Pollutant Minimization Program is to reduce all potential sources of a priority pollutant through pollutant minimization (control) strategies, including pollution prevention measures as appropriate, to maintain the effluent concentration at or below the water quality-based effluent limitation. Pollution prevention measures may be particularly appropriate for persistent bioaccumulative priority pollutants where there is evidence that beneficial uses are being impacted. Cost effectiveness may be considered when establishing the requirements of a Pollutant Minimization Program. The completion and implementation of a Pollution Prevention Plan, if required pursuant to Water Code section 13263.3(d), is considered to fulfill Pollutant Minimization Program requirements.

Pollution Prevention
Any action that causes a net reduction in the use or generation of a hazardous substance or other pollutant that is discharged into water and includes, but is not limited to, input change, operational improvement, production process change, and product reformulation (as defined in Water Code section 13263.3). Pollution prevention does not include actions that merely shift a pollutant in wastewater from one environmental medium to another environmental medium, unless clear environmental benefits of such an approach are identified to the satisfaction of the State Water Board or Regional Water Board.

Reporting Level (RL)
ML (and its associated analytical method) chosen by the Discharger for reporting and compliance determination from the MLs included in this Order, including an additional factor if applicable as discussed herein. The MLs included in this Order correspond to approved analytical methods for reporting a sample result that are selected by the Regional Water Board either from SIP Appendix 4 in accordance with SIP section 2.4.2 or established in accordance with SIP section 2.4.3. The ML is based on the proper application of method-based analytical procedures for sample preparation and the absence of any matrix interferences. Other factors may be applied to the ML depending on the specific sample preparation steps employed. For example, the treatment typically applied in cases where there are matrix-effects is to dilute the sample or sample aliquot by a factor of ten. In such cases, this additional factor must be applied to the ML in the computation of the RL.

Source of Drinking Water
Any water designated as having a municipal or domestic supply (MUN) beneficial use.

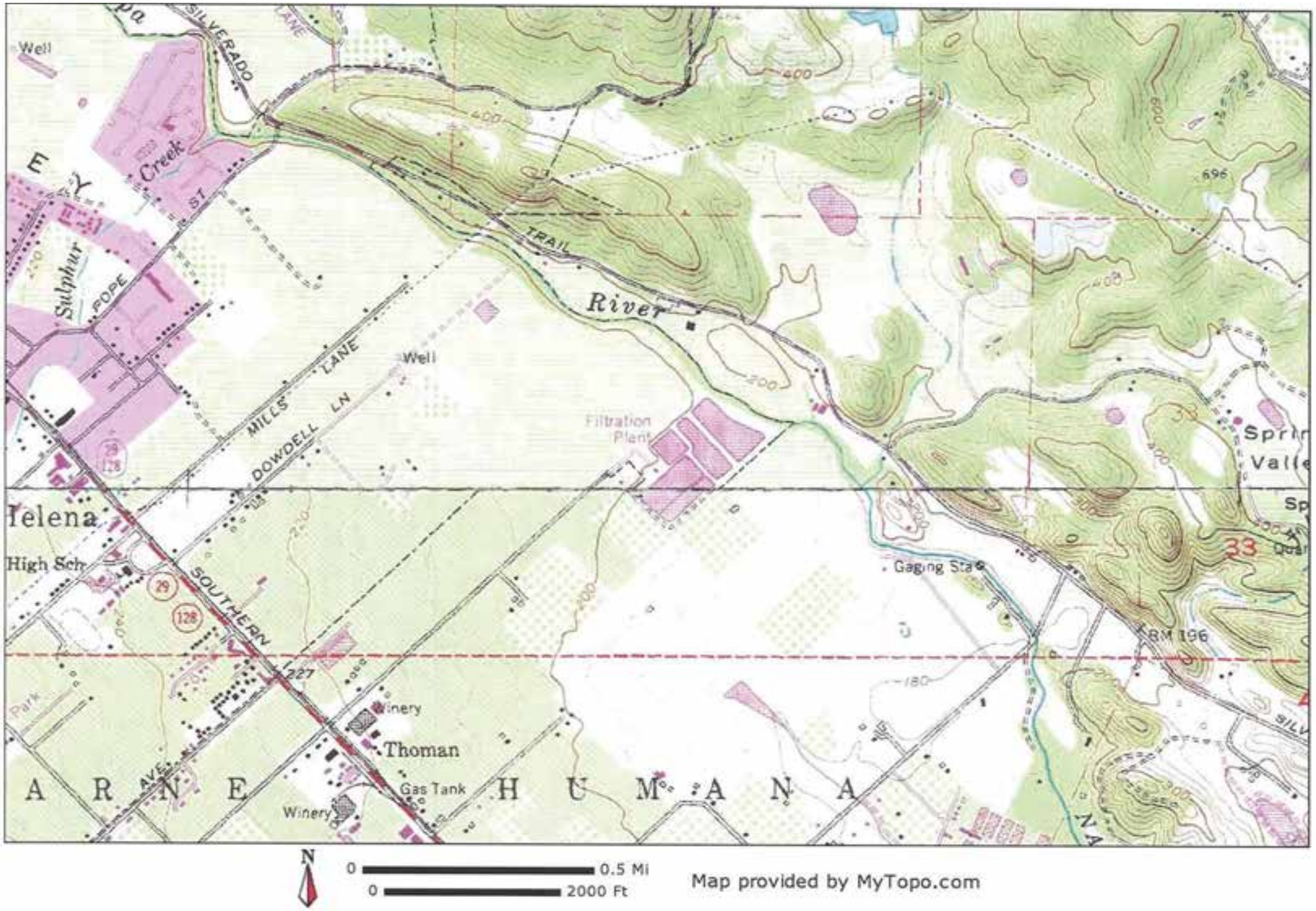
Standard Deviation (σ)
Measure of variability calculated as follows:

$$\sigma = (\sum[(x - \mu)^2]/(n - 1))^{0.5}$$

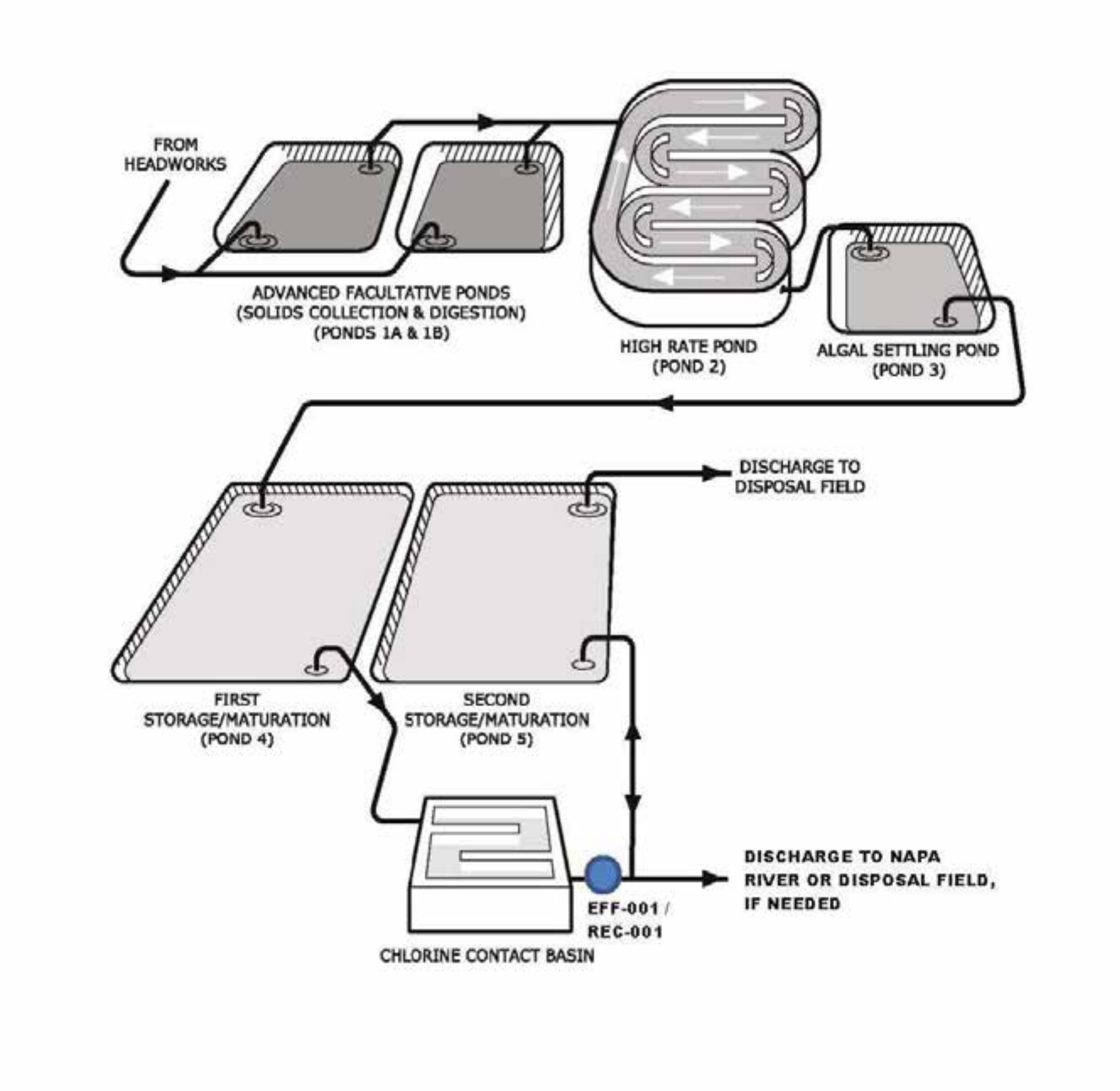
where:
x is the observed value;
μ is the arithmetic mean of the observed values; and
n is the number of samples.

Toxicity Reduction Evaluation (TRE)
Study conducted in a step-wise process designed to identify the causative agents of effluent or ambient toxicity, isolate the sources of toxicity, evaluate the effectiveness of toxicity control options, and then confirm the reduction in toxicity. The first steps of the TRE consist of the collection of data relevant to the toxicity, including additional toxicity testing, and an evaluation of facility operations and maintenance practices, and best management practices. A Toxicity Identification Evaluation (TIE) may be required as part of the TRE, if appropriate. A TIE is a set of procedures to identify the specific chemicals responsible for toxicity. These procedures are performed in three phases (characterization, identification, and confirmation) using aquatic organism toxicity tests.

ATTACHMENT B – FACILITY MAP



ATTACHMENT C – PROCESS FLOW DIAGRAM



ATTACHMENT D –STANDARD PROVISIONS

I. STANDARD PROVISIONS – PERMIT COMPLIANCE

A. Duty to Comply

1. The Discharger must comply with all of the terms, requirements, and conditions of this Order. Any noncompliance constitutes a violation of the Clean Water Act (CWA) and the California Water Code and is grounds for enforcement action; permit termination, revocation and reissuance, or modification; denial of a permit renewal application; or a combination thereof. (40 C.F.R. § 122.41(a); Wat. Code §§ 13261, 13263, 13265, 13268, 13000, 13001, 13304, 13350, 13385.)

2. The Discharger shall comply with effluent standards or prohibitions established under CWA section 307(a) for toxic pollutants and with standards for sewage sludge use or disposal established under CWA section 405(d) within the time provided in the regulations that establish these standards or prohibitions, even if this Order has not yet been modified to incorporate the requirement. (40 C.F.R. § 122.41(a)(1).)

B. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for a Discharger in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this Order. (40 C.F.R. § 122.41(c).)

C. Duty to Mitigate

The Discharger shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this Order that has a reasonable likelihood of adversely affecting human health or the environment. (40 C.F.R. § 122.41(d).)

D. Proper Operation and Maintenance

The Discharger shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Discharger to achieve compliance with the conditions of this Order. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems that are installed by a Discharger only when necessary to achieve compliance with the conditions of this Order. (40 C.F.R. § 122.41(e).)

E. Property Rights

1. This Order does not convey any property rights of any sort or any exclusive privileges. (40 C.F.R. § 122.41(g).)

2. The issuance of this Order does not authorize any injury to persons or property or invasion of other private rights, or any infringement of state or local law or regulations. (40 C.F.R. § 122.5(c).)

F. Inspection and Entry

The Discharger shall allow the Regional Water Board, State Water Board, U.S. EPA, and/or their authorized representatives (including an authorized contractor acting as their representative), upon the presentation of credentials and other documents, as may be required by law, to (33 U.S.C. § 1318(a)(4)(B); 40 C.F.R. § 122.41(i); Wat. Code, §§ 13267, 13383):

1. Enter upon the Discharger's premises where a regulated facility or activity is located or conducted, or where records are kept under the conditions of this Order (33 U.S.C. § 1318(a)(4)(B)(i); 40 C.F.R. § 122.41(i)(1); Wat. Code, §§ 13267, 13383);

2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this Order (33 U.S.C. § 1318(a)(4)(B)(ii); 40 C.F.R. § 122.41(i)(2)); Wat. Code, §§ 13267, 13383);

3. Inspect and photograph, at reasonable times, any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order (33 U.S.C. § 1318(a)(4)(B)(ii); 40 C.F.R. § 122.41(i)(3); Wat. Code, §§ 13267, 13383); and

4. Sample or monitor, at reasonable times, for the purposes of ensuring Order compliance or as otherwise authorized by the CWA or the Water Code, any substances or parameters at any location. (33 U.S.C. § 1318(a)(4)(B); 40 C.F.R. § 122.41(i)(4); Wat. Code, §§ 13267, 13383.)

G. Bypass

1. Definitions

a. "Bypass" means the intentional diversion of waste streams from any portion of a treatment facility. (40 C.F.R. § 122.41(m)(1)(i).)

b. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities, which causes them to become inoperable, or substantial and permanent loss of natural resources that can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production. (40 C.F.R. § 122.41(m)(1)(ii).)

2. Bypass not exceeding limitations. The Discharger may allow any bypass to occur which does not cause exceedances of effluent limitations, but only if it is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions listed in Standard Provisions – Permit Compliance I.G.3, I.G.4, and I.G.5 below. (40 C.F.R. § 122.41(m)(2).)

3. Prohibition of bypass. Bypass is prohibited, and the Regional Water Board may take enforcement action against a Discharger for bypass, unless (40 C.F.R. § 122.41(m)(4)(i)):

a. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage (40 C.F.R. § 122.41(m)(4)(i)(A));

b. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass that occurred during normal periods of equipment downtime or preventive maintenance (40 C.F.R. § 122.41(m)(4)(i)(B)); and

c. The Discharger submitted notice to the Regional Water Board as required under Standard Provisions – Permit Compliance I.G.5 below. (40 C.F.R. § 122.41(m)(4)(i)(C).)

4. **Approval.** The Regional Water Board may approve an anticipated bypass, after considering its adverse effects, if the Regional Water Board determines that it will meet the three conditions listed in Standard Provisions—Permit Compliance I.G.3 above. (40 C.F.R. § 122.41(m)(4)(ii).)

5. **Notice**

a. **Anticipated bypass.** If the Discharger knows in advance of the need for a bypass, it shall submit a notice, if possible at least 10 days before the date of the bypass. (40 C.F.R. § 122.41(m)(3)(i).)

b. **Unanticipated bypass.** The Discharger shall submit notice of an unanticipated bypass as required in Standard Provisions - Reporting V.E below (24-hour notice). (40 C.F.R. § 122.41(m)(3)(ii).)

H. Upset

Upset means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the Discharger. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation. (40 C.F.R. § 122.41(n)(1).)

1. **Effect of an upset.** An upset constitutes an affirmative defense to an action brought for noncompliance with such technology based permit effluent limitations if the requirements of Standard Provisions – Permit Compliance I.H.2 below are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review. (40 C.F.R. § 122.41(n)(2).)

2. **Conditions necessary for a demonstration of upset.** A Discharger who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs or other relevant evidence that (40 C.F.R. § 122.41(n)(3)):

a. An upset occurred and that the Discharger can identify the cause(s) of the upset (40 C.F.R. § 122.41(n)(3)(i));

b. The permitted facility was, at the time, being properly operated (40 C.F.R. § 122.41(n)(3)(ii));

c. The Discharger submitted notice of the upset as required in Standard Provisions—Reporting V.E.2.b below (24-hour notice) (40 C.F.R. § 122.41(n)(3)(iii)); and

d. The Discharger complied with any remedial measures required under Standard Provisions—Permit Compliance I.C above. (40 C.F.R. § 122.41(n)(3)(iv).)

3. **Burden of proof.** In any enforcement proceeding, the Discharger seeking to establish the occurrence of an upset has the burden of proof. (40 C.F.R. § 122.41(n)(4).)

II. STANDARD PROVISIONS—PERMIT ACTION

A. General

This Order may be modified, revoked and reissued, or terminated for cause. The filing of a request by the Discharger for modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any Order condition. (40 C.F.R. § 122.41(f).)

B. Duty to Reapply

If the Discharger wishes to continue an activity regulated by this Order after the expiration date of this Order, the Discharger must apply for and obtain a new permit. (40 C.F.R. § 122.41(b).)

C. Transfers

This Order is not transferable to any person except after notice to the Regional Water Board. The Regional Water Board may require modification or revocation and reissuance of the Order to change the name of the Discharger and incorporate such other requirements as may be necessary under the CWA and the Water Code. (40 C.F.R. §§ 122.41(l)(3), 122.61.)

III. STANDARD PROVISIONS – MONITORING

A. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. (40 C.F.R. § 122.41(j)(1).)

B. Monitoring must be conducted according to test procedures approved under 40 C.F.R. part 136 for the analyses of pollutants unless another method is required under 40 C.F.R. chapter 1, subchapters N or O. Monitoring must be conducted according to sufficiently sensitive test methods approved under 40 C.F.R. part 136 for the analysis of pollutants or pollutant parameters or required under 40 C.F.R. chapter 1, subchapter N or O. For the purposes of this paragraph, a method is sufficiently sensitive when:

1. The method minimum level (ML) is at or below the level of the effluent limitation established in the permit for the measured pollutant or pollutant parameter, and either (a) the method ML is at or below the level of the applicable water quality criterion for the measured pollutant or pollutant parameter, or (b) the method ML is above the applicable water quality criterion but the amount of the pollutant or pollutant parameter in a facility's discharge is high enough that the method detects and quantifies the level of the pollutant or pollutant parameter in the discharge; or

2. The method has the lowest ML of the analytical methods approved under 40 C.F.R. part 136 or required under 40 C.F.R. chapter 1, subchapter N or O for the measured pollutant or pollutant parameter.

In the case of pollutants for which there are no approved methods under 40 C.F.R. part 136 or otherwise required under 40 C.F.R. chapter 1, subchapters N or O, monitoring must be conducted according to a test procedure specified in this Order for such pollutants. (40 C.F.R. §§ 122.21(e)(3),122.41(j)(4), 122.44(i)(1)(iv).)

IV. STANDARD PROVISIONS—RECORDS

A. Except for records of monitoring information required by this Order related to the Discharger's sewage sludge use and disposal activities, which shall be retained for a period of at least five years (or longer as required by 40 C.F.R. part 503), the Discharger shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this Order, and records of all data used to complete the application for this Order, for a period of at least three (3) years from the date of the sample, measurement, report or application. This period may be extended by request of the Regional Water Board Executive Officer at any time. (40 C.F.R. § 122.41(j)(2).)

B. Records of monitoring information shall include the following:

1. The date, exact place, and time of sampling or measurements (40 C.F.R. § 122.41(j)(3)(i));
2. The individual(s) who performed the sampling or measurements (40 C.F.R. § 122.41(j)(3)(ii));
3. The date(s) the analyses were performed (40 C.F.R. § 122.41(j)(3)(iii));
4. The individual(s) who performed the analyses (40 C.F.R. § 122.41(j)(3)(iv));
5. The analytical techniques or methods used (40 C.F.R. § 122.41(j)(3)(v)); and
6. The results of such analyses. (40 C.F.R. § 122.41(j)(3)(vi).)

C. Claims of confidentiality for the following information will be denied (40 C.F.R. § 122.7(b)):

1. The name and address of any permit applicant or Discharger (40 C.F.R. § 122.7(b)(1)); and
2. Permit applications and attachments, permits, and effluent data. (40 C.F.R. § 122.7(b)(2).)

V. STANDARD PROVISIONS—REPORTING

A. Duty to Provide Information

The Discharger shall furnish to the Regional Water Board, State Water Board, or U.S. EPA within a reasonable time, any information which the Regional Water Board, State Water Board, or U.S. EPA may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Order or to determine compliance with this Order. Upon request, the Discharger shall also furnish to the Regional Water Board, State Water Board, or U.S. EPA copies of records required to be kept by this Order. (40 C.F.R. § 122.41(h); Wat. Code, §§ 13267, 13383.)

B. Signatory and Certification Requirements

1. All applications, reports, or information submitted to the Regional Water Board, State Water Board, and/or U.S. EPA shall be signed and certified in accordance with Standard Provisions—Reporting V.B.2, V.B.3, V.B.4, and V.B.5 below. (40 C.F.R. § 122.41(k).)

2. For a corporation, all permit applications shall be signed by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means: (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures. (40 C.F.R. § 122.22(a)(1).)

For a partnership or sole proprietorship, all permit applications shall be signed by a general partner or the proprietor, respectively. (40 C.F.R. § 122.22(a)(2).)

For a municipality, state, federal, or other public agency, all permit applications shall be signed by either a principal executive officer or ranking elected official. For purposes of this provision, a principal executive officer of a federal agency includes (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of U.S. EPA). (40 C.F.R. § 122.22(a)(3).).

3. All reports required by this Order and other information requested by the Regional Water Board, State Water Board, or U.S. EPA shall be signed by a person described in Standard Provisions – Reporting V.B.2 above, or by a duly authorized representative of that person. A person is a duly authorized representative only if:

a. The authorization is made in writing by a person described in Standard Provisions—Reporting V.B.2 above (40 C.F.R. § 122.22(b)(1));

b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.) (40 C.F.R. § 122.22(b)(2)); and

c. The written authorization is submitted to the Regional Water Board and State Water Board. (40 C.F.R. § 122.22(b)(3).)

4. If an authorization under Standard Provisions – Reporting V.B.3 above is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Standard Provisions—Reporting V.B.3 above must be submitted to the Regional Water Board and State Water Board prior to or together with any reports, information, or applications, to be signed by an authorized representative. (40 C.F.R. § 122.22(c).)

5. Any person signing a document under Standard Provisions—Reporting V.B.2 or V.B.3 above shall make the following certification:

> "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations." (40 C.F.R. § 122.22(d).)

C. Monitoring Reports

1. Monitoring results shall be reported at the intervals specified in the Monitoring and Reporting Program in this Order. (40 C.F.R. § 122.22(l)(4).)

2. Monitoring results must be reported on a Discharge Monitoring Report (DMR) form or forms provided or specified by the Regional Water Board or State Water Board for reporting results of monitoring of sludge use or disposal practices. (40 C.F.R. § 122.41(l)(4)(i).)

3. If the Discharger monitors any pollutant more frequently than required by this Order using test procedures approved under 40 C.F.R. part 136, or another method required for an industry-specific waste stream under 40 C.F.R. subchapters N or O, the results of such monitoring shall be included in the calculation and reporting of the data submitted in the DMR or sludge reporting form specified by the Regional Water Board. (40 C.F.R. § 122.41(l)(4)(ii).)

4. Calculations for all limitations, which require averaging of measurements, shall utilize an arithmetic mean unless otherwise specified in this Order. (40 C.F.R. § 122.41(l)(4)(iii).)

D. Compliance Schedules

Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this Order, shall be submitted no later than 14 days following each schedule date. (40 C.F.R. § 122.41(l)(5).)

E. Twenty-Four Hour Reporting

1. The Discharger shall report any noncompliance that may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the Discharger becomes aware of the circumstances. A written submission shall also be provided within five (5) days of the time the Discharger becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance. (40 C.F.R. § 122.41(l)(6)(i).)

2. The following shall be included as information that must be reported within 24 hours under this paragraph (40 C.F.R. § 122.41(l)(6)(ii)):

a. Any unanticipated bypass that exceeds any effluent limitation in this Order. (40 C.F.R. § 122.41(l)(6)(ii)(A).)

b. Any upset that exceeds any effluent limitation in this Order. (40 C.F.R. § 122.41(l)(6)(ii)(B).)

3. The Regional Water Board may waive the above-required written report under this provision on a case-by-case basis if an oral report has been received within 24 hours. (40 C.F.R. § 122.41(l)(6)(iii).)

F. Planned Changes

The Discharger shall give notice to the Regional Water Board as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required under this provision only when (40 C.F.R. § 122.41(l)(1)):

1. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 C.F.R. section 122.29(b) (40 C.F.R. § 122.41(l)(1)(i)); or

2. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants that are not subject to effluent limitations in this Order. (Alternatively, for an existing manufacturing, commercial, mining, or silvicultural discharge as referenced in 40 C.F.R. section 122.42(a), this notification applies to pollutants that are subject neither to effluent limitations in this Order nor to notification requirements under 40 C.F.R. section 122.42(a)(1) (see Additional Provisions—Notification Levels VII.A.1).) (40 C.F.R. § 122.41(l)(1)(ii).)

3. The alteration or addition results in a significant change in the Discharger's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan. (40 C.F.R. § 122.41(l)(1)(iii).)

G. Anticipated Noncompliance

The Discharger shall give advance notice to the Regional Water Board or State Water Board of any planned changes in the permitted facility or activity that may result in noncompliance with this Order’s requirements. (40 C.F.R. § 122.41(l)(2).)

H. Other Noncompliance

The Discharger shall report all instances of noncompliance not reported under Standard Provisions—Reporting V.C, V.D, and V.E above at the time monitoring reports are submitted. The reports shall contain the information listed in Standard Provision—Reporting V.E above. (40 C.F.R. § 122.41(l)(7).)

I. Other Information

When the Discharger becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Regional Water Board, State Water Board, or U.S. EPA, the Discharger shall promptly submit such facts or information. (40 C.F.R. § 122.41(l)(8).)

VI. STANDARD PROVISIONS – ENFORCEMENT

A. The Regional Water Board is authorized to enforce the terms of this permit under several provisions of the Water Code, including, but not limited to, sections 13268, 13385, 13386, and 13387.

VII. ADDITIONAL PROVISIONS—NOTIFICATION LEVELS

A. Publicly-Owned Treatment Works (POTWs)

All POTWs shall provide adequate notice to the Regional Water Board of the following (40 C.F.R. § 122.42(b)):

1. Any new introduction of pollutants into the POTW from an indirect discharger that would be subject to CWA sections 301 or 306 if it were directly discharging those pollutants (40 C.F.R. § 122.42(b)(1)); and

2. Any substantial change in the volume or character of pollutants being introduced into that POTW by a source introducing pollutants into the POTW at the time of adoption of this Order. (40 C.F.R. § 122.42(b)(2).)

3. Adequate notice shall include information on the quality and quantity of effluent introduced into the POTW as well as any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW. (40 C.F.R. § 122.42(b)(3).)

ATTACHMENT E – MONITORING AND REPORTING PROGRAM (MRP)

Contents

I. General Monitoring Provisions E-2
II. Monitoring Locations E-2
III. Influent Monitoring Requirements E-3
IV. Effluent Monitoring Requirements E-3
  A. Discharges to Napa River E-3
  B. Discharges to Irrigation Fields or Reused Offsite E-4
V. Whole Effluent Acute Toxicity Testing Requirements E-5
VI. Receiving Water Monitoring Requirements E-5
VII. Other Monitoring Requirements E-6
VIII. Reporting Requirements E-6
  A. General Monitoring and Reporting Requirements E-6
  B. Self-Monitoring Reports (SMRs) E-6
  C. Discharge Monitoring Reports (DMRs) E-9
IX. Modifications to Attachment G E-9

Tables

Table E-1. Monitoring Locations E-2
Table E-2. Influent Monitoring E-3
Table E-3. Effluent Monitoring—Monitoring Location EFF-001 ..... E-3
Table E-4. Receiving Water Monitoring E-5
Table E-5. CIWQS Reporting E-7
Table E-6. Monitoring Periods E-8

ATTACHMENT E – MONITORING AND REPORTING PROGRAM (MRP)

Clean Water Act section 308 and 40 C.F.R. sections 122.41(h), 122.41(j)-(l), 122.44(i), and 122.48 require that all NPDES permits specify monitoring and reporting requirements. Water Code sections 13267 and 13383 also authorize the Regional Water Board to establish monitoring, inspection, entry, reporting, and recordkeeping requirements. This MRP establishes monitoring, reporting, and recordkeeping requirements that implement federal and State laws and regulations.

I. GENERAL MONITORING PROVISIONS

A. The Discharger shall comply with this MRP. The Executive Officer may amend this MRP pursuant to 40 C.F.R. sections 122.62, 122.63, and 124.5. If any discrepancies exist between this MRP and the “Regional Standard Provisions, and Monitoring and Reporting Requirements (Supplement to Attachment D) for NPDES Wastewater Discharge Permits” (Attachment G), this MRP shall prevail.

B. The Discharger shall conduct all monitoring in accordance with Attachment D, section III, as supplemented by Attachment G. Equivalent test methods must be more sensitive than those specified in 40 C.F.R. section 136 and must be specified in this permit.

II. MONITORING LOCATIONS

The Discharger shall establish the following monitoring locations to demonstrate compliance with the effluent limitations, discharge specifications, and other requirements in this Order:

Table E-1. Monitoring Locations

Monitoring Location Type	Monitoring Location Name	Monitoring Location Description
Influent	INF-001	Any point in the plant at which all waste tributary to the treatment system is present and preceding any phase of treatment that may alter the influent character.
Effluent	EFF-001	Any point after full treatment, including disinfection, that represents all wastewater discharged to the Napa River at Discharge Point No. 001.
Effluent	REC-001	Any point after full treatment, including disinfection, that represents all wastewater directed to irrigation fields or recycled (excluding internal recycle at the treatment plant), and thus not discharged to the Napa River at Discharge Point No. 001.
Receiving Water	RSW-001	Any point in the Napa River upstream of Discharge Point No 001.
Receiving Water	RSW-002	A point in the Napa River approximately 600 feet downstream of Discharge Point No. 001.
Receiving Water	RSW-900	Any point or points in the Napa River for the purpose of collecting data for the Receiving Water Characterization Study identified in Provision VI.C.3 of the Order.
Biosolids	BIO-001	Any point following onsite biosolids processing.

III. INFLUENT MONITORING REQUIREMENTS

The Discharger shall monitor plant influent at Monitoring Location INF-001 as follows:

Table E-2. Influent Monitoring

Parameter	Units	Sample Type	Minimum Sampling Frequency
Flow [1]	MGD	Continuous	Continuous/D
Biochemical Oxygen Demand (5-day @ 20°C)	mg/L	C-24	3/Week [2]
Total Suspended Solids	mg/L	C-24	3/Week [2]

Abbreviations:

MGD = million gallons per day
mg/L = milligrams per liter
C-24 = 24-hour composite sample
Continuous/D = measured continuously, and recorded and reported daily
1/Week = once per week

Footnotes:

[1] Flow shall be monitored continuously and the following information shall be reported in monthly self-monitoring reports:
- Daily average flow (MGD)
- Monthly average flow (MGD)
- Total monthly flow volume (MG)
- Maximum daily average flow rates (MGD)

[2] The Discharger shall collect influent samples on the same days as effluent samples. The monitoring frequency may be decreased to once per quarter when not discharging to the Napa River.

IV. EFFLUENT MONITORING REQUIREMENTS

A. Discharges to Napa River

When discharging to the Napa River, the Discharger shall monitor plant effluent at Monitoring Location EFF-001 as follows. When the minimum sampling frequency is weekly, monthly, or quarterly, at least one sample is required for any weekly, monthly, or quarterly period in which a discharge to Discharge Point No. 001 occurs.

Table E-3. Effluent Monitoring—Monitoring Location EFF-001

Parameter	Units	Sample Type	Minimum Sampling Frequency
Flow [1]	MGD	Continuous	Continuous/D
Biochemical Oxygen Demand (5-day @ 20°C)	mg/L	C-24	3/Week
Total Suspended Solids	mg/L	C-24	3/Week
Oil and Grease	mg/L	C-24	1/Quarter [2]
Total Coliform Bacteria	MPN/100 mL [3]	Grab	3/Week
Ammonia, Total	mg/L as N	C-24	1/Quarter [4]
pH	standard units	Grab	1/Day [4,5]
Temperature	ºC	Grab	1/Quarter [4]
Acute Toxicity [6]	% survival	C-24	1/Quarter
Chlorine Residual [7]	mg/L	Continuous or Grab	1/Day or Continuous/2H
Copper	µg/L	C-24	1/Month
Cyanide [8]	µg/L	Grab	1/Month
River Flow-to-Effluent Flow Ratio [9]	---	Calculated	1/Day

Abbreviations:

MGD	= million gallons per day
mg/L	= milligrams per liter
μg/L	= micrograms per liter
mg/L as N	= milligrams per liter as nitrogen
ºC	= degrees Celsius
% survival	= percent survival
C-24	= 24-hour composite
Grab	= grab sample
Continuous/D	= measured continuously, and recorded and reported daily
Continuous/2H	= measured continuously or, if infeasible, at least every 2 hours
1/Day	= once per day
3/Week	= three times per week
1/Month	= once per month
1/Quarter	= once per quarter

Footnotes:

[1] Flow shall be monitored continuously and the following information shall be reported in self-monitoring reports:
- Daily average flow (MGD)
- Monthly average flow (MGD)
- Total monthly flow volume (MG)
- Maximum daily average flow rates (MGD)

[2] Oil and grease sampling and analysis shall be conducted in accordance with U.S. EPA Method 1664A.

[3] Results may be reported as Colony Forming Units/100 milliliters (CFU/100 mL) if the laboratory method used provides results in CFU/100 mL.

[4] Ammonia monitoring shall occur concurrently with pH and temperature monitoring.

[5] If pH is monitored continuously, the minimum and maximum pH values for each day shall be reported in self-monitoring reports.

[6] Acute bioassay tests shall be performed in accordance with MRP section V.A.

[7] Effluent residual chlorine concentrations shall be monitored once per day by grab sample from the recycled water storage pond, or continuously, or at a minimum every other hour, immediately following dechlorination. The Discharger shall describe all excursions of the chlorine limit in the transmittal letter of self-monitoring reports as required by Attachment G section V.C.1.a. If monitoring continuously, the Discharger shall report through data upload to CIWQS, from discrete readings of the continuous monitoring every hour on the hour, the maximum for each day and any other discrete hourly reading that exceed the effluent limit, and, for the purpose of mandatory minimum penalties required by Water Code section 13385(i), compliance shall be based only on these discrete readings. The Discharger shall retain continuous monitoring readings for at least three years. The Regional Water Board reserves the right to use all continuous monitoring data for discretionary enforcement.

[8] The Discharger may, at its option, analyze for cyanide as Weak Acid Dissociable Cyanide using protocols specified in Standard Method Part 4500-CN-I, USEPA Method OI 1677, or an equivalent method in the latest edition.

[9] The Discharger shall calculate and report the river flow-to-effluent flow ratio once per day when discharging to the Napa River. The river flow-to-effluent flow ratio shall be calculated as the ratio of the instantaneous flow of the Napa River measured at USGS Station No. 11458000 (at 8 a.m. every morning) to the average effluent flow during the previous 24 hours (8 a.m. to 8 a.m.) measured at Monitoring Location EFF-001.

B. Discharges to Irrigation Fields or Reused Offsite

The Discharger shall monitor plant effluent flow at Monitoring Location REC-001 continuously and the following information shall be reported in self-monitoring reports:

- Daily average flow (MGD)
- Monthly average flow (MGD)
- Total monthly flow volume (MG)
- Maximum daily average flow (MGD)

V. WHOLE EFFLUENT ACUTE TOXICITY TESTING REQUIREMENTS

A. Compliance with the whole effluent acute toxicity effluent limitations at Discharge Point No. 001 shall be evaluated at Monitoring Location EFF-001 by measuring survival of test organisms exposed to 96-hour static renewal bioassays.

B. Test organisms shall be fathead minnow (*Pimephales promelas*). Alternatively, the Executive Officer may specify a more sensitive organism or, if testing a particular organism proves unworkable, the most sensitive organism available.

C. Bioassays shall be performed according to the most up-to-date protocols in 40 C.F.R. part 136, currently *Methods for Measuring the Acute Toxicity of Effluents and Receiving Water to Freshwater and Marine Organisms,* 5th Edition (EPA-821-R-02-012). If these protocols prove unworkable, the Executive Officer and the Environmental Laboratory Accreditation Program may grant exceptions in writing upon the Discharger's request with justification.

D. If the Discharger demonstrates that specific identifiable substances in the discharge are rapidly rendered harmless upon discharge to the receiving water, compliance with the acute toxicity limit may be determined after test samples are adjusted to remove the influence of those substances. Written acknowledgement that the Executive Officer concurs with the Discharger's demonstration and that the adjustment will not remove the influence of other substances must be obtained prior to any such adjustment. The Discharger may manually adjust the pH of whole effluent acute toxicity samples prior to performing bioassays to minimize ammonia toxicity interference.

E. The sample may be taken from final secondary effluent prior to disinfection. Bioassay water monitoring shall include, on a daily basis, pH, dissolved oxygen, ammonia (if toxicity is observed), temperature, hardness, and alkalinity. These results shall be reported. If final or intermediate results of an acute bioassay test indicate a violation or threatened violation (e.g., the percentage of surviving test organisms is less than 70 percent), the Discharger shall initiate a new test as soon as practical and shall investigate the cause of the mortalities and report its findings in the next self-monitoring report. The Discharger shall repeat the test until a test fish survival rate of 90 percent or greater is observed. If the control fish survival rate is less than 90 percent, the bioassay test shall be restarted with new fish and shall continue as soon as practical until an acceptable test is completed (i.e., control fish survival rate is 90 percent or greater).

VI. RECEIVING WATER MONITORING REQUIREMENTS

The Discharger shall monitor receiving waters at Monitoring Location RSW-002 as set forth in the table below. In addition, the Discharger shall obtain flow data from USGS Station No.11458000 at approximately 8 a.m. each day that a discharge to the Napa River occurs (this flow shall be used to calculate the river flow-to-effluent flow ratio; see Discharge Prohibition III.C of the Order).

Table E-4. Receiving Water Monitoring

Parameter	Units	Sample Type	Minimum Sampling Frequency
pH	standard units	Grab	2/Year [1]
Temperature	°C	Grab	2/Year [1]

Parameter	Units	Sample Type	Minimum Sampling Frequency
Total Ammonia	mg/L as N	Grab	2/Year [1]
Hardness	mg/L as $CaCO_3$	Grab	2/Year [1]

Abbreviations:

MGD = million gallons per day
°C = degrees Celsius
mg/L = milligrams per liter
mg/L as N = milligrams per liter as nitrogen
mg/L as $CaCO_3$ = milligrams per liter as calcium carbonate
Grab = grab sample
1/Day = once per day
2/Year = twice per year

Footnote:

[1] Parameters shall be analyzed twice per year during the discharge season; once after the first storm of the season during the interval from October 1 through January 31, and once during the interval from February 1 through May 15.

VII. OTHER MONITORING REQUIREMENTS

The Discharger shall adhere to sludge monitoring requirements required by 40 C.F.R. part 258 (for landfill disposal) and 40 C.F.R. part 503 (for land application).

VIII. REPORTING REQUIREMENTS

A. General Monitoring and Reporting Requirements

The Discharger shall comply with all Standard Provisions (Attachments D and G) related to monitoring, reporting, and recordkeeping, with modifications shown in section X, below.

B. Self-Monitoring Reports (SMRs)

1. **SMR Format.** The Discharger shall electronically submit SMRs using the State Water Board's California Integrated Water Quality System (CIWQS) Web site (http://www.waterboards.ca.gov/water_issues/programs/ciwqs). The CIWQS website will provide additional information for SMR submittal in the event of a planned service interruption for electronic submittal.

2. **SMR Due Dates and Contents.** The Discharger shall submit SMRs by the due dates, and with the contents, specified below:

   a. **Monthly SMRs —** Monthly SMRs shall be due 30 days after the end of each calendar month, covering that calendar month. The monthly SMR shall contain the applicable items described in sections V.B and V.C of both Attachments D and G of this Order. See Provision VI.C.2 (Effluent Characterization Study and Report) and Provision VI.C.3 (Receiving Water Characterization Study and Report) of this Order for information that must also be reported with monthly SMRs.

      Monthly SMRs shall include all new monitoring results obtained since the last SMR was submitted. If the Discharger monitors any pollutant more frequently than required by this Order, the Discharger shall include the results of such monitoring in the calculations and reporting for the SMR.

b. Annual SMR — Annual SMRs shall be due February 1 each year, covering the previous calendar year. The annual SMR shall contain the items described in sections V.C.1.f of Attachment G. See Provision VI.C.2 (Effluent Characterization Study and Report), Provision VI.C.3 (Receiving Water Characterization Study and Report), and Provision VI.C.4 (Pollution Minimization Program) of this Order for information that must also be reported with the annual SMR.

c. Specifications for Submitting SMRs to CIWQS — The Discharger shall submit analytical results and other information using one of the methods in the table below:

Table E-5. CIWQS Reporting

Parameter	Method of Reporting	
	EDF/CDF data upload or manual entry	**Attached File**
All parameters identified in influent, effluent, and receiving water monitoring tables (except Dissolved Oxygen and Temperature)	Required for all results	
Dissolved Oxygen Temperature	Required for monthly maximum and minimum results only [1]	Discharger may use this method for all results or keep records
Antimony Arsenic Beryllium Cadmium Chromium Copper Cyanide Lead Mercury Nickel Selenium Silver Thallium Zinc Dioxins & Furans (by U.S. EPA Method 1613) Other Pollutants (by U.S. EPA methods 601, 602, 608, 610, 614, 624, and 625)	Required for all results [2]	
Volume and Duration of Blended Discharge [3]	Required for all blended effluent discharges	
Analytical Method	Not required (Discharger may select "data unavailable") [1]	
Collection Time Analysis Time	Not required (Discharger may select "0:00") [1]	

Footnotes:

[1] The Discharger shall continue to monitor at the minimum frequency specified in this MRP, keep records of the measurements, and make the records available upon request.

[2] These parameters require EDF/CDF data upload or manual entry regardless of whether monitoring is required by this MRP or other provisions of this Order (except for biosolids, sludge, or ash provisions).

[3] The requirement for volume and duration of blended discharge applies only if this Order authorizes the Discharger to discharge blended effluent.

The Discharger shall arrange all reported data in a tabular format and summarize data to clearly illustrate whether the Facility is operating in compliance with effluent limitations. The Discharger is not required to duplicate the submittal of data entered in a tabular format within CIWQS. When electronic submittal of data is required and CIWQS does not provide for entry into a tabular format, the Discharger shall electronically submit the data in a tabular format as an attachment.

3. **Monitoring Periods.** Monitoring periods for all required monitoring shall be as set forth below unless otherwise specified:

Table E-6. Monitoring Periods

Sampling Frequency	Monitoring Period Begins On…	Monitoring Period
Continuous	Order effective date	All times
1/2 Hours	Order effective date	Every two-hour period, beginning at midnight (e.g., 12:00 a.m. through 1:59 a.m.)
1/Day	Order effective date	Every 24-hour period, beginning at midnight and continuing through 11:59 p.m.
1/Week or 3/Week	Sunday following (or on) Order effective date	Sunday through Saturday
1/Month	First day of calendar month following (or on) Order effective date	First day of calendar month through last day of calendar month
1/Quarter [1]	Closest January 1, April 1, July 1, or October 1 before or after Order effective date	January 1 through March 31 April 1 through June 30 July 1 through September 30 October 1 through December 31
2/Year [1]	Closest October 1 or February 1 before or after Order effective date	October 1 through January 31 February 1 through May 15
1/Year [1]	Closest January 1 before or after Order effective date	January 1 through December 31
Once	Order effective date	Anytime such that monitoring results may be submitted with the application for permit reissuance

Footnote:
[1] Monitoring performed during the previous order term may be used to satisfy monitoring required by this Order.

4. **RL and MDL Reporting.** The Discharger shall report with each sample result the Reporting Level (RL) and Method Detection Limit (MDL) as determined by the procedure in 40 C.F.R. part 136. The Discharger shall report the results of analytical determinations for the presence of chemical constituents in a sample using the following reporting protocols:

   a. Sample results greater than or equal to the RL shall be reported as measured by the laboratory (i.e., the measured chemical concentration in the sample).

   b. Sample results less than the RL, but greater than or equal to the laboratory's MDL, shall be reported as "Detected, but Not Quantified," or DNQ. The estimated chemical concentration of the sample shall also be reported.

   For purposes of data collection, the laboratory shall write the estimated chemical concentration next to DNQ. The laboratory may, if such information is available, include numerical estimates of the data quality for the reported result. Numerical estimates of data quality may be percent accuracy (+/- a percentage of the reported value), numerical ranges (low to high), or any other means the laboratory considers appropriate.

   c. Sample results less than the laboratory's MDL shall be reported as "Not Detected," or ND.

d. The Discharger shall instruct laboratories to establish calibration standards so that the minimum level (ML) value (or its equivalent if there is differential treatment of samples relative to calibration standards) is the lowest calibration standard. At no time is the Discharger to use analytical data derived from extrapolation beyond the lowest point of the calibration curve.

5. **Compliance Determination.** Compliance with effluent limitations for priority pollutants shall be determined using sample reporting protocols defined above and in the Fact Sheet and Attachments A, D, and G. For purposes of reporting and administrative enforcement by the Regional Water Board and the State Water Board, the Discharger shall be deemed out of compliance with effluent limitations if the concentration of the priority pollutant in the monitoring sample is greater than the effluent limitation and greater than or equal to the reporting level (RL).

C. Discharge Monitoring Reports (DMRs)

At any time during the term of this Order, the State Water Board or the Regional Water Board may notify and require the Discharger to submit DMRs. Once notified, the Discharger shall electronically certify and submit DMRs with SMRs using the Electronic Self-Monitoring Reports module eSMR 2.5 or any upgraded version. Electronic DMR submittal shall be in addition to electronic SMR submittal. Information about electronic DMR submittal is available at the DMR website at
http://www.waterboards.ca.gov/water_issues/programs/discharge_monitoring.

IX. MODIFICATIONS TO ATTACHMENT G

This MRP modifies Attachment G as indicated below.

A. Attachment G section V.C.1.c.2 is revised as follows:

2) When determining compliance with an average monthly or maximum daily effluent limitation, and more than one sample result is available, the Discharger shall compute the arithmetic mean unless the data set contains one or more reported determinations of detected but not quantified (DNQ) or nondetect (ND). In those cases, the Discharger shall compute the median in place of the arithmetic mean in accordance with the following procedure:

   i. The data set shall be ranked from low to high, reported ND determinations lowest, DNQ determinations next, followed by quantified values (if any). The order of the individual ND or DNQ determinations is unimportant.

   ii. The median value of the data set shall be determined. If the data set has an odd number of data points, then the median is the middle value. If the data set has an even number of data points, then the median is the average of the two values around the middle unless one or both of the points are ND or DNQ, in which case the median value shall be the lower of the two data points where DNQ is lower than a value and ND is lower than DNQ.

If a sample result, or the arithmetic mean or median of multiple sample results, is below the reporting limit, and there is evidence that the priority pollutant is present in the effluent above an effluent limitation and the Discharger conducts a Pollutant Minimization Program, the Discharger shall not be deemed out of compliance.

B. Attachment G sections V.C.1.f and V.C.1.g are revised as follows, and section V.C.1.h (Reporting data in electronic format) is deleted:

f. Annual self-monitoring report requirements

By the date specified in the MRP, the Discharger shall submit an annual report to the Regional Water Board covering the previous calendar year. The report shall contain the following:

1) Annual compliance summary table of treatment plant performance, including documentation of any blending events (this summary table is not required if the Discharger has submitted the year's monitoring results to CIWQS in electronic reporting format by EDF/CDF upload or manual entry);

2) Comprehensive discussion of treatment plant performance and compliance with the permit (This discussion shall include any corrective actions taken or planned, such as changes to facility equipment or operation practices that may be needed to achieve compliance, and any other actions taken or planned that are intended to improve performance and reliability of the Discharger's wastewater collection, treatment, or disposal practices.);

3) Both tabular and graphical summaries of the monitoring data for the previous year if parameters are monitored at a frequency of monthly or greater (this item is not required if the Discharger has submitted the year's monitoring results to CIWQS in electronic reporting format by EDF/CDF upload or manual entry);

4) List of approved analyses, including the following:

   (i) List of analyses for which the Discharger is certified;

   (ii) List of analyses performed for the Discharger by a separate certified laboratory (copies of reports signed by the laboratory director of that laboratory shall not be submitted but be retained onsite); and

   (iii)List of "waived" analyses, as approved;

5) Plan view drawing or map showing the Discharger's facility, flow routing, and sampling and observation station locations;

6) Results of annual facility inspection to verify that all elements of the SWPP Plan are accurate and up to date (only required if the Discharger does not route all stormwater to the headworks of its wastewater treatment plant); and

7) Results of facility report reviews (The Discharger shall regularly review, revise, and update, as necessary, the O&M Manual, the Contingency Plan, the Spill

Prevention Plan, and Wastewater Facilities Status Report so that these documents remain useful and relevant to current practices. At a minimum, reviews shall be conducted annually. The Discharger shall include, in each Annual Report, a description or summary of review and evaluation procedures, recommended or planned actions, and an estimated time schedule for implementing these actions. The Discharger shall complete changes to these documents to ensure they are up-to-date.).

g. Report submittal

The Discharger shall submit SMRs addressed as follows, unless the Discharger submits SMRs electronically to CIWQS:

California Regional Water Quality Control Board
San Francisco Bay Region
1515 Clay Street, Suite 1400
Oakland, CA 94612
Attn: NPDES Wastewater Division

h. Reporting data in electronic format – *Deleted*

C. Attachment G sections V.E.2, V.E.2.a, and V.E.2.c are revised as follows, and sections V.E.2.b (24-hour Certification) and V.E.2.d (Communication Protocol) are deleted:

2. Unauthorized Discharges from Municipal Wastewater Treatment Plants[1]

The following requirements apply to municipal wastewater treatment plants that experience an unauthorized discharge at their treatment facilities and supersede requirements imposed on the Discharger by the Executive Officer by letter of May 1, 2008.

a. Two (2)-Hour Notification

For any unauthorized discharges that enter a drainage channel or a surface water, the Discharger shall, as soon as possible, but not later than two (2) hours after becoming aware of the discharge, notify the California Office of Emergency Services (CalOES, currently 800-852-7550), the local health officers or directors of environmental health with jurisdiction over the affected water bodies, and the Regional Water Board. Timely notification by the Discharger to CalOES also satisfies notification to the Regional Water Board. Notification shall include the following:

1) Incident description and cause;

2) Location of threatened or involved waterway(s) or storm drains;

[1] California Code of Regulations, Title 23, Section 2250(b), defines an unauthorized discharge to be a discharge, not regulated by waste discharge requirements, of treated, partially treated, or untreated wastewater resulting from the intentional or unintentional diversion of wastewater from a collection, treatment or disposal system.

3) Date and time the unauthorized discharge started;

4) Estimated quantity and duration of the unauthorized discharge (to the extent known), and the estimated amount recovered;

5) Level of treatment prior to discharge (e.g., raw wastewater, primary treated, undisinfected secondary treated, and so on); and

6) Identity of the person reporting the unauthorized discharge.

b. 24-hour Certification – *Deleted*

c. 5-day Written Report

Within five business days, the Discharger shall submit a written report that includes, in addition to the information required above, the following:

1) Methods used to delineate the geographical extent of the unauthorized discharge within receiving waters;

2) Efforts implemented to minimize public exposure to the unauthorized discharge;

3) Visual observations of the impacts (if any) noted in the receiving waters (e.g., fish kill, discoloration of water) and the extent of sampling if conducted;

4) Corrective measures taken to minimize the impact of the unauthorized discharge;

5) Measures to be taken to minimize the chances of a similar unauthorized discharge occurring in the future;

6) Summary of Spill Prevention Plan or O&M Manual modifications to be made, if necessary, to minimize the chances of future unauthorized discharges; and

7) Quantity and duration of the unauthorized discharge, and the amount recovered.

d. Communication Protocol – *Deleted*

ATTACHMENT F - FACT SHEET

Contents

I. Permit Information F-3
II. Facility Description F-4
  A. Wastewater and Biosolids Treatment F-4
  B. Discharge Points and Receiving Waters F-5
  C. Summary of Existing Requirements and Monitoring Data F-5
  D. Compliance Summary F-6
  E. Planned Changes F-8
III. Applicable Plans, Policies, and Regulations F-8
IV. Rationale For Effluent Limitations and Discharge Specifications F-11
  A. Discharge Prohibitions F-11
  B. Conventional and Non-Conventional Pollutant Effluent Limitations F-14
    1. Scope and Authority F-14
    2. Effluent Limitations F-14
  C. Toxic Pollutant Effluent Limitations F-15
    1. Scope and Authority F-15
    2. Beneficial Uses and Water Quality Criteria and Objectives F-15
    3. Need for Water Quality-Based Effluent Limitations (Reasonable Potential Analysis) F-17
    4. Water Quality-Based Effluent Limitations (WQBELs) F-26
  D. Discharge Requirement Considerations F-30
V. Rationale for Receiving Water Limitations F-31
VI. Rationale for Provisions F-31
  A. Standard Provisions F-31
  B. Monitoring and Reporting F-31
  C. Special Provisions F-32
    1. Reopener Provisions F-32
    2. Effluent Characterization Study and Report F-32
    3. Receiving Water Characterization Study and Report F-32
    4. Pollutant Minimization Program F-32
    5. Special Provisions for Municipal Facilities F-32
VII. Rationale for Monitoring and Reporting Program F-33
VIII. Public Participation F-35

Tables

Table F-1. Facility Information....F-3
Table F-2. Wastewater Ponds....F-5
Table F-3. Historic Effluent Limitations and Monitoring Data....F-6
Table F-4. Effluent Limitation Violations....F-6
Table F-5. SSO Rates (total SSOs/100 miles of sewer)....F-8
Table F-6. Napa River Beneficial Uses....F-9
Table F-7. Secondary Treatment Requirements....F-14
Table F-8. Priority Pollutant Reasonable Potential Analysis....F-19
Table F-9. Municipal and Agricultural Supply Pollutant Reasonable Potential Analysis....F-23
Table F-10. WQBEL Calculations....F-28
Table F-11. Monitoring Requirements Summary....F-34

ATTACHMENT F – FACT SHEET

This Fact Sheet includes the legal requirements and technical rationale that serve as the basis for the requirements of this Order. As described in section II.B of the Order, the Regional Water Board incorporates this Fact Sheet as findings supporting the issuance of the Order.

I. PERMIT INFORMATION

The following table summarizes administrative information related to the facility:

Table F-1. Facility Information

WDID	2 283014001
CIWQS Place ID	258386
Discharger	City of St. Helena
Facility Name	City of St. Helena Wastewater Treatment and Reclamation Plant and its wastewater collection system
Facility Address	1 Chaix/Thomann Lane St. Helena, CA 94574 Napa County
Facility Contact, Title, Phone	Steven Palmer, Public Works Director, 707-967-2792
Authorized Person to Sign and Submit Reports	Same as facility contact
Mailing Address	1480 Main Street, St. Helena, CA 94574
Billing Address	Same as mailing address
Facility Type	Publicly-Owned Treatment Works (POTW)
Major or Minor Facility	Minor
Threat to Water Quality	2
Complexity	B
Pretreatment Program	No
Recycled Water Requirements	Regional Water Board Order No. 87-090
Mercury and PCBs Requirements	NPDES Permit No. CA0038849
Permitted Flow	0.50 million gallons per day (MGD) – average daily dry weather design flow
Design Flow	2.8 MGD – peak wet weather flow
Watershed	San Pablo Bay
Receiving Water	Napa River
Receiving Water Type	Freshwater

A. The City of St. Helena (Discharger) owns and operates the City of St. Helena Wastewater Treatment and Reclamation Plant (plant) and its associated wastewater collection system (collectively, the Facility). The plant provides secondary treatment of wastewater collected from its service area and discharges treated effluent to the Napa River when plant influent exceeds the capacity of the recycled water distribution and storage system. The Napa River is a water of the United States within the San Pablo Bay watershed. Attachment B provides maps of the area around the Facility, and Attachment C provides a plant flow schematic.

For the purposes of this Order, references to the “discharger” or “permittee” in applicable federal and State laws, regulations, plans, and policy are held to be equivalent to references to the Discharger herein.

B. The Discharger is regulated pursuant to National Pollutant Discharge Elimination System (NPDES) Permit No. CA0038016. The Discharger is authorized to discharge subject to waste discharge requirements in this Order at the discharge location described in Table 2 of this Order. Regulations at 40 C.F.R. section 122.46 limit the duration of NPDES permits to a fixed term not to exceed five years. Accordingly, Table 3 of this Order limits the effective period for the discharge authorization.

C. Pursuant to California Code of Regulations, title 23, section 2235.4, the terms and conditions of an expired permit are automatically continued pending reissuance of the permit if the Discharger complies with all federal NPDES regulation requirements for continuation of expired permits. The Discharger was previously subject to Order No. R2-2010-0105 (previous order), which became effective on November 1, 2010. The Discharger filed a Report of Waste Discharge and submitted an application for reissuance of its Waste Discharge Requirements (WDRs) and NPDES permit on May 1, 2015. The previous order was therefore administratively extended by operation of law beyond its stated expiration date (October 31, 2015).

D. The discharge is also regulated under NPDES Permit No. CA0038849, which establishes requirements on mercury and polychlorinated biphenyls (PCBs). This Order does not affect that permit.

The Discharger is also regulated by Order No. 87-090 for the discharge or disposal of plant effluent to the Discharger's spray irrigation fields during dry weather. In contrast, this Order regulates the discharge of plant effluent to the Napa River during wet weather when the irrigation fields are saturated. Discharge to the irrigation fields occurs more commonly than discharge to Napa River.

E. When applicable, State law requires dischargers to file a petition with the State Water Board's Division of Water Rights and receive approval for any change in the point of discharge, place of use, or purpose of use of treated wastewater that decreases the flow in any portion of a watercourse. The State Water Board retains separate jurisdictional authority to enforce such requirements under Water Code section 1211. This is not an NPDES permit requirement.

II. FACILITY DESCRIPTION

A. Wastewater and Biosolids Treatment

1. **Location and Service Area**. The plant is located at 1 Chaix/Thomann Lane in St. Helena. It provides secondary treatment of domestic and commercial source wastewater from the City of St. Helena. The estimated service area population is about 6,000.

2. **Collection System**. The Discharger operates about 18.8 miles of sewer lines and one pump station on Crinella Drive.

3. **Current Wastewater Treatment**. The average dry weather design treatment capacity of the plant is 0.50 million gallons per day (MGD). Wastewater treatment processes include solids grinding by a comminutor, biological treatment through a series of ponds (described in Table F-2), and chlorine disinfection. These treatment processes are capable of meeting secondary treatment standards. The average dry weather flow treated in 2014 was 0.36 MGD. The average annual flow treated in 2014 was 0.47 MGD, and the highest daily flow treated was 1.03 MGD during wet weather.

The previous order had required the Discharger to evaluate the adequacy of its treatment capacity. The Discharger's March 2015 *Wastewater Facilities Evaluation Update* (Bennett Engineering Services) indicated that the service area population is only growing slightly (less than earlier projections) and that the per capita wastewater flows are declining due to conservation measures. Therefore, the existing treatment system is capable of meeting the Discharger's near-term waste loads and flows. The report projected that in 2030 the average dry weather flows will be about 0.50 MGD, the current capacity. However, the report also indicated that the Discharger should plan to increase its capacity to 0.65 MGD by 2030 to account for uncertainty.

Table F-2. Wastewater Ponds

Pond	Type	Surface Area (acres)	Depth (feet)	Volume (million gallons)
1A	Facultative with Digester	2.9	10	8.1
1B	Facultative with Digester	2.1	14	7.5
2	High-rate (aeration)	5.1	3	4.0
3	Algae Sedimentation	2.5	9	6.3
4	Maturation/Storage	3.0	11.5	9.8
5	Maturation/Storage	6.7	13	24.6

4. **Future Wastewater Treatment**. To comply with the effluent limitations listed in Table 4 of this Order, the Discharger will design and construct upgrades to the treatment plant.

5. **Biosolids Management**. The Discharger does not remove solids from its ponds on a regular basis. Most of the solids settle out in Ponds 1A and 1B, where they are anaerobically digested at the bottom of the pond. When solids accumulate to the point where treatment becomes ineffective, the Discharger drains Ponds 1A and 1B to excavate the solids. The Discharger last did this for Pond 1A in 2014.

6. **Stormwater**. Stormwater discharges at the plant are covered under the State Water Board's General Permit for Industrial Stormwater Discharges (NPDES General Permit CAS000001).

B. Discharge Points and Receiving Waters

Plant effluent is discharged into the Napa River through a shallow water outfall (Discharge Point No. 001). This occurs typically only during wet weather when the Discharger's irrigation fields are saturated. Normally during dry weather, the Discharger disposes of plant effluent to its 88 acres of fields through spray irrigation pursuant to Order No. 87-090. A small portion of plant effluent, less than 2 percent, is also reused to irrigate a redwood tree farm and to grow mosquito fish.

C. Summary of Existing Requirements and Monitoring Data

The effluent limitations in the previous order and representative monitoring data from the previous order term are presented below:

Table F-3. Historic Effluent Limitations and Monitoring Data

Parameter	Units	Effluent Limits			Monitoring Data (when discharging to Napa River) (12/1/10-6/30/15)		
		Monthly Average	Weekly Average	Daily Maximum	No. of Samples / No. Below Detection Limit	Highest Daily Discharge	Average ± Standard Deviation [1]
Biochemical Oxygen Demand (BOD)	mg/L	30	45	---	21/4	23	8.1 ± 4.6
Total Suspended Solids (TSS)	mg/L	30	45	---	21/3	20	12 ± 5.1
Oil and Grease	mg/L	10	---	20	6/6	<1.4	---
pH	standard units	6.5 - 8.5			4/0	6.3-7.2 [2]	6.6 ± 0.4
Residual Chlorine, Total	mg/L	0.0 maximum			---	0.0	---
Copper, Total	µg/L	14	---	24	6/0	6.9	5.0 ± 1.4
Cyanide, Total	µg/L	30	---	15	5/0	23	13 ± 8
Bis(2-ethylhexyl)phthalate	µg/L	6.0	---	3.0	6/6	<3.0	---
Dioxin-TEQ	µg/L	2.6×10^{-8}	---	1.3×10^{-8}	4/4	<3.40E-07	---
Ammonia, Total	mg/L as N	39	---	16	6/0	16	9.9 ± 4.0
Acute Toxicity	% Survival	Greater than 90% (3-sample median) Not less than 70% (single sample)			6/0	95 [3]	98 ± 3

Unit Abbreviations:

mg/L = milligrams per liter
µg/L = micrograms per liter
mg/L as N = milligrams per liter as nitrogen
% = percent

Footnotes:

[1] Samples below the detection limit were assumed to be one-half the detection limit.
[2] Lowest and highest values.
[3] Lowest value.

D. Compliance Summary

1. **Treatment Plant.** The table below lists violations from November 2010 through August 2015 of the previous order and Order No. 87-090, which regulates discharge of the treated effluent to land:

Table F-4. Effluent Limitation Violations

Date	Violation	Unit	Effluent Limit	Reported Value
NPDES Permit Violations				
11/04/2010	Total Coliform 5-Sample Moving Median	MPN/100 mL	23	30
11/19/2010	Total Coliform 5-Sample Moving Median	MPN/100 mL	23	30
11/20/2010	Total Coliform 5-Sample Moving Median	MPN/100 mL	23	30
11/24/2010	Total Coliform 5-Sample Moving Median	MPN/100 mL	23	30
11/30/2010	Total Coliform 5-Sample Moving Median	MPN/100 mL	23	30
12/28/2010	Copper Daily Maximum	µg/L	24	123

09/27/2012	Total Coliform 5-Sample Moving Median	MPN/100 mL	23	37
10/12/2012	Total Coliform Single-Sample Maximum	MPN/100 mL	240	500
10/12/2012	Total Coliform 5-Sample Moving Median	MPN/100 mL	23	30
10/15/2012	Total Coliform 5-Sample Moving Median	MPN/100 mL	23	30
10/15/2012	Total Coliform 5-Sample Moving Median	MPN/100 mL	23	50
10/15/2012	Total Coliform 5-Sample Moving Median	MPN/100 mL	23	30
10/23/2012	Total Coliform 5-Sample Moving Median	MPN/100 mL	23	50
12/26/2012	Residual Chlorine Daily Maximum	mg/L	0.0	0.4
12/27/2012	Residual Chlorine Daily Maximum	mg/L	0.0	0.1
05/22/2013	Total Coliform 5-Sample Moving Median	MPN/100 mL	23	30
05/23/2013	Total Coliform 5-Sample Moving Median	MPN/100 mL	23	30
10/25/2013	Total Coliform 5-Sample Moving Median	MPN/100 mL	23	50
10/30/2013	Total Coliform 5-Sample Moving Median	MPN/100 mL	23	50
10/31/2013	Total Coliform 5-Sample Moving Median	MPN/100 mL	23	50
02/12/2014	Total Coliform 5-Sample Moving Median	MPN/100 mL	23	33
02/13/2014	Total Coliform 5-Sample Moving Median	MPN/100 mL	23	33
02/14/2014	Total Coliform 5-Sample Moving Median	MPN/100 mL	23	33
12/22/2014	Cyanide, Total (as CN) 30-Day Average	μg/L	15	16
Water Reclamation Requirements (Order No. 87-090) Violations				
12/24/2010	Biochemical Oxygen Demand Daily Maximum	mg/L	40	76
03/02/2012	Biochemical Oxygen Demand Daily Maximum	mg/L	40	>220
06/28/2012	Biochemical Oxygen Demand Daily Maximum	mg/L	40	43
07/03/2012	Biochemical Oxygen Demand Daily Maximum	mg/L	40	43
09/17/2012	Biochemical Oxygen Demand Daily Maximum	mg/L	40	42
09/25/2012	Biochemical Oxygen Demand Daily Maximum	mg/L	40	44
10/08/2012	Biochemical Oxygen Demand Daily Maximum	mg/L	40	87
06/12/2013	Biochemical Oxygen Demand Daily Maximum	mg/L	40	42
06/20/2013	Biochemical Oxygen Demand Daily Maximum	mg/L	40	49
09/03/2013	Biochemical Oxygen Demand Daily Maximum	mg/L	40	45
09/20/2013	Biochemical Oxygen Demand Daily Maximum	mg/L	40	44
10/04/2013	Biochemical Oxygen Demand Daily Maximum	mg/L	40	101
10/11/2013	Biochemical Oxygen Demand Daily Maximum	mg/L	40	51
11/08/2013	Biochemical Oxygen Demand Daily Maximum	mg/L	40	46
12/04/2013	Biochemical Oxygen Demand Daily Maximum	mg/L	40	67
12/13/2013	Biochemical Oxygen Demand Daily Maximum	mg/L	40	54
05/01/2014	Biochemical Oxygen Demand Daily Maximum	mg/L	40	46
06/01/2014	Biochemical Oxygen Demand Daily Maximum	mg/L	40	46
06/17/2014	Biochemical Oxygen Demand Daily Maximum	mg/L	40	51
08/08/2014	Biochemical Oxygen Demand Daily Maximum	mg/L	40	70
08/28/2014	Biochemical Oxygen Demand Daily Maximum	mg/L	40	59
09/09/2014	Biochemical Oxygen Demand Daily Maximum	mg/L	40	59
11/25/2014	Biochemical Oxygen Demand Daily Maximum	mg/L	40	81
11/26/2014	Biochemical Oxygen Demand Daily Maximum	mg/L	40	61
12/09/2014	Biochemical Oxygen Demand Daily Maximum	mg/L	40	111
12/10/2014	Biochemical Oxygen Demand Daily Maximum	mg/L	40	124
03/12/2015	Biochemical Oxygen Demand Daily Maximum	mg/L	40	76

2. **Collection System.** The table below shows the Discharger's sanitary sewer overflow (SSO) rates (total SSOs per 100 miles of collection system for each of the past four years) and other information along with those for the county and region. The Discharger had three SSOs in 2012 and none since. Future SSOs could potentially reach waters of the U.S. and thus could violate Prohibition III.D of this Order.

Table F-5. SSO Rates (total SSOs/100 miles of sewer)
(based on CIWQS data analysis completed in February 2015) [1]

	Sewer System Length (miles)	Sewer System Average Age (years) [2]	2011	2012	2013	2014
St. Helena	20	30.4	0	6.3	0	0
Napa County average of 3 medium systems (10-99 miles)	29.8	38.9	2.7	4.9	4.2	4.6
San Francisco Bay Region average of 49 medium systems (10-99 miles)	31.8	45.2	10.7	10.9	12.9	10.4
San Francisco Bay Region median of all 132 systems	42	44.5	4.2	4.8	4.5	2.7

Footnotes:

[1] The State Water Board's Enrollee's Guide to the SSO Database defines "Total number of SSOs per 100 miles of Sewer" as "…the number of SSOs, for which the reporting Enrollee is responsible, for every 100 miles of pipe or sewer lines in an Enrollee's sanitary sewer system. Due to the large variation in facility specific characteristics, this metric should only be viewed as a rough comparison of the operation and maintenance performance of Enrollees and their sanitary sewer systems."

[2] Average age as of 2014.

E. Planned Changes

To comply with the new limitations for BOD and TSS in Table 4 of this Order, which reflect pollutant levels achievable by implementing advanced secondary treatment, the Discharger will upgrade the plant. Concurrent with adoption of this Order, the Regional Water Board considered a cease and desist order containing a time schedule of tasks to achieve advanced secondary treatment.

III. APPLICABLE PLANS, POLICIES, AND REGULATIONS

A. Legal Authorities

This Order serves as WDRs pursuant to California Water Code article 4, chapter 4, division 7 (commencing with § 13260). This Order is also issued pursuant to Clean Water Act (CWA) section 402 and implementing regulations adopted by U.S. EPA and Water Code chapter 5.5, division 7 (commencing with § 13370). It shall serve as an NPDES permit for point source discharges from the Facility to surface waters.

B. California Environmental Quality Act

Under Water Code section 13389, this action to adopt an NPDES permit is exempt from the provisions of the California Environmental Quality Act, Public Resources Code division 13, chapter 3 (commencing with § 21100).

C. State and Federal Regulations, Policies, and Plans

1. **Water Quality Control Plan.** The Regional Water Board adopted the *Water Quality Control Plan for the San Francisco Bay Basin* (Basin Plan), which designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for all waters addressed through the plan. Requirements in this Order implement the Basin Plan. In addition, this Order implements State Water Board Resolution No. 88-63, which established State policy that all waters, with certain exceptions, should be considered suitable or potentially suitable for municipal or domestic supply. Beneficial uses applicable to the Napa River are listed below:

Table F-6. Napa River Beneficial Uses

Discharge Point	Receiving Water	Beneficial Uses
001	Napa River	Agricultural Supply (AGR) Municipal and Domestic Supply (MUN) Cold Freshwater Habitat (COLD) Fish Spawning (SPWN) Warm Freshwater Habitat (WARM) Wildlife Habitat (WILD) Water Contact Recreation (REC1) Non-Contact Water Recreation (REC2) Navigation (NAV) Fish Migration (MIGR) Preservation of Rare and Endangered Species (RARE)

2. **National Toxics Rule (NTR) and California Toxics Rule (CTR).** U.S. EPA adopted the NTR on December 22, 1992, and amended it on May 4, 1995 and November 9, 1999. About 40 criteria in the NTR apply in California. On May 18, 2000, U.S. EPA adopted the CTR. The CTR promulgated new toxics criteria for California and incorporated the previously adopted NTR criteria that applied in the State. U.S. EPA amended the CTR on February 13, 2001. These rules contain water quality criteria for priority pollutants.

3. **State Implementation Policy.** On March 2, 2000, the State Water Board adopted the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (State Implementation Policy or SIP). The SIP became effective on April 28, 2000, with respect to the priority pollutant criteria U.S. EPA promulgated for California through the NTR and the priority pollutant objectives the Regional Water Board established in the Basin Plan. The SIP became effective on May 18, 2000, with respect to the priority pollutant criteria U.S. EPA promulgated through the CTR. The State Water Board adopted amendments to the SIP on February 24, 2005, that became effective on July 13, 2005. The SIP establishes implementation provisions for priority pollutant criteria and objectives, and provisions for chronic toxicity control. Requirements of this Order implement the SIP.

4. **Domestic Water Quality**. In accordance with Water Code section 106.3, it is the policy of the State of California that every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes. This Order complies with that policy by requiring discharges to meet, when necessary, maximum contaminant levels designed to protect human health and ensure that water is safe for domestic use.

5. **Antidegradation Policy.** Federal regulations at 40 C.F.R. section 131.12 requires that state water quality standards include an antidegradation policy consistent with the federal policy. The State Water Board established California's antidegradation policy through State Water Board Resolution No. 68-16, *Statement of Policy with Respect to Maintaining High Quality of Waters in California,* which is deemed to incorporate the federal antidegradation policy where the federal policy applies under federal law. Resolution No. 68-16 requires that existing water quality be maintained unless degradation is justified based on specific findings. The Basin Plan implements, and incorporates by reference, both the State and federal antidegradation policies. Permitted discharges must be consistent with the antidegradation provisions of 40 C.F.R. section 131.12 and State Water Board Resolution No. 68-16.

6. **Anti-Backsliding Requirements.** CWA sections 402(o) and 303(d)(4) and 40 C.F.R. section 122.44(l) restrict backsliding in NPDES permits. These anti-backsliding provisions require that effluent limitations in a reissued permit be as stringent as those in the previous permit, with some exceptions in which limitations may be relaxed.

7. **Recycled Water Policy.** The State Water Board adopted Resolution No. 2013-0003 on January 22, 2013, titled *Policy for Water Quality Control for Recycled Water*, which is intended to promote sustainable local water supplies by increasing the acceptance and promoting the use of recycled water. The policy sets a goal to increase the use of recycled water statewide by at least one million acre feet per year (afy) over the 2002 baseline-level by 2020 and by at least two million afy by 2030. Consistent with the policy, the Regional Water Board is to exercise its authority to the fullest extent possible to encourage the use of recycled water and to develop watershed-based salt and nutrient management plans to ensure use of recycled water does not degrade groundwater resources.

D. Impaired Waters on CWA 303(d) List

In October 2011, U.S. EPA approved a revised list of impaired waters pursuant to CWA section 303(d), which requires identification of specific water bodies where it is expected that water quality standards will not be met after implementation of technology-based effluent limitations on point sources. Where it has not done so already, the Regional Water Board plans to adopt total maximum daily loads (TMDLs) for pollutants on the 303(d) list. TMDLs establish wasteload allocations for point sources and load allocations for non-point sources and are established to achieve the water quality standards for the impaired waters.

The Napa River is listed as impaired by nutrients, pathogens, and sediment. San Pablo Bay, to which the Napa River is tributary, is listed for chlordane, DDT, dieldrin, dioxins and furans, mercury, nickel, PCBs, selenium, and exotic species. The SIP requires final effluent limitations for all 303(d)-listed pollutants to be consistent with TMDLs and associated wasteload allocations.

On February 12, 2008, U.S. EPA approved a TMDL for mercury in San Francisco Bay. On March 29, 2010, U.S. EPA approved a TMDL for PCBs in San Francisco Bay. The TMDLs for mercury and PCBs apply to this discharge but are implemented through NPDES Permit No. CA0038849.

On February 29, 2008, U.S. EPA approved a TMDL for pathogens in the Napa River. This Order's total coliform effluent limitations are more stringent than the Napa River pathogens TMDL requires.

On January 21, 2011, U.S. EPA approved a TMDL for sediment in the Napa River. This Order's TSS effluent limitations are more stringent than specified by the Napa River sediment TMDL (see Basin Plan Table 7.8.4-3b, footnote a).

The discharge is a potential source of nutrients to the Napa River but is not expected to be a significant contributor to the impairment. The Napa River was listed as impaired for nutrients in the 1970s because of high nutrient levels and excessive algae growth, but water quality has significantly improved as a result of changes in agricultural practices in the watershed and reduced nutrient loads from wastewater treatment plants. In the 1980s, the Regional Water Board started prohibiting wastewater discharges to the river during the dry season when flows are naturally low because of the summer droughts in this Mediterranean climate. While the discharge prohibition in this Order does not apply exclusively to the "dry season," it serves the same function because it limits discharge to the river when there is recycled water demand, which correlates closely to the dry season. Also, the three treatment plants discharging to the non-tidal portion of the river (Calistoga, St. Helena, and Yountville) have improved their treatment processes. Receiving water nutrient concentrations (i.e., nitrate, nitrite, and ammonia) and other indicators (i.e., algae and chlorophyll *a*) are now below levels of concern. On February 12, 2014, the Regional Water Board approved a proposal to remove the nutrients listing, subject to State Water Board and U.S. EPA approval.

The discharge is not a significant source of chlordane, DDT, and dieldrin because these pollutants have not been detected in the discharge. The discharge is also not a source of exotic species because it is disinfected. It is an insignificant source of dioxins and furans, nickel, and selenium because discharge concentrations of these pollutants are consistently below water quality objectives or detection limits.

IV. RATIONALE FOR EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS

The CWA requires point source dischargers to control the amount of conventional, non-conventional, and toxic pollutants discharged into waters of the United States. The control of pollutants discharged is established through effluent limitations and other requirements in NPDES permits. There are two principal bases for effluent limitations: 40 C.F.R. section 122.44(a) requires that permits include applicable technology-based limitations and standards; and 40 C.F.R. section 122.44(d) requires that permits include water quality-based effluent limitations to attain and maintain applicable numeric and narrative water quality criteria to protect the beneficial uses of receiving waters.

A. Discharge Prohibitions

1. **Discharge Prohibition III.A (Discharge at a location or in a manner different from that described in this Order is prohibited):** This prohibition is based on 40 C.F.R. section 122.21(a) and Water Code section 13260, which require filing an application and Report of Waste Discharge before a discharge can occur. Discharges not described in the application and Report of Waste Discharge, and subsequently in this Order, are prohibited.

2. **Discharge Prohibition III.B (Discharge is prohibited unless the river flow-to-effluent flow ratio is at least 50:1):** This prohibition ensures that the discharge does not fully use the assimilative capacity of the Napa River in consideration of the other permitted wastewater discharges to this same segment of the river, specifically the City of Calistoga and the Town of Yountville, because all dischargers share the same receiving water monitoring for priority pollutants. Attachment F-1 to this Fact Sheet estimates that a ratio of at least 46:1 is necessary to ensure that assimilative capacity is available for all Napa River dischargers. These relatively simple calculations involve the following assumptions:

   - The mass of pollutants flowing downstream through the river equals the masses from each source flowing into the river;

   - Urban runoff flows are about 15 times the combined flows of the treatment plants discharging to the river; and

   - Urban runoff copper loads are about 8 times those of the wastewater discharges.

   This prohibition also ensures that the river flow-to-effluent flow ratio is consistent with an underlying assumption of the mixing zone study (June 2010 Effluent Mixing Zone / Dilution Credit Study, Larry Walker Associates) that serves as the basis for dilution credits used to analyze reasonable potential for non-priority pollutants (see Fact Sheet section IV.C.3.c) and to derive water quality-based effluent limits for others (see Fact Sheet section IV.C.4).

3. **Discharge Prohibition III.C (Bypass is prohibited):** This prohibition is based on 40 C.F.R. section 122.41(m) (see Attachment D section I.G).

4. **Discharge Prohibition III.D (Average dry weather influent flow in excess of 0.50 MGD is prohibited):** This Order prohibits an average dry weather influent flow greater than 0.50 MGD because the plant design treatment capacity (i.e., its historic and tested treatment reliability) is 0.50 MGD. Exceeding this flow could result in lower reliability and greater potential to violate water quality requirements.

5. **Discharge Prohibition III.E (Sanitary sewer overflows are prohibited):** Basin Plan Table 4-1, Discharge Prohibition 15, and the CWA prohibit the discharge of wastewater to surface waters, except as authorized under an NPDES permit. Publicly-owned treatment works must achieve secondary treatment at a minimum and any more stringent limitations necessary to meet water quality standards (33 U.S.C. § 1311[b][1][B and C]). A sanitary sewer overflow that results in the discharge of raw sewage or wastewater not meeting this Order's effluent limitations to surface waters is therefore prohibited under the CWA and the Basin Plan.

6. **Discharge Prohibition III.F (Discharge to Napa River is prohibited during dry season) and Exception to Non-Tidal Water Discharge Prohibition:** Basin Plan Table 4-1, Discharge Prohibition 1, prohibits discharges to any non-tidal water. Discharge Point No. 001 discharges to the Napa River where the river is non-tidal. Discharge Prohibition III.F of this Order is similar to the previous order and maintains Basin Plan Discharge Prohibition 1 during the dry season when it is feasible to not discharge (i.e., when the treated wastewater can be discharged to irrigation fields or used to supply recycled water demand) and provides an exception when it is infeasible to not discharge (i.e., during wet weather when there is no recycled water demand or demand is low and the irrigation fields are saturated). Basin Plan

section 4.2 provides for exceptions to Basin Plan Discharge Prohibition 1 under certain circumstances:

- An inordinate burden would be placed on a discharger relative to the beneficial uses protected, and an equivalent level of environmental protection can be achieved by alternate means;
- A discharge is approved as part of a reclamation project;
- Net environmental benefits will be derived as a result of the discharge; or
- A discharge is approved as part of a groundwater cleanup project.

The Basin Plan further states:

Significant factors to be considered by the Regional Water Board in reviewing requests for exceptions will be the reliability of the discharger's system in preventing inadequately treated wastewater from being discharged to the receiving water and the environmental consequence of such discharges.

This Order grants an exception to Basin Plan Discharge Prohibition 1 for the following reasons:

- At times, avoiding discharge to non-tidal waters is an inordinate burden. There is no feasible alternative to discharge when the irrigation field is saturated during wet weather. Regional Water Board Order No. 87-090 prohibits discharge to the Discharger's irrigation fields when they are saturated. The wastewater volume during these times can far exceed the storage capacity of the ponds.

- An equivalent level of protection is provided when the discharge meets the BOD and TSS effluent limits in Table 4 of the Order, which reflect advanced secondary treatment.

The basis for this Order granting an exception to Basin Plan Discharge Prohibition 1 is different than the basis set forth in the previous order. The previous order granted an exception based on the Discharger providing reliable treatment. However, the compliance record summarized in Fact Sheet section II.D.1 shows that assuming reliable treatment is unjustified. The new basis relies on equivalent protection resulting from more stringent BOD and TSS limits than those in the previous order. More stringent BOD and TSS limits will also improve disinfection performance to ensure compliance with total coliform limits. Moreover, it is reasonable to re-assess the appropriateness of the exemption based simply on "reliable" secondary treatment nearly four decades after the secondary treatment standards were established nationally.

The Discharger cannot immediately comply with the more stringent limits; therefore, concurrent with the adoption of this Order, the Regional Water Board considered a cease and desist order that requires actions leading to compliance with these new more stringent requirements.

B. Conventional and Non-Conventional Pollutant Effluent Limitations

1. Scope and Authority

CWA section 301(b) and 40 C.F.R. section 122.44 require that permits include conditions meeting technology-based requirements, at a minimum, and any more stringent effluent limitations necessary to meet water quality standards. The discharges authorized by this Order must meet minimum federal technology-based requirements based on the Secondary Treatment Standards at 40 C.F.R. section 133 as summarized below. The Basin Plan contains additional requirements for certain pollutants.

Table F-7. Secondary Treatment Requirements

Parameter	Monthly Average	Weekly Average
BOD_5 [1]	30 mg/L	45 mg/L
$CBOD_5$ [1]	25 mg/L	40 mg/L
TSS	30 mg/L	45 mg/L
BOD (or CBOD) and TSS Removal	85 percent or greater	-
pH	6.0 – 9.0 standard units	

Abbreviations:

BOD_5 = biochemical oxygen demand (5 days at 20°C)
$CBOD_5$ = carbonaceous biochemical oxygen demand (5 days at 20°C)

Footnote:

[1] $CBOD_5$ effluent limitations may be substituted for BOD_5 limitations.

2. Effluent Limitations

a. **BOD and TSS.** The BOD and TSS 85 percent removal requirement is based on secondary treatment standards. The weekly and average monthly limitations are based on performance reflective of advanced secondary treatment and are comparable to limits for other facilities in the region operating advanced secondary systems.

The TSS limits are also more stringent than necessary to comply with the Napa River sediment TMDL (Basin Plan section 7.8.4). Basin Plan Table 7.8.4-3b (footnote a) states, "For wastewater treatment plant discharges, compliance with [an] existing permit effluent limit of 30 mg/L of TSS is consistent with these wasteload allocations."

b. **Oil and Grease.** The oil and grease effluent limitations are based on Basin Plan Table 4-2.

c. **pH.** The pH effluent limitations are based on the Secondary Treatment Standards and Basin Plan Table 4-2.

d. **Total Residual Chlorine.** The total residual chlorine effluent limitation is based on Basin Plan Table 4-2.

e. **Total Coliform.** The total coliform effluent limitations are based on Basin Plan Table 4-2A, footnotes b and d. Footnote b allows total coliform limits in lieu of enterococcus limits for intermittent discharges and discharges for which total coliform monitoring is required (e.g., at water recycling facilities). Footnote d allows exceptions to the limits listed in Table 4-2A as long as beneficial uses are not compromised and discharges do not exceed a five-sample median of 23 MPN/100 mL nor a maximum of 240 MPN/100 mL during dry weather. The total coliform limits are more stringent than the Napa River Pathogen TMDL requires (Basin Plan section 7.8.2 and Table 7.8.2-4 require a five-sample median less than 240 colony-forming units [CFU]/100 mL and a single-sample maximum of 10,000 CFU/100 mL).

C. Toxic Pollutant Effluent Limitations

1. Scope and Authority

For toxic pollutants, this Order contains water quality-based effluent limitations (WQBELs) that implement water quality objectives that protect beneficial uses. CWA section 301(b) and 40 C.F.R. section 122.44(d) require that permits include limitations more stringent than federal technology-based requirements where necessary to achieve applicable water quality standards. According to 40 C.F.R. section 122.44(d)(1)(i), permits must include effluent limitations for all pollutants that are or may be discharged at levels that have a reasonable potential to cause or contribute to an exceedance of a water quality standard, including numeric and narrative objectives within a standard. Where reasonable potential has been established for a pollutant, but there is no numeric criterion or objective, WQBELs must be established using (1) U.S. EPA criteria guidance under CWA section 304(a), supplemented where necessary by other relevant information; (2) an indicator parameter for the pollutant of concern; or (3) a calculated numeric water quality criterion, such as a proposed state criterion or policy interpreting a narrative criterion, supplemented with relevant information (40 C.F.R. § 122.44[d][1][vi]). The process for determining reasonable potential and calculating WQBELs is intended to achieve applicable water quality objectives and criteria and to protect designated uses of receiving waters as specified in the Basin Plan. This Order imposes numeric effluent limitations for toxic pollutants with reasonable potential to cause or contribute to exceedances of water quality standards.

2. Beneficial Uses and Water Quality Criteria and Objectives

Discharge Point No. 001 discharges to the Napa River. Fact Sheet section III.C.1, above, identifies the beneficial uses of the Napa River. Water quality criteria and objectives to protect these beneficial uses are described below:

a. **Basin Plan Objectives.** The Basin Plan specifies numeric water quality objectives for many pollutants to protect aquatic life, municipal drinking water supplies, and agricultural water supplies (see Basin Plan sections 3.3.21 and 3.3.22). It also specifies several narrative water quality objectives, including objectives for toxicity, bioaccumulation, and temperature. The narrative toxicity objective states, “All waters shall be maintained free of toxic substances in concentrations that are lethal to or that produce other detrimental responses in aquatic organisms.” The narrative bioaccumulation objective states, “Controllable water quality factors shall not cause a detrimental increase in concentrations of toxic substances found in bottom sediments or aquatic life. Effects on aquatic organisms, wildlife, and human health will be considered.” The narrative temperature objective states, “The natural receiving water temperature of inland surface waters shall not be altered…,” and “The temperature of any cold or warm freshwater habitat shall not be increased by more than 5ºF (2.8ºC) above natural receiving water temperature.”

i. **Agricultural Supply Pollutants.** The agricultural supply water quality objectives listed in Basin Plan Table 3-6 include threshold and limit concentrations. Pollutant effects are observable at threshold concentrations and undesirable at limit concentrations; therefore, the limit concentrations listed in Basin Plan Table 3-6 are the applicable water quality objectives for this Order.

ii. **Dioxins and Furans.** With respect to dioxins and furans, the narrative bioaccumulation objective is translated into a numeric criterion as follows. When the CTR was promulgated, U.S. EPA stated its support of the regulation of dioxin and dioxin-like compounds through the use of toxicity equivalencies (TEQs). U.S. EPA stated, "For California waters, if the discharge of dioxin or dioxin-like compounds has reasonable potential to cause or contribute to a violation of a narrative criterion, numeric WQBELs for dioxin or dioxin-like compounds should be included in NPDES permits and should be expressed using a TEQ scheme" (65 Fed. Reg. 31695-31696, May 18, 2000). This Order uses a TEQ scheme based on a set of toxicity equivalency factors (TEFs) the World Health Organization developed in 1998, and a set of bioaccumulation equivalency factors (BEFs) U.S. EPA developed for the Great Lakes region (40 C.F.R. part 132, Appendix F) to convert the concentration of any congener of dioxin or furan into an equivalent concentration of 2,3,7,8-tetrachlorinated dibenzo-p-dioxin (2,3,7,8-TCDD). Although the 1998 World Health Organization scheme includes TEFs for dioxin-like PCBs, they are not included in this Order's TEQ scheme. The CTR has established a specific water quality criterion for PCBs, and dioxin-like PCBs are included in the analysis of total PCBs.

The CTR establishes a numeric water quality objective for 2,3,7,8-TCDD of 1.4×10^{-8} μg/L for the protection of human health when aquatic organisms are consumed. The CTR criterion is used as a criterion for dioxin-TEQ because dioxin-TEQ represents a toxicity-weighted concentration equivalent to 2,3,7,8-TCDD, thus translating the narrative bioaccumulation objective into a numeric criterion.

iii. **Total Ammonia.** Basin Plan section 3.3.20 contains water quality objectives for un-ionized ammonia of 0.025 mg/L as an annual median and 0.16 mg/L as a maximum for Central San Francisco Bay and upstream waters. Using the receiving water temperature, salinity levels, and pH concentrations, as explained below, this translates to 52 mg/L (as nitrogen) as the chronic objective for total ammonia and 64 mg/L (as nitrogen) as the acute total ammonia objective. Translation is necessary since (1) sampling and laboratory methods are unavailable to analyze for un-ionized ammonia, and (2) the fraction of total ammonia that exists in the toxic un-ionized form depends on the pH, salinity, and temperature of the receiving water.

To translate the un-ionized ammonia objectives, pH, salinity, and temperature data were obtained from the Napa River from December 2010 through December 2012. The un-ionized fraction of total ammonia was calculated as follows:

$$\text{For salinity} < 10 \text{ ppt: fraction of } NH_3 = \frac{1}{1+10^{(pK-pH)}}$$

Where:

$$pK = 0.09018 + \frac{2729.92}{T}$$

T = Temperature (Kelvin)

The median and maximum un-ionized ammonia fractions were then used to express the daily maximum and the annual average un-ionized objectives as chronic and acute total ammonia criteria. The results were 52 mg/L for the chronic objective and 64 mg/L for the acute objective.

b. CTR Criteria. The CTR specifies numeric aquatic life and human health criteria for numerous priority pollutants. These criteria apply to inland surface waters and enclosed bays and estuaries. Some human health criteria are for consumption of "water and organisms" and others are for consumption of "organisms only." The criteria applicable to "water and organisms" apply to the Napa River because it is a potential source of drinking water.

c. NTR Criteria. The NTR establishes numeric aquatic life and human health criteria for a number of toxic pollutants for San Francisco Bay waters upstream to and including Suisun Bay and the Sacramento-San Joaquin Delta. The NTR criteria apply to the Napa River.

d. Receiving Water Salinity. The Napa River is a freshwater river in the vicinity of the discharge. As confirmed by the *Collaborative Napa River Receiving Water Evaluation* (2003), Napa River salinity in all samples upstream and downstream of the discharge falls below one part per thousand, indicating a freshwater environment. Therefore, the freshwater water quality objectives from the Basin Plan, NTR, and CTR apply to this discharge.

e. Receiving Water Hardness. Ambient hardness data were used to calculate freshwater water quality objectives that are hardness dependent. Six data were collected downstream of the discharge point between April 2010 and December 2012. The average hardness of 69 mg/l was used to calculate the water quality objectives.

f. Site-Specific Metals Translators. Effluent limitations for metals must be expressed as total recoverable metal (40 C.F.R. § 122.45[c]). Since the water quality objectives for metals are typically expressed as dissolved metal, translators must be used to convert metals concentrations from dissolved to total recoverable and vice versa. The CTR contains default translators; however, site-specific conditions, such as water temperature, pH, total suspended solids, and organic carbon may affect the form of metal (dissolved, non-filterable, or otherwise) present and therefore available to cause toxicity. In general, dissolved metals are more available and more toxic to aquatic life than other forms. Site-specific translators can account for site-specific conditions, thereby preventing overly stringent or under-protective water quality objectives. In determining the need for and calculating WQBELs for all applicable metals, CTR default translators were used.

3. Need for Water Quality-Based Effluent Limitations (Reasonable Potential Analysis)

Assessing whether a pollutant has reasonable potential to exceed a water quality objective is the fundamental step in determining whether a WQBEL is required.

a. Available Information. The reasonable potential analysis for this Order is based on effluent monitoring data the Discharger collected from November 2010 to March 2015, as supplemented by effluent data the Discharger collected in March 2015 (for pollutant objectives listed in Basin Plan Tables 3-5 and 3-6). The reasonable potential analysis is based on ambient monitoring data the Discharger collected from April 2007 to February 2009 and data reported in *Collaborative Napa River Receiving Water Evaluation* (2003).

In some cases, reasonable potential cannot be determined because effluent data are limited or ambient background concentrations are unavailable. Provision VI.C.2 of the Order requires the Discharger to continue monitoring for such constituents in its effluent using analytical methods that provide the best feasible detection limitations. When additional data become available, further analysis will be conducted to determine whether numeric effluent limitations are necessary.

This Order does not contain WQBELs for constituents that do not demonstrate reasonable potential; however, Provision VI.C.2 of the Order still requires monitoring for such pollutants. If concentrations are found to have increased significantly, Provision VI.C.2 of the Order requires the Discharger to investigate the sources of the increases and implement remedial measures if the increases pose a threat to receiving water quality.

b. Priority Pollutants. For the priority pollutants (including those with Basin Plan water quality objectives for municipal and agricultural supply beneficial uses), the reasonable potential analysis for this Order is based on the methodology set forth in SIP section 1.3. Dioxin-TEQ is also included because these objectives are intended to protect aquatic life and human health, similar to the priority pollutant objectives. The analysis begins with identifying the maximum effluent concentration (MEC) observed for each pollutant based on available effluent concentration data and the ambient background concentration (B). SIP section 1.4.3 states that ambient background concentrations are either the maximum ambient concentration observed or, for water quality objectives intended to protect human health, the arithmetic mean of observed concentrations. There are three triggers in determining reasonable potential:

i. Trigger 1 is activated if the maximum effluent concentration is greater than or equal to the lowest applicable water quality objective (MEC $\geq$ water quality objective).

ii. Trigger 2 is activated if the ambient background concentration observed in the receiving water is greater than the lowest applicable water quality objective (B > water quality objective), *and* the pollutant is detected in any effluent sample.

iii. Trigger 3 is activated if a review of other information indicates that a WQBEL is needed to protect beneficial uses.

The maximum effluent concentrations (MECs), most stringent applicable water quality criteria and objectives, and background concentrations used in the analysis are presented below, along with the reasonable potential analysis results (yes or no) for each pollutant. The pollutants that exhibit reasonable potential are copper and cyanide by Trigger 1.

Table F-8. Priority Pollutant Reasonable Potential Analysis

CTR No.	Pollutants	C or Governing Criterion or Objective (µg/L)	MEC or Minimum DL (µg/L) [1][2]	B or Minimum DL (µg/L) [1][2]	RPA Results [3]
1	Antimony	6	0.16	1.8	No
2	Arsenic	50	1.4	4.3	No
3	Beryllium	4	<0.09	0.06	U
4	Cadmium	0.85	0.06	<0.02	No
5a	Chromium (III)	50	---	1.8	U
5b	Chromium (VI)	11	<4.5	<0.6	No
6	**Copper**	**6.8**	**6.9**	**3.1**	**Yes**
7	Lead	2.0	0.45	1.1	No
8	Mercury (303(d) listed) [4]	---	---	---	---
9	Nickel	38	5	4.1	No
10	Selenium (303(d) listed)	5.0	<0.4	3.0	No
11	Silver	2.1	0.04	0.02	No
12	Thallium	1.7	<0.05	<0.01	No
13	Zinc	87	17	12	No
14	**Cyanide**	**5.2**	**23**	**<0.6**	**Yes**
16	2,3,7,8-TCDD	1.4 E-08	<5.3 E-07	<3.4 E-07	U
	Dioxin-TEQ	1.4 E-08	<3.4 E-07	1.1 E-11	U
17	Acrolein	320	2.8	<1.2	No
18	Acrylonitrile	0.059	<0.69	<0.58	U
19	Benzene	1	<0.18	<0.10	No
20	Bromoform	4.3	<0.15	<0.10	No
21	Carbon Tetrachloride	0.25	<0.16	<0.06	No
22	Chlorobenzene	70	<0.18	<0.1	No
23	Chlorodibromomethane	0.40	<0.17	<0.08	No
24	Chloroethane	No Criteria	<0.38	<0.11	U
25	2-Chloroethylvinyl ether	No Criteria	<0.28	<0.29	U
26	Chloroform	No Criteria	1.4	<0.09	U
27	Dichlorobromomethane	0.56	<0.17	<0.08	No
28	1,1-Dichloroethane	5	<0.19	<0.06	No
29	1,2-Dichloroethane	0.38	<0.18	<0.09	No
30	1,1-Dichloroethylene	0.057	<0.21	<0.07	U
31	1,2-Dichloropropane	0.52	<0.18	<0.07	No
32	1,3-Dichloropropylene	0.5	<0.16	<0.07	No
33	Ethylbenzene	300	<0.26	<0.09	No
34	Methyl Bromide	48	<0.17	<0.06	No
35	Methyl Chloride	No Criteria	<0.23	<0.09	U
36	Methylene Chloride	4.7	<0.2	<0.08	No
37	1,1,2,2-Tetrachloroethane	0.17	<0.1	<0.07	No
38	Tetrachloroethylene	0.8	<0.19	<0.12	No
39	Toluene	150	1.2	<0.06	No
40	1,2-Trans-Dichloroethylene	10	<0.22	<0.09	No
41	1,1,1-Trichloroethane	200	<0.19	<0.11	No
42	1,1,2-Trichloroethane	0.6	<0.16	<0.06	No

CTR No.	Pollutants	C or Governing Criterion or Objective (µg/L)	MEC or Minimum DL (µg/L) [1][2]	B or Minimum DL (µg/L) [1][2]	RPA Results [3]
43	Trichloroethylene	2.7	<0.2	<0.07	No
44	Vinyl Chloride	0.5	<0.25	<0.14	No
45	2-Chlorophenol	120	<0.98	<0.80	No
46	2,4-Dichlorophenol	93	<0.99	<0.70	No
47	2,4-Dimethylphenol	540	<0.87	<0.80	No
48	2-Methyl- 4,6-Dinitrophenol	13.4	<0.91	<0.60	No
49	2,4-Dinitrophenol	70	<0.83	<0.60	No
50	2-Nitrophenol	No Criteria	<0.89	<0.60	U
51	4-Nitrophenol	No Criteria	<0.83	<0.70	U
52	3-Methyl 4-Chlorophenol	No Criteria	<0.91	<0.60	U
53	Pentachlorophenol	0.28	<0.81	<0.60	U
54	Phenol	21000	<0.69	<0.60	No
55	2,4,6-Trichlorophenol	2.1	<0.97	<0.60	No
56	Acenaphthene	1200	<0.03	<0.03	No
57	Acenaphthylene	No Criteria	<0.03	<0.02	U
58	Anthracene	9600	<0.03	0.02	No
59	Benzidine	0.00012	<5	<5.0	U
60	Benzo(a)Anthracene	0.0044	<0.03	<0.02	U
61	Benzo(a)Pyrene	0.0044	<0.03	<0.02	U
62	Benzo(b)Fluoranthene	0.0044	<0.03	<0.02	U
63	Benzo(ghi)Perylene	No Criteria	<0.03	<0.02	U
64	Benzo(k)Fluoranthene	0.0044	<0.03	<0.03	U
65	Bis(2-Chloroethoxy)Methane	No Criteria	<0.93	<0.70	U
66	Bis(2-Chloroethyl)Ether	0.031	<0.93	<0.90	U
67	Bis(2-Chloroisopropyl)Ether	1400	<0.95	<0.60	No
68	Bis(2-Ethylhexyl)Phthalate	1.8	<0.81	<0.60	No
69	4-Bromophenyl Phenyl Ether	No Criteria	<0.97	<0.97	U
70	Butylbenzyl Phthalate	3000	<0.98	<0.70	No
71	2-Chloronaphthalene	1700	<0.98	<0.98	No
72	4-Chlorophenyl Phenyl Ether	No Criteria	<0.99	<0.99	U
73	Chrysene	0.0044	<0.03	<0.02	U
74	Dibenzo(a,h)Anthracene	0.0044	<0.03	<0.02	U
75	1,2-Dichlorobenzene	600	<0.27	<0.11	No
76	1,3-Dichlorobenzene	400	<0.18	<0.11	No
77	1,4-Dichlorobenzene	5	<0.18	<0.10	No
78	3,3 Dichlorobenzidine	0.04	<5	<0.10	U
79	Diethyl Phthalate	23000	<0.86	<0.60	No
80	Dimethyl Phthalate	313000	<0.97	<0.70	No
81	Di-n-Butyl Phthalate	2700	<0.91	<0.60	No
82	2,4-Dinitrotoluene	0.11	<0.96	<0.60	U
83	2,6-Dinitrotoluene	No Criteria	<0.98	<0.60	U
84	Di-n-Octyl Phthalate	No Criteria	<0.92	<0.70	U
85	1,2-Diphenyhydrazine	0.04	<0.9	<0.60	U
86	Fluoranthene	300	<0.03	<0.02	No

CTR No.	Pollutants	C or Governing Criterion or Objective (µg/L)	MEC or Minimum DL (µg/L) [1][2]	B or Minimum DL (µg/L) [1][2]	RPA Results [3]
87	Fluorene	1300	<0.03	<0.02	No
88	Hexachlorobenzene	0.00075	<0.91	<0.91	U
89	Hexachlorobutadiene	0.44	<0.92	<0.92	U
90	Hexachlorocyclopentadiene	50	<0.9	<0.80	No
91	Hexachloroethane	1.9	<0.94	<0.94	No
92	Indeno(1,2,3-cd)Pyrene	0.0044	<0.03	<0.02	U
93	Isophorone	8.4	<0.93	<0.8	No
94	Naphthalene	No Criteria	<0.03	<0.02	U
95	Nitrobenzene	17	<0.95	<0.70	No
96	N-Nitrosodimethylamine	0.00069	<0.88	<0.80	U
97	N-Nitrosodi-n-Propylamine	0.005	<0.97	<0.60	U
98	N-Nitrosodiphenylamine	5	<0.83	<0.60	No
99	Phenanthrene	No Criteria	<0.03	0.04	U
100	Pyrene	960	<0.03	<0.02	No
101	1,2,4-Trichlorobenzene	5	<0.98	<0.98	No
102	Aldrin	0.00013	<0.0047	<0.002	U
103	Alpha-BHC	0.0039	<0.005	<0.002	U
104	Beta-BHC	0.014	<0.004	<0.002	No
105	Gamma-BHC	0.019	<0.004	<0.002	No
106	Delta-BHC	No Criteria	<0.004	<0.02	U
107	Chlordane (303(d) listed)	0.00057	<0.005	<0.003	U
108	4,4'-DDT (303(d) listed)	0.00059	<0.004	<0.003	U
109	4,4'-DDE (linked to DDT)	0.00059	<0.003	<0.003	U
110	4,4'-DDD	0.00083	<0.004	<0.002	U
111	Dieldrin (303d listed)	0.00014	<0.004	<0.003	U
112	Alpha-Endosulfan	0.056	<0.004	<0.003	No
113	beta-Endosulfan	0.056	<0.005	<0.002	No
114	Endosulfan Sulfate	110	<0.005	<0.002	No
115	Endrin	0.036	<0.005	<0.002	No
116	Endrin Aldehyde	0.76	<0.005	<0.002	No
117	Heptachlor	0.00021	<0.005	<0.003	U
118	Heptachlor Epoxide	0.0001	<0.004	<0.002	U
119-125	PCBs sum (303(d) listed) [4]	---	---	---	---
126	Toxaphene	0.0002	<0.2	---	U

Unit Abbreviations:

mg/L = milligrams per liter
µg/L = micrograms per liter

Footnotes:

[1] The maximum effluent concentration and ambient background concentration are the actual detected concentrations unless preceded by a "<" sign, in which case the value shown is the minimum detection level (DL).

[2] The maximum effluent concentration or ambient background concentration is "Unavailable" when there are no monitoring data for the constituent.

[3] RPA Results = Yes, if MEC ≥ WQC, B > WQC and MEC is detected, or Trigger 3
= No, if MEC and B are < WQC or all effluent data are undetected
= Unknown, cannot determine (U), if no criteria have been promulgated or data are insufficient.

[4] SIP section 1.3 excludes from its reasonable potential analysis procedure priority pollutants for which a TMDL has been developed. TMDLs have been developed for mercury and PCBs in San Francisco Bay. Mercury and PCBs from wastewater discharges are regulated by NPDES Permit No. CA0038849, which implements the San Francisco Bay Mercury and PCBs TMDLs.

c. Municipal and Agricultural Supply Pollutants. Municipal and agricultural supply are beneficial uses of the Napa River. For water quality objectives designed to protect municipal and agricultural supply (see Basin Plan Tables 3-5 and 3-6), except for those already analyzed in Table F-8, the reasonable potential analysis is based on the *Technical Support Document for Water Quality-based Toxics Control* (Technical Support Document or TSD) (EPA/505/2-90-001). The TSD allows reasonable potential analyses using either receiving water concentrations projected from effluent data or measured receiving water concentrations. The analysis presented in Table F-9 is based on the method that predicts receiving water quality based on pollutant concentrations, a confidence interval, and the number of samples available. The first step is to calculate the percentile, p_n, represented by the maximum effluent concentration (MEC) in a set of n samples based on the desired confidence level, e.g., 95% or 99% (the higher the confidence level, the more conservative the analysis).

$$p_{\mathrm{n}} = (1 - \text{confidence level})^{1/\mathrm{n}}$$

Only one sample was taken for these pollutants in this analysis. Using a 95 percent confidence interval, the percentile is:

$$p_1 = (1 - 0.95)^{1/1} = 0.05$$

For a normal distribution, the Z-score for 0.95 percentile is:

$$Z_{0.95} = 1.64$$

The concentration multiplying factor (C)[1] corresponding to the MEC percentile (C_{Pn}) and the selected upper bound percentile ($C_{P\ upper\ bound}$) is found using the following equation, where $\sigma^2 = \ln(CV^2+1)$, p is the percentile ($p_{upper\ bound}$ or p_n), and z_p is the standard normal distribution value for the percentile p:

$$C_p = \exp(Z_p\sigma - 0.5\sigma^2)$$

Assuming the coefficient of variation (CV) is 0.6 (the TSD assumes 0.6 whenever there are fewer than ten samples), the variability $\sigma^2 = \ln(CV^2 + 1) = 0.307$. Therefore,

$$C_{0.05} = \exp(Z_{0.05}\sigma - 0.5\sigma^2) = \exp(-1.64 * 0.55 - 0.5 * 0.55^2) = 0.35$$
$$C_{upperbound} = C_{0.95} = \exp(Z_{0.95}\sigma - 0.5\sigma^2) = \exp(1.64 * 0.55 - 0.5 * 0.55^2) = 2.13$$

The concentration ratio (*R*) is calculated using the following equation:

$$R = \frac{C_{upperbound}}{C_{Pn}} = \frac{2.13}{0.35} = 6.1$$

1 The TSD refers to these values as "reasonable potential multiplying factors." In this context, they are directly proportional to the effluent concentrations at the corresponding percentiles.

The Discharger's mixing zone study (June 2010 Effluent Mixing Zone / Dilution Credit Study, Larry Walker Associates) indicates that the effluent plume is diluted 21:1 (i.e., 20 parts river water for each part effluent or D = 20) about 225 feet downstream from Discharge Point No. 001 when the river flow-to-effluent flow ratio is 50:1 Discharge Prohibition III.B maintains this ratio, and Fact Sheet section IV.C.4.a justifies a mixing zone as large as 225 feet downstream. Therefore, to calculate the receiving water concentration, this analysis assumes a dilution factor of D=20. This dilution factor accounts for upstream discharges (Calistoga), which for the purpose of this calculation are assumed to contain pollutant concentrations similar to those of this discharge (few data are available for the pollutants listed in Table F-7).

Using R=6.1 and D=20, the projected maximum receiving water concentrations (RWC) is then estimated using the following equation:

$$RWC = MEC \times R / \text{dilution factor} = MEC \times 0.305$$

The most stringent applicable water quality objectives, maximum effluent concentrations, and calculated receiving water concentrations (RWC) are presented below, along with the reasonable potential analysis results (yes or no) for each pollutant. Reasonable potential was not exhibited for any pollutants.

Table F-9. Municipal and Agricultural Supply Pollutant Reasonable Potential Analysis

Pollutant	Governing Criterion or Objective (µg/L)	MEC or Minimum DL (µg/L) [1]	RWC (µg/L) [1]	RPA Results [2]
Total Dissolved Solids	500,000	430,000	130,000	No
Electrical Conductivity	900 mmhos/cm	630 mmhos/cm	190 mmhos/cm	No
Aluminum	200	310	95	No
Barium	1,000	44	13	No
Boron	2,000	200	61	No
Chloride	360,000	65	20	No
Cobalt	5,000	1	0.3	No
Fluoride	600	<0.1	<0.1	No
Iron	300	780	240	No
Lithium	2,500	6.9	2.1	No
Manganese	50	140	43	No
Molybdenum	50	0.95	0.58	No
Nitrate (as NO_3)	45,000	---	---	U
Nitrate + Nitrite (as N)	5,000	1,300	390	No
Nitrite (as N)	1,000	---	---	U
Sulfate	250,000	46,000	28,000	No
Vanadium	1,000	3.3	2.0	No
MBAS (foaming agents)	500	200	61	No
Phenols	1.0	<1.0	<1.0	No
Trihalomethanes	100	1.2	0.40	No
Lindane	0.2	<0.04	<0.04	No
Methoxychlor	30	<0.005	<0.005	No
2,4-D	70	<0.028	<0.028	No
2,4,4-TP Silvex	50	<0.2	<0.2	No

Pollutant	Governing Criterion or Objective (µg/L)	MEC or Minimum DL (µg/L) [1]	RWC (µg/L) [1]	RPA Results [2]
Alachlor	2.0	<0.022	<0.022	No
Atrazine	1.0	<0.048	<0.048	No
Bentazon	18	<0.063	<0.063	No
Dalapon	200	<0.12	<0.12	No
Dinoseb	7.0	<0.2	<0.2	No
Diquat	20	<0.34	<0.34	No
Endothall	100	<2.7	<2.7	No
Ethylene dibromide	0.05	<0.0057	<0.0057	No
Glyphosate	700	<1.6	<1.6	No
Molinate	20	<0.015	<0.015	No
Oxarnyl	50	<0.40	<0.40	No
Picloram	500	<0.015	<0.015	No
Simazine	4.0	<0.028	<0.028	No
Thiobencarb	1.0	<0.008	<0.008	No
1,2-dibromo-3-chloropropane	0.2	<0.01	<0.01	No
Cis-1,2-dichloroethylene	6.0	<0.20	<0.20	No
Methyl-tert-butyl ether	5	<0.15	<0.15	No
Monochlorobenzene	70	<0.5	<0.5	No
Styrene	100	<0.5	<0.5	No
Trichlorofluoromethane	150	<0.29	<0.29	No
1,1,2-trichloro-1,2,2-trifluoromethane	1,200	<1.0	<1.0	No

Unit Abbreviations:

µg/L = micrograms per liter
mmhos/cm = millisiemens per centimeter

Footnotes:

[1] The maximum effluent concentration and ambient background concentration are the actual detected concentrations unless preceded by a "<" sign, in which case the value shown is the minimum detection level (DL).

[2] RPA Results = Yes, if RWC ≥ WQC
= No, if RWC < WQC or all effluent data are undetected
= Unknown, cannot determine (U), if no criteria have been promulgated or data are insufficient.

d. Ammonia. Reasonable potential for ammonia was evaluated using two approaches, one based on effluent ammonia concentrations and one based on receiving water ammonia concentrations.

i. Effluent Approach. The effluent approach uses the TSD method described in Fact Sheet section IV.C.3.c above. Four un-ionized ammonia effluent samples were collected between December 2010 and December 2012. Using a 95 percent confidence interval, the percentile is:

$$p_1 = (1 - 0.95)^{1/5} = 0.473$$

For a normal distribution, the Z-score for 0.95 percentile is:

$$Z_{0.473} = -0.07$$

The concentration multiplying factor (C) corresponding to the MEC percentile (C_{Pn}) and the selected upper bound percentile ($C_{P\ upper\ bound}$) is found using the following equations, assuming the coefficient of variation (CV) is 0.6:

$$C_{0.05} = \exp(Z_{0.473}\sigma - 0.5\sigma^2) = \exp(-0.07 * 0.55 - 0.5 * 0.55^2) = 0.83$$

$$C_{upperbound} = C_{0.95} = \exp(Z_{0.95}\sigma - 0.5\sigma^2) = \exp(1.64 * 0.55 - 0.5 * 0.55^2) = 2.13$$

The concentration ratio (*R)* is calculated using the following equation:

$$R = \frac{C_{upperbound}}{C_{Pn}} = \frac{2.13}{0.83} = 2.58$$

Using R=2.32 and assuming no dilution, the projected maximum receiving water concentration (RWC) is estimated using the following equation, where the MEC is expressed as un-ionized ammonia based on effluent temperature and pH as described in Fact Sheet section IV.C.2.a.ii above:

$$\text{RWC} = \text{MEC} \times \text{R} = 0.063 \text{ mg/L} \times 2.58 = 0.16 \text{ mg/L}$$

This projected RWC is equals the acute water quality objective (0.016 mg/L) and is greater than the chronic water quality objective (0.025 mg/L), indicating reasonable potential.

ii. **Receiving Water Approach.** The receiving water approach is based on four receiving water samples collected about 100 feet downstream of the discharge outfall from December 2010 through December 2012. Un-ionized ammonia concentrations are calculated based on receiving water temperature and pH as described in Fact Sheet section IV.C.2.a.ii above. The observed maximum concentration (0.0033 mg/L) was less than the acute water quality objective (0.16 mg/L) and the observed median concentration (0.00042 mg/L) was less than the chronic water quality objective (0.025 mg/L). Therefore, reasonable potential is not triggered using this approach. Nevertheless, since the effluent approach results in reasonable potential, this Order contains ammonia WQBELs.

e. **Temperature.** Basin Plan section 3.3.17 prohibits the alteration of natural receiving water temperatures such that beneficial uses are adversely affected and temperature increases greater than 2.8ºC above natural receiving water temperatures. Receiving water and effluent monitoring from April 2010 through December 2014 showed no significant difference between the upstream, downstream, and effluent monitoring stations. Therefore, the discharge will not increase the river temperature, and there is no reasonable potential for temperature to exceed the Basin Plan water quality objective.

f. **Acute Toxicity.** Basin Plan section 4.5.5.3.1 requires acute toxicity monitoring and limitations, implying there is reasonable potential for the discharge to cause or contribute to exceedances of the acute toxicity water quality objective.

g. **Chronic Toxicity.** Consistent with Basin Plan section 4.5.5.3.2, the Discharger does not monitor for chronic toxicity because the Facility is small, there are no industrial dischargers within its service area, and its discharges are intermittent. For these same reasons, there is no reasonable potential for the discharge to cause or contribute to exceedances of the chronic toxicity water quality objective.

4. Water Quality-Based Effluent Limitations (WQBELs)

WQBELs were developed for the pollutants determined to have reasonable potential to cause or contribute to exceedances of water quality objectives. The WQBELs are based on the procedure specified in SIP section 1.4, which is required for priority pollutants. SIP section 1.4 is used as guidance for other pollutants.

a. Mixing Zones and Dilution Credits. The Order provides dilution credits for cyanide and copper. The SIP allows dilution credits for completely-mixed discharges and, under certain circumstances, incompletely-mixed discharges. The discharge is incompletely-mixed as defined in the SIP (more than 5 percent difference in pollutant concentrations in a cross section of the river within two river widths downstream). The outfall does not have a diffuser.

A CORMIX model was run under various flow conditions with a 50:1 river flow-to-wastewater flow ratio. According to the Discharger's mixing zone study (June 2010 Effluent Mixing Zone / Dilution Credit Study, Larry Walker Associates), within 25 feet downstream, the model estimated the plume had 6:1 dilution and spread 5 to 10 feet across the channel due to lateral momentum. At about 100 feet downstream, the plume was fully mixed vertically and spread about 12 feet across the channel. A dye tracer study provided similar results; the dye was diluted by at least 5:1 within this zone and spread across half of the river's width 100 feet downstream.

The dilution ratio was 21:1 by about 225 feet downstream under worst-case conditions (e.g., maximum daily average flow of 8.1 MGD). As discussed in Fact Sheet section IV.C.3.c, above, a mixing zone extending 225 feet downstream was used for the reasonable potential analysis for most non-priority pollutants with municipal or agricultural supply water quality objectives. A mixing zone extending no more than 225 feet downstream from the outfall meets SIP section 1.4.2.2.A requirements because it will not do any of the following:

i. **Compromise the integrity of the water body.** The mixing zone will not compromise the integrity of the receiving waters because it is small (less than 225 feet) relative to the size of the Napa River (55 miles).

ii. **Cause acute toxicity to aquatic life passing through the mixing zone.** Acutely toxic conditions will not exist inside the mixing zone because this Order contains acute toxicity effluent limits and requires acute toxicity testing to demonstrate compliance. These limits do not account for any dilution; therefore, compliance with these limits protects areas within the mixing zones. Bioassay monitoring conducted on fathead minnow during the past permit cycle showed high survival rates, indicating that organisms passing through the mixing zone are unlikely to experience acute toxicity.

iii. **Restrict the passage of aquatic life.** The mixing zone will not restrict the passage of aquatic life because the mixing zone is small compared to the size of the river at the discharge location. The mixing zone extends about 100 feet downstream and about 12 feet from the bank. The width of the river is about 40 feet. Aquatic organisms can easily pass around the mixing zone.

iv. **Adversely affect biologically sensitive or critical habitats, including, but not limited to, habitats of species under federal or State endangered species laws.** The Napa River has two potential species of concern in the area. Steelhead (*Oncorhyncus mykiss irideus*) is a federally-listed "threatened" species known to spawn in the Napa River in January and February. The western pond turtle (*Actinemys marmorata*) is a State-listed species of special concern. Since turtles breathe air, they are unlikely to be adversely affected by contact with diluted effluent. Steelhead may take in pollutants through their gills as they pass through the mixing zone, but, because the mixing zone extends only 12 feet from the bank and 100 feet downstream, steelhead are unlikely to reside within the mixing zone for any significant duration that could adversely affect them.

v. **Produce undesirable or nuisance aquatic life.** The mixing zone will not produce undesirable or nuisance aquatic life. Cyanide and copper are not biostimulants or plant nutrients so they will not cause growth of aquatic nuisance species. Moreover, this Order imposes receiving water limitations that prohibit bottom deposits or aquatic growths to the extent that such deposits or growths cause nuisance or adversely affect beneficial uses.

vi. **Result in floating debris, oil, or scum.** The mixing zone will not result in floating debris, oil, or scum because the effluent receives treatment that will eliminate oils, grease, debris, and scum. In addition, this Order imposes receiving water limitations that prohibit floating debris, oil, or scum at any place and at any time.

vii. **Produce objectionable color, odor, taste, or turbidity.** The mixing zone will not produce objectionable color, odor, taste, or turbidity because the effluent receives treatment and is disinfected prior to discharge. Secondary treatment generally addresses objectionable odor, taste, and turbidity through the biological degradation of organic compounds and clarification. In addition, this Order prohibits alteration of color or turbidity beyond natural background levels.

viii. **Cause objectionable bottom deposits.** The mixing zone will not cause objectionable bottom deposits because the effluent receives treatment and is free of settleable solids. In addition, this Order prohibits bottom deposits or aquatic growths to the extent that such deposits or growths cause nuisance or adversely affect beneficial uses.

ix. **Cause nuisance.** The mixing zone will not cause a nuisance because the effluent receives treatment and is disinfected prior to discharge. This Order prohibits discharges from causing a nuisance, which Water Code section 13050(m) defines to mean anything that meets all three of the following criteria:

- is injurious to health, or is indecent or offensive to the senses, or an obstruction to the free use of property, so as to interfere with the comfortable enjoyment of life or property;

- affects at the same time an entire community or neighborhood, or any considerable number of persons, although the extent of the annoyance or damage inflicted upon individuals may be unequal; and

- occurs during, or as a result of, the treatment or disposal of wastes.

x. **Dominate the receiving water body or overlap a mixing zone from a different outfall.** The mixing zone will not overlap any other mixing zone because the Regional Water Board has not established any other mixing zone nearby.

xi. **Be located at or near any drinking water intake.** There are no drinking water intakes within 225 feet of the outfall.

In compliance with SIP section 1.4.2.2.B, the mixing zone protects all beneficial uses and complies with all regulatory requirements. Copper and cyanide are not carcinogenic, bioaccumulative, or persistent in the environment. Moreover, the Napa River flows freely at the point of discharge and flushes and dilutes pollutants downstream.

SIP section 1.4.2.2 requires mixing zones to be as small as practicable. To ensure that the cyanide and copper mixing zones are as small as possible, the cyanide and copper WQBELs are based on the smallest possible dilution credits (D = 3 and D = 1). Based on current performance, these dilution credits are minimum necessary for the Discharger to consistently meet the resulting WQBELs. These dilution credits are much smaller than the dilution credit associated with the 225-foot mixing zone (D = 20).

b. WQBEL Calculations. For those pollutants with reasonable potential, average monthly effluent limitations (AMELs) and maximum daily effluent limitations (MDELs) were calculated as shown in the table below:

Table F-10. WQBEL Calculations

PRIORITY POLLUTANTS	**Cyanide**	**Copper**	**Total Ammonia (acute)**	**Total Ammonia (chronic)**
Units	**µg/L**	**µg/L**	**mg/L N**	**mg/L N**
Basis and Criteria type	NTR	Basin Plan	Basin Plan Aquatic Life	Basin Plan Aquatic Life
Criteria -Acute	22	9.9	64	---
Criteria -Chronic	5.2	6.8	---	52
Criteria –Human Health	---	---	---	---
Water Effects Ratio (WER)	1	1	1	1
Lowest WQO	5.2	6.8	64	52
Dilution Factor (D) (if applicable)	3.0	1.0	0	0
No. of samples per month	4	4	4	30 [1]
Aquatic life criteria analysis required? (Y/N)	Y	Y	Y	Y
HH criteria analysis required? (Y/N)	Y	N	N	N
Applicable Acute WQO	22	9.9	64	---
Applicable Chronic WQO	5.2	6.8	---	52

PRIORITY POLLUTANTS	Cyanide	Copper	Total Ammonia (acute)	Total Ammonia (chronic)
Units	**µg/L**	**µg/L**	**mg/L N**	**mg/L N**
HH criteria	220,000	---	---	---
Background (Maximum Conc for Aquatic Life calc)	0.60	3.10	0.40	0.40
Background (Average Conc for Human Health calc)	0.60	---	---	---
Is the pollutant on the 303d list and/or bioaccumulative (Y/N)?	N	N	N	N
ECA acute	86	17	64	---
ECA chronic	19	10	---	52
ECA HH	700	---	---	---
No. of data points <10 or at least 80% of data reported non detect? (Y/N)	N	N	N	N
Avg of effluent data points	12	4.2	8.7	8.7
Std Dev of effluent data points	0.75	0.08	0.34	0.34
CV calculated	0.60	0.80	0.04	0.04
CV (Selected) - Final	0.60	0.60	0.60	0.60
ECA acute mult99	0.32	0.32	0.32	----
ECA chronic mult99	0.53	0.53	---	0.93
LTA acute	28	5.3	21	---
LTA chronic	10	5.5	---	48
minimum of LTAs	10	5.3	21	48
AMEL mult95	1.6	1.6	1.6	1.2
MDEL mult99	3.1	3.1	3.1	3.1
AMEL (aq life)	16	8.3	32	57
MDEL(aq life)	31	17	64	150
MDEL/AMEL Multiplier	2.0	2.0	2.0	2.6
AMEL (human hlth)	700	---	---	---
MDEL (human hlth)	1,400	---	----	---
minimum of AMEL for Aq. life vs HH	16	8.3	32	57
minimum of MDEL for Aq. Life vs HH	31	17	64	150
Previous order limit (average monthly)	15	14	16	16
Previous order limit (maximum daily)	30	24	39	39
Final limit - AMEL	15	8.3	16	16
Final limit - MDEL	30	17	39	39

Footnote:

[1] Statistical adjustments were made to the total ammonia WQBEL calculations. The SIP assumes a 4-day average concentration and a monthly sampling frequency of 4 days per month to calculate effluent limitations based on

chronic criteria, but the Basin Plan chronic water quality objective for un-ionized ammonia is based on an annual median instead of the typical 4-day average. Therefore, a 365-day average and a monitoring frequency of 30 days per month (the maximum daily sampling frequency in a month since the averaging period for the chronic criteria is longer than 30 days) were used. These statistical adjustments are supported by U.S. EPA's *Water Quality Criteria; Notice of Availability; 1999 Update of Ambient Water Quality Criteria for Ammonia* (64 Fed. Reg. 71974-71980, December 22, 1999).

c. **Acute Toxicity WQBELs.** This Order includes whole effluent acute toxicity WQBELs based on Basin Plan Table 4-3. Bioassays are to be performed as specified in the MRP. Based on Basin Plan section 3.3.20, if the Discharger can demonstrate that ammonia causes acute toxicity in excess of the whole effluent acute toxicity WQBELs, and that the ammonia in the discharge complies with the total ammonia WQBELs in this Order, then such toxicity does not constitute a violation of the whole effluent acute toxicity WQBELs.

D. Discharge Requirement Considerations

1. **Anti-backsliding.** This Order complies with the anti-backsliding provisions of CWA sections 402(o) and 303(d)(4), and 40 C.F.R. section 122.44(l), which generally require effluent limitations in a reissued permit to be as stringent as those in the previous order. The requirements of this Order are at least as stringent as those in the previous order.

   This Order does not retain WQBELs for dioxin-TEQ from the previous order because data do not indicate reasonable potential to exceed water quality objectives. This is consistent with State Water Board Order No. WQ 2001-16.

2. **Antidegradation.** This Order complies with the antidegradation provisions of 40 C.F.R. section 131.12 and State Water Board Resolution No. 68-16. It continues the status quo with respect to the level of discharge authorized in the previous order, which is the baseline by which to measure whether degradation will occur. This Order does not allow for an increase in flow, a reduced level of treatment, or less stringent effluent limitations relative to those in the previous order.

   This Order removes a prohibition in the previous order against discharge of elevated temperature into the Napa River; however, this removal will not degrade water quality because monitoring during the past permit cycle showed no temperature difference between the effluent and receiving water. Moreover, the receiving water limitation in Provision V.5 of the Order requires that present natural background temperatures not be altered.

3. **Stringency of Requirements for Individual Pollutants.** This Order contains both technology-based and water quality-based effluent limitations for individual pollutants. This Order's technology-based requirements implement minimum, applicable federal technology-based requirements. In addition, this Order contains more stringent effluent limitations as necessary to meet water quality standards. Collectively, this Order's restrictions on individual pollutants are no more stringent than required to implement CWA requirements.

   This Order's WQBELs have been derived to implement water quality objectives that protect beneficial uses. The beneficial uses and water quality objectives have been approved pursuant to federal law and are the applicable federal water quality standards. To the extent that WQBELs were derived from the CTR, the CTR is the applicable standard pursuant to

40 C.F.R. section 131.38. The procedures for calculating these WQBELs are based on the CTR, as implemented in accordance with the SIP, which U.S. EPA approved on May 18, 2000. U.S. EPA approved most Basin Plan beneficial uses and water quality objectives prior to May 30, 2000. Beneficial uses and water quality objectives submitted to U.S. EPA prior to May 30, 2000, but not approved by U.S. EPA before that date, are nonetheless "applicable water quality standards for purposes of the CWA" pursuant to 40 C.F.R. section 131.21(c)(1). U.S. EPA approved the remaining beneficial uses and water quality objectives so they are applicable water quality standards pursuant to 40 C.F.R. section 131.21(c)(2).

V. RATIONALE FOR RECEIVING WATER LIMITATIONS

The receiving water limitations in sections V.A and V.B of the Order are based on Basin Plan narrative and numeric water quality objectives. The receiving water limitation in section V.C of the Order requires compliance with federal and State water quality standards in accordance with the CWA and regulations adopted thereunder.

VI. RATIONALE FOR PROVISIONS

A. Standard Provisions

Attachment D contains standard provisions that apply to all NPDES permits in accordance with 40 C.F.R. section 122.41 and additional conditions applicable to specific categories of permits in accordance with 40 C.F.R. section 122.42. The Discharger must comply with these provisions. The conditions set forth in 40 C.F.R. sections 122.41(a)(1) and (b) through (n) apply to all state-issued NPDES permits and must be incorporated into the permits either expressly or by reference.

In accordance with 40 C.F.R. section 123.25(a)(12), states may omit or modify conditions to impose more stringent requirements. Attachment G contains standard provisions that supplement the federal standard provisions in Attachment D. This Order omits federal conditions that address enforcement authority specified in 40 C.F.R. sections 122.41(j)(5) and (k)(2) because the State's enforcement authority under the Water Code is more stringent. In lieu of these conditions, this Order incorporates Water Code section 13387(e) by reference.

B. Monitoring and Reporting

CWA section 308 and 40 C.F.R. sections 122.41(h), 122.41(j)-(l), 122.44(i), and 122.48 require that NPDES permits specify monitoring and reporting requirements. Water Code sections 13267 and 13383 also authorize the Regional Water Board to establish monitoring, inspection, entry, reporting, and recordkeeping requirements. The Monitoring and Reporting Program (Attachment E) establishes monitoring, reporting, and recordkeeping requirements that implement federal and State requirements. For more background regarding these requirements, see Fact Sheet section VII.

C. Special Provisions

1. Reopener Provisions

These provisions are based on 40 C.F.R. sections 122.62 and 122.63 and allow modification of this Order and its effluent limitations as necessary in response to updated water quality objectives, regulations, or other new and relevant information that may become available in the future, and other circumstances as allowed by law.

2. Effluent Characterization Study and Report

This Order does not include effluent limitations for pollutants that do not demonstrate reasonable potential, but this provision requires the Discharger to continue monitoring for these pollutants as described in the MRP and Attachment G. Monitoring data are necessary to verify that the "no" and "unknown" reasonable potential analysis conclusions of this Order remain valid. This requirement is authorized pursuant to Water Code section 13267 and is necessary to inform the next permit reissuance and to ensure that the Discharger takes timely steps in response to any unanticipated change in effluent quality during the term of this Order.

3. Receiving Water Characterization Study and Report

This Order does not include effluent limitations for pollutants that do not demonstrate reasonable potential, but this provision requires the Discharger to continue monitoring for these pollutants as described in the MRP and Attachment G. Monitoring data are necessary to verify that the "no" and "unknown" reasonable potential analysis conclusions of this Order remain valid. This requirement is authorized pursuant to Water Code section 13267 and is necessary to inform the next permit reissuance. The Order allows the Discharger to complete the study on its own or in collaboration with other Napa River dischargers.

4. Pollutant Minimization Program

This provision is based on Basin Plan section 4.13.2 and SIP section 2.4.5.

5. Special Provisions for Municipal Facilities

a. **Sludge and Biosolids Management.** This provision is based on Basin Plan section 4.17 and 40 C.F.R. parts 257 and 503. "Sludge" refers to the solid, semisolid, and liquid residue removed during primary, secondary, and advanced wastewater treatment processes. "Biosolids" refers to sludge that has been treated and may be beneficially reused.

b. **Collection System Management.** The Discharger's collection system is part of the Facility regulated through this Order. This provision explains this Order's requirements as they relate to the Discharger's collection system and promotes consistency with the State Water Board's *Statewide General Waste Discharge Requirements for Sanitary Sewer Systems* (General Collection System WDRs), Order No. 2006-0003-DWQ, as amended by Order No. WQ 2013-0058-EXEC. The General Collection System WDRs contain requirements for collection system operation and maintenance, and for reporting and mitigating sanitary sewer overflows. They also require agencies to develop sanitary sewer management plans and report all sanitary sewer overflows. The Discharger must comply with both the General Collection System WDRs and this Order.

c. **Wastewater Impoundment Integrity.** This provision is required to ensure that the wastewater storage ponds do not leak and potentially threaten groundwater beneficial uses. Because this provision implements State requirements only and does not contain NPDES-related requirements, the following factors listed in Water Code section 13241 are considered:

   i. **Past Present, and Probable Future Beneficial Uses**. This provision will protect the municipal and agricultural beneficial uses of groundwater by ensuring that untreated or partially-treated wastewater does not leak through the impoundments and contaminate the groundwater. In the past, leaking impoundments have contaminated nearby municipal supply wells.

   ii. **Environmental Characteristics of Hydrographic Unit.** This provision will not affect the Napa River hydrographic unit because the impoundments are not intended or designed to serve as a water source for underlying groundwater or the Napa River.

   iii. **Water Quality Conditions That Could Reasonably Be Achieved Through Coordinated Control.** This provision will protect water quality in the area by fully containing wastewater until it meets specified treatment levels.

   iv. **Economic Considerations.** This provision will have no cost beyond the expected expenses to maintain impoundments as designed. This provision could avoid costs associated with potentially contaminating groundwater.

   v. **Need For Developing Housing Within Region.** This provision will not affect the need to develop housing in the region because it does not affect population or land use within the region.

   vi. **Need To Develop and Use Recycled Water.** This provision may improve the Discharger’s ability to recycle water by containing water long enough to achieve full treatment to meet water quality criteria for multiple uses, including recycled water. It will also prevent water loss through percolation.

d. **Standard Operating Procedures for Resource Recovery.** Standard Operating Procedures are required for dischargers that accept hauled waste fats, oil, and grease for injection into anaerobic digesters. The development and implementations of Standard Operating Procedures for management of these materials is intended to allow the California Department of Resources Recycling and Recovery to exempt operations from separate and redundant permitting programs. If the Discharger does not accept fats, oil, and grease for resource recovery purposes, it is not required to develop and implement Standard Operating Procedures.

VII. RATIONALE FOR MONITORING AND REPORTING PROGRAM

Attachment E contains the MRP for this Order. It specifies sampling stations, pollutants to be monitored (including all parameters for which effluent limitations are specified), monitoring frequencies, and reporting requirements. The following provides the rationale for the MRP requirements.

A. MRP Requirements Rationale

1. **Influent Monitoring.** Influent flow monitoring is necessary to understand Facility operations and to evaluate compliance with Discharge Prohibition III.D, which prohibits dry weather influent flow greater than 0.5 MGD. Influent BOD_5 and TSS monitoring is necessary to evaluate compliance with this Order's 85 percent removal requirements.

2. **Effluent Monitoring.** Effluent flow monitoring at Monitoring Location EFF-001 is necessary to distinguish flows discharged to the Napa River versus flows that go to the irrigation fields. Monitoring for other parameters at this location is necessary to evaluate compliance with this Order's effluent limitations and to conduct future reasonable potential analyses.

   Effluent flow monitoring at Monitoring Location REC-001 is to understand Facility operations and to distinguish flows discharged to the Napa River versus flows that go to the irrigation fields.

3. **Whole Effluent Acute Toxicity Testing**. Acute whole effluent toxicity tests are necessary to evaluate compliance with the whole effluent acute toxicity effluent limitations.

4. **Receiving Water Monitoring.** Napa River flow monitoring is needed to determine the river flow-to-effluent flow ratio and to evaluate compliance with Discharge Prohibition III.C. Monitoring for hardness is necessary to determine applicable water quality objectives. Monitoring for pH and temperature is necessary to provide data to translate the Basin Plan's un-ionized ammonia water quality objectives into total ammonia criteria. Monitoring for total ammonia may be useful to complete future reasonable potential analyses.

5. **Other Monitoring.** Biosolids monitoring is required pursuant to 40 C.F.R. part 258 (for landfill disposal) or 40 C.F.R. part 503 (for land application).

B. **Monitoring Requirements Summary.** The table below summarizes routine monitoring requirements. This table is for informational purposes only. The actual requirements are specified in the MRP and elsewhere in this Order.

Table F-11. Monitoring Requirements Summary

Parameter	Influent INF-001	Effluent EFF-001	Effluent REC-001	Receiving Water RSW-001 and RSW-002	Biosolids BIO-001
Flow	Continuous/D	Continuous/D	Continuous/D	1/Day [1]	----
Biochemical Oxygen Demand 5-day @ 20°C BOD_5	1/Week [2]	3/Week	---	----	----
Total Suspended Solids	1/Week [2]	3/Week	---	----	----
Oil and Grease	----	1/Quarter	----	----	----
pH	----	1/Day	----	2/Year [3]	----
Temperature	----	1/Quarter	----	2/Year [3]	----
Total Coliform Bacteria	----	3/Week	----	----	----

Parameter	Influent INF-001	Effluent EFF-001	Effluent REC-001	Receiving Water RSW-001 and RSW-002	Biosolids BIO-001
Acute Toxicity	----	1/Quarter	----	----	----
Chlorine Residual	----	Continuous/2H	----	----	----
Ammonia, Total	----	1/Quarter	----	2/Year [3]	----
Hardness	----	---	----	2/Year [3]	----
Copper, Total	----	1/Month	----	---	----
Cyanide, Total	----	1/Month	----	---	----
Other Pollutants	----	Once	----	Once [4]	----
River Flow-to-Effluent Flow Ratio	----	1/Day	----	----	----
Paint Filter Test	----	----	----	----	1/Year

Abbreviations:

Continuous/D = measured continuously, and recorded and reported daily
Continuous/2H= measured continuously or, if infeasible, at least every 2 hours
1/Day = once per day
1/Week = once per week
3/Week = three times per week
1/Month = once per month
1/Quarter = once per quarter
2/Year = twice per year

Footnotes:

[1] Monitoring is required at the USGS Station No.11458000 and only when discharging to the Napa River.

[2] The frequency is to be once per quarter when not discharging to the Napa River.

[3] Monitoring is required only at Monitoring Location RSW-002.

[4] Collaborative downstream monitoring is to be conducted at Monitoring Location RSW-900.

VIII. PUBLIC PARTICIPATION

The Regional Water Board considered the issuance of WDRs that will serve as an NPDES permit for the Facility. As a step in the WDR adoption process, Regional Water Board staff developed tentative WDRs and encouraged public participation in the WDR adoption process.

A. Notification of Interested Parties. The Regional Water Board notified the Discharger and interested agencies and persons of its intent to prescribe WDRs for the discharge and provided an opportunity to submit written comments and recommendations. Notification was provided through *The Napa Valley Register*. The public had access to the agenda and any changes in dates and locations through the Regional Water Board's website at http://www.waterboards.ca.gov/sanfranciscobay.

B. Written Comments. Interested persons were invited to submit written comments concerning the tentative WDRs as explained through the notification process. Comments were to be submitted either in person or by mail to the Executive Officer at the Regional Water Board at 1515 Clay Street, Suite 1400, Oakland, California 94612, Attention: Vince Christian.

For full staff response and Regional Water Board consideration, the written comments were due at the Regional Water Board office by 5:00 p.m. on November 23, 2015.

C. Public Hearing. The Regional Water Board held a public hearing on the tentative WDRs during its regular meeting at the following date and time, and at the following location:

Date: January 13, 2016
Time: 9:00 a.m.
Location: Elihu Harris State Office Building
1515 Clay Street, 1st Floor Auditorium
Oakland, CA 94612
Contact: Vince Christian, (510) 622-2336, vchristian@waterboards.ca.gov.

Interested persons were invited to attend. At the public hearing, the Regional Water Board heard testimony pertinent to the discharge, WDRs, and permit. For accuracy of the record, important testimony was requested to be in writing.

Dates and venues change. The Regional Water Board web address is http://www.waterboards.ca.gov/sanfranciscobay, where one could access the current agenda for changes in dates and locations.

D. Reconsideration of Waste Discharge Requirements. Any aggrieved person may petition the State Water Board to review the Regional Water Board decision regarding the final WDRs. The State Water Board must receive the petition at the following address within 30 calendar days of the Regional Water Board action:

State Water Resources Control Board
Office of Chief Counsel
P.O. Box 100
Sacramento, CA 95812-0100

For instructions on how to file a petition for review, see http://www.waterboards.ca.gov/public_notices/petitions/water_quality/wqpetition_instr.shtml.

E. Information and Copying. The Report of Waste Discharge, related supporting documents, and comments received are on file and may be inspected at the address above at any time between 8:00 a.m. and 5:00 p.m. (except noon to 1 p.m.), Monday through Friday. Copying of documents may be arranged by calling (510) 622-2300.

F. Register of Interested Persons. Any person interested in being placed on the mailing list for information regarding the WDRs and NPDES permit should contact the Regional Water Board, reference the Facility, and provide a name, address, and phone number.

G. Additional Information. Requests for additional information or questions regarding this Order should be directed to Vince Christian, at (510) 622-2336 or vchristian@waterboards.ca.gov.

APPENDIX F-1
RIVER FLOW-TO-EFFLUENT FLOW RATIO CALCULATIONS

The flow balance for the Napa River from a point just upstream of the City of Calistoga's outfalls to a point just downstream of the City of St. Helena's outfall can be expressed as in Equation 1.

$$Q_{RivUpstrm} + Q_c + Q_{sh} + Q_y + Q_{urban} + Q_{trib} = Q_{RivDnstrm}$$

Where:

$Q_{RivUpstrm}$ = Upstream River Flow
Q_c = Calistoga Effluent Flow
Q_{sh} = Saint Helena Effluent Flow
Q_y = Yountville Effluent Flow
Q_{urban} = Urban Runoff Flow
Q_{trib} = Tributary Flow
$Q_{RivDnstrm}$ = Downstream River Flow

Conservatively assuming that Q_{trib} is negligible during the early part of the discharge season, this equation yields the following:

Equation 1: $Q_{RivUpstrm} + Q_c + Q_{sh} + Q_y + Q_{urban} = Q_{RivDnstrm}$

Conservatively using wet weather influent data[1] to estimate the flows of each wastewater treatment facility yields the following:

Q_{sh} = 1.0 Mgal/day
Q_y = 0.80 Mgal/day = 0.8 * Q_{sh}
Q_c = 0.89 Mgal/day = 0.89 * Q_{sh}

Thus:

Equation 2: $Q_c + Q_{sh} + Q_y = 2.69 * Q_{sh}$ = 2.69 Mgal/day = 982 Mgal/year

Q_{urban} can be estimated through this equation:[2]

$$Q_{urban} = C_{mun} * I * A_{mun} + C_{ind} * I * A_{ind}$$

Where:

I = rainfall = 30 inches / year
C_{mun} = municipal runoff fraction = 0.2
C_{ind} = industrial runoff fraction = 1.0
A_{mun} = municipal area = 25,667 acres
A_{ind} = industrial area = 1,447 acres

---

1 Average flow data are from Calistoga, St. Helena, and Yountville self-monitoring reports for December 2014, a very wet month.

2 This equation, the runoff fractions, and land use areas are from Table 7b of the staff report for the Napa River Sediment Total Maximum Daily Load (January 16, 2007).

$$Q_{urban} = \left[0.2\left({}^{30in}/_{year}\right)(25667acres) + 1.0\left({}^{30in}/_{year}\right)(1447acres)\right] \times \left[\frac{1.008ft^3/_{sec}}{acre-in/_{hr}}\right] \times \left[\frac{3600sec}{hr}\right] \times \left[\frac{7.4805gal}{ft^3}\right]$$

$$Q_{urban} = 5{,}359\ Mgal/year$$

Therefore, Q_{urban} is about 5.5 times the combined flow of the treatment plants.

$$\frac{Qurban}{Qc + Qsh + Qy} = \frac{5359\ {}^{Mgal}/_{year}}{982\ {}^{Mgal}/_{year}} = 5.5$$

$$Q_{Urban} = 5.5 * (Q_c + Q_{sh} + Q_y)$$

Substituting this ratio into Equation 1:

$$Q_{RivUpstrm} + 6.5 * (Q_c + Q_{sh} + Q_y) = Q_{RivDnstrm}$$

Using Equation 2:

Equation 3: $Q_{RivUpstrm} = Q_{RivDnstrm} - 17.485 * Q_{sh}$

Effluent and ambient background data suggest that the Napa River's assimilative capacity may be most limited with respect to copper. Therefore, the minimum river flow-to-effluent flow ratio is calculated by setting the background, effluent, and runoff copper mass equal to the downstream copper mass based on the downstream flow and copper water quality objective (C_o).

The copper mass balance can be expressed as follows:

Equation 4: $Q_{RivUpstrm} * C_b + Q_c * C_c + Q_{sh} * C_{sh} + Q_y * C_y + Q_{urban} * C_{urban} = Q_{RivDnstrm} * C_o$

Where:

C_b = Upstream Background River Copper Concentration
C_c = Calistoga Effluent Copper Concentration
C_{sh} = Saint Helena Effluent Copper Concentration
C_y = Yountville Effluent Copper Concentration
C_{urban} = Urban Runoff Copper Concentration
C_{trib} = Tributary Copper Concentration
C_o = Downstream River Copper Water Quality Objective Concentration

Assuming that urban and non-urban runoff copper loads are about eight times those of the wastewater treatment plants yields the following:[3]

$$Q_{urban} * C_{urban} = 8 * (Q_c * C_c + Q_{sh} * C_{sh} + Q_y * C_y)$$

Combining the above equation with Equation 4 yields the following:

$$Q_{RivUpstrm} * C_b + 9 * (Q_c * C_c + Q_{sh} * C_{sh} + Q_y * C_y) = Q_{RivDnstrm} * C_o$$

[3] The relative copper loads are from the staff report for the Copper Site Specific Objectives (June 6, 2007).

Substituting Equation 3 into Equation 4 and solving for the river flow-to-effluent flow ratio yields the following:

$$\frac{Q_{RivDnstrm}}{Q_{sh}} = \frac{17.485 \times C_b - 8.01 \times C_c - 9 \times C_{sh} - 7.2 \times C_y}{C_b - C_o}$$

Effluent copper concentrations are conservatively based on each wastewater treatment plant's 95th percentile effluent copper concentration from 2010 through 2014. The downstream copper water quality objective (7.9 mg/L) is based on Basin Plan Table 3-4 and the lowest measured downstream hardness of 82 mg/L. The background copper concentration (3.1 mg/L) is based on the highest upstream measurement the Discharger collected from February 2002 through March 2015.

C_c = 8.9 mg/L
C_{sh} = 6.8 mg/L
C_y = 16 mg/L
C_o = 7.9 mg/L
C_b = 3.1 mg/L

Substituting these values into the equation above yields the following:

$$\frac{Q_{RivDnstrm}}{Q_{sh}} = \frac{17.485 \times 3.1 - 8.01 \times 8.9 - 9 \times 6.8 \ - 9 \times 16}{3.1 - 7.9} = \frac{46}{1}$$

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ATTACHMENT G
REGIONAL STANDARD PROVISIONS, AND MONITORING AND REPORTING REQUIREMENTS
(SUPPLEMENT TO ATTACHMENT D)

For

NPDES WASTEWATER DISCHARGE PERMITS

March 2010

Contents

I. STANDARD PROVISIONS - PERMIT COMPLIANCE G-1
- A. Duty to Comply G-1
- B. Need to Halt or Reduce Activity Not a Defense G-1
- C. Duty to Mitigate G-1
  - 1. Contingency Plan G-1
  - 2. Spill Prevention Plan G-2
- D. Proper Operation & Maintenance G-2
  - 1. Operation and Maintenance (O&M) Manual G-2
  - 2. Wastewater Facilities Status Report G-2
  - 3. Proper Supervision and Operation of Publicly Owned Treatment Works (POTWs) G-3
- E. Property Rights G-3
- F. Inspection and Entry G-3
- G. Bypass G-3
- H. Upset G-3
- I. Other G-3
- J. Storm water G-3
  - 1. Storm water Pollution Prevention Plan (SWPP Plan) G-3
  - 2. Source Identification G-4
  - 3. Storm water Management Controls G-5
  - 4. Annual Verification of SWPP Plan G-6
- K. Biosolids Management G-6

II. STANDARD PROVISIONS – PERMIT ACTION G-7

III. STANDARD PROVISIONS – MONITORING G-7
- A. Sampling and Analyses G-7
  - 1. Use of Certified Laboratories G-7
  - 2. Use of Appropriate Minimum Levels G-7
  - 3. Frequency of Monitoring G-7
- B. Biosolids Monitoring G-10
  - 1. Biosolids Monitoring Frequency G-10
  - 2. Biosolids Pollutants to Monitor G-10
- C. Standard Observations G-10
  - 1. Receiving Water Observations G-10
  - 2. Wastewater Effluent Observations G-11
  - 3. Beach and Shoreline Observations G-11
  - 4. Land Retention or Disposal Area Observations G-11
  - 5. Periphery of Waste Treatment and/or Disposal Facilities Observations G-12

IV. STANDARD PROVISIONS – RECORDS G-12
- A. Records to be Maintained G-12
- B. Records of monitoring information G-12
  - 1. Analytical Information G-12
  - 2. Flow Monitoring Data G-12
  - 3. Wastewater Treatment Process Solids G-13
  - 4. Disinfection Process G-13
  - 5. Treatment Process Bypasses G-13
  - 6. Treatment Facility Overflows G-14
- C. Claims of Confidentiality G-14

V. STANDARD PROVISIONS – REPORTING G-14
- A. Duty to Provide Information G-14

B. Signatory and Certification Requirements G-14
C. Monitoring Reports G-14
1. Self Monitoring Reports G-14
D. Compliance Schedules G-18
E. Twenty-Four Hour Reporting G-18
1. Spill of Oil or Other Hazardous Material Reports G-18
2. Unauthorized Discharges from Municipal Wastewater Treatment Plants G-19
F. Planned Changes G-22
G. Anticipated Noncompliance G-22
H. Other Noncompliance G-22
I. Other Information G-22
VI. STANDARD PROVISION – ENFORCEMENT G-22
VII. ADDITIONAL PROVISIONS – NOTIFICATION LEVELS G-22
VIII. DEFINITIONS G-22

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

REGIONAL STANDARD PROVISIONS, AND MONITORING AND REPORTING REQUIREMENTS (SUPPLEMENT TO ATTACHMENT D)

FOR

NPDES WASTEWATER DISCHARGE PERMITS

APPLICABILITY

This document applies to dischargers covered by a National Pollutant Discharge Elimination System (NPDES) permit. This document does not apply to Municipal Separate Storm Sewer System (MS4) NPDES permits.

The purpose of this document is to supplement the requirements of Attachment D, Standard Provisions. The requirements in this supplemental document are designed to ensure permit compliance through preventative planning, monitoring, recordkeeping, and reporting. In addition, this document requires proper characterization of issues as they arise, and timely and full responses to problems encountered. To provide clarity on which sections of Attachment D this document supplements, this document is arranged in the same format as Attachment D.

I. STANDARD PROVISIONS - PERMIT COMPLIANCE

A. Duty to Comply – Not Supplemented

B. Need to Halt or Reduce Activity Not a Defense – Not Supplemented

C. Duty to Mitigate – This supplements I.C. of Standard Provisions (Attachment D)

1. Contingency Plan - The Discharger shall maintain a Contingency Plan as originally required by Regional Water Board Resolution 74-10 and as prudent in accordance with current municipal facility emergency planning. The Contingency Plan shall describe procedures to ensure that existing facilities remain in, or are rapidly returned to, operation in the event of a process failure or emergency incident, such as employee strike, strike by suppliers of chemicals or maintenance services, power outage, vandalism, earthquake, or fire. The Discharger may combine the Contingency Plan and Spill Prevention Plan into one document. Discharge in violation of the permit where the Discharger has failed to develop and implement a Contingency Plan as described below will be the basis for considering the discharge a willful and negligent violation of the permit pursuant to California Water Code Section 13387. The Contingency Plan shall, at a minimum, contain the provisions of a. through g. below.

a. Provision of personnel for continued operation and maintenance of sewerage facilities during employee strikes or strikes against contractors providing services.

b. Maintenance of adequate chemicals or other supplies and spare parts necessary for continued operations of sewerage facilities.

c. Provisions of emergency standby power.

d. Protection against vandalism.

e. Expeditious action to repair failures of, or damage to, equipment and sewer lines.

f. Report of spills and discharges of untreated or inadequately treated wastes, including measures taken to clean up the effects of such discharges.

g. Programs for maintenance, replacement, and surveillance of physical condition of equipment, facilities, and sewer lines.

2. Spill Prevention Plan - The Discharger shall maintain a Spill Prevention Plan to prevent accidental discharges and minimize the effects of such events. The Spill Prevention Plan shall:

a. Identify the possible sources of accidental discharge, untreated or partially treated waste bypass, and polluted drainage;

b. Evaluate the effectiveness of present facilities and procedures, and state when they became operational; and

c. Predict the effectiveness of the proposed facilities and procedures, and provide an implementation schedule containing interim and final dates when they will be constructed, implemented, or operational.

This Regional Water Board, after review of the Contingency and Spill Prevention Plans or their updated revisions, may establish conditions it deems necessary to control accidental discharges and to minimize the effects of such events. Such conditions may be incorporated as part of the permit upon notice to the Discharger.

D. Proper Operation & Maintenance – This supplements I.D of Standard Provisions (Attachment D)

1. Operation and Maintenance (O&M) Manual - The Discharger shall maintain an O&M Manual to provide the plant and regulatory personnel with a source of information describing all equipment, recommended operational strategies, process control monitoring, and maintenance activities. To remain a useful and relevant document, the O&M Manual shall be kept updated to reflect significant changes in treatment facility equipment and operational practices. The O&M Manual shall be maintained in usable condition and be available for reference and use by all relevant personnel and Regional Water Board staff.

2. Wastewater Facilities Status Report - The Discharger shall regularly review, revise, or update, as necessary, its Wastewater Facilities Status Report. This report shall document how the Discharger operates and maintains its wastewater collection, treatment, and disposal facilities to ensure that all facilities are adequately staffed, supervised, financed, operated, maintained, repaired, and upgraded as necessary to provide adequate and reliable transport, treatment, and disposal of all wastewater from both existing and planned future wastewater sources under the Discharger's service responsibilities.

3. **Proper Supervision and Operation of Publicly Owned Treatment Works (POTWs) -** POTWs shall be supervised and operated by persons possessing certificates of appropriate grade pursuant to Division 4, Chapter 14, Title 23 of the California Code of Regulations.

E. Property Rights – Not Supplemented

F. Inspection and Entry – Not Supplemented

G. Bypass – Not Supplemented

H. Upset – Not Supplemented

I. Other – This section is an addition to Standard Provisions (Attachment D)

1. Neither the treatment nor the discharge of pollutants shall create pollution, contamination, or nuisance as defined by California Water Code Section 13050.

2. Collection, treatment, storage, and disposal systems shall be operated in a manner that precludes public contact with wastewater, except in cases where excluding the public is infeasible, such as private property. If public contact with wastewater could reasonably occur on public property, warning signs shall be posted.

3. If the Discharger submits a timely and complete Report of Waste Discharge for permit reissuance, this permit continues in force and effect until a new permit is issued or the Regional Water Board rescinds the permit.

J. Storm Water – This section is an addition to Standard Provisions (Attachment D)

These provisions apply to facilities that do not direct all storm water flows from the facility to the wastewater treatment plant headworks.

1. Storm Water Pollution Prevention Plan (SWPP Plan)

   The SWPP Plan shall be designed in accordance with good engineering practices and shall address the following objectives:

   a. To identify pollutant sources that may affect the quality of storm water discharges; and

   b. To identify, assign, and implement control measures and management practices to reduce pollutants in storm water discharges.

   The SWPP Plan may be combined with the existing Spill Prevention Plan as required in accordance with Section C.2. The SWPP Plan shall be retained on-site and made available upon request of a representative of the Regional Water Board.

2. Source Identification

The SWPP Plan shall provide a description of potential sources that may be expected to add significant quantities of pollutants to storm water discharges, or may result in non-storm water discharges from the facility. The SWPP Plan shall include, at a minimum, the following items:

a. A topographical map (or other acceptable map if a topographical map is unavailable), extending one-quarter mile beyond the property boundaries of the facility, showing the wastewater treatment facility process areas, surface water bodies (including springs and wells), and discharge point(s) where the facility's storm water discharges to a municipal storm drain system or other points of discharge to waters of the State. The requirements of this paragraph may be included in the site map required under the following paragraph if appropriate.

b. A site map showing the following:

   1) Storm water conveyance, drainage, and discharge structures;

   2) An outline of the storm water drainage areas for each storm water discharge point;

   3) Paved areas and buildings;

   4) Areas of actual or potential pollutant contact with storm water or release to storm water, including but not limited to outdoor storage and process areas; material loading, unloading, and access areas; and waste treatment, storage, and disposal areas;

   5) Location of existing storm water structural control measures (i.e., berms, coverings, etc.);

   6) Surface water locations, including springs and wetlands; and

   7) Vehicle service areas.

c. A narrative description of the following:

   1) Wastewater treatment process activity areas;

   2) Materials, equipment, and vehicle management practices employed to minimize contact of significant materials of concern with storm water discharges;

   3) Material storage, loading, unloading, and access areas;

   4) Existing structural and non-structural control measures (if any) to reduce pollutants in storm water discharges; and

   5) Methods of on-site storage and disposal of significant materials.

d. A list of pollutants that have a reasonable potential to be present in storm water discharges in significant quantities.

3. Storm Water Management Controls

The SWPP Plan shall describe the storm water management controls appropriate for the facility and a time schedule for fully implementing such controls. The appropriateness and priorities of controls in the SWPP Plan shall reflect identified potential sources of pollutants. The description of storm water management controls to be implemented shall include, as appropriate:

a. Storm water pollution prevention personnel

Identify specific individuals (and job titles) that are responsible for developing, implementing, and reviewing the SWPP Plan.

b. Good housekeeping

Good housekeeping requires the maintenance of clean, orderly facility areas that discharge storm water. Material handling areas shall be inspected and cleaned to reduce the potential for pollutants to enter the storm drain conveyance system.

c. Spill prevention and response

Identify areas where significant materials can spill into or otherwise enter storm water conveyance systems and their accompanying drainage points. Specific material handling procedures, storage requirements, and cleanup equipment and procedures shall be identified, as appropriate. The necessary equipment to implement a cleanup shall be available, and personnel shall be trained in proper response, containment, and cleanup of spills. Internal reporting procedures for spills of significant materials shall be established.

d. Source control

Source controls include, for example, elimination or reduction of the use of toxic pollutants, covering of pollutant source areas, sweeping of paved areas, containment of potential pollutants, labeling of all storm drain inlets with “No Dumping” signs, isolation or separation of industrial and non-industrial pollutant sources so that runoff from these areas does not mix, etc.

e. Storm water management practices

Storm water management practices are practices other than those that control the sources of pollutants. Such practices include treatment or conveyance structures, such as drop inlets, channels, retention and detention basins, treatment vaults, infiltration galleries, filters, oil/water separators, etc. Based on assessment of the potential of various sources to contribute pollutants to storm water discharges in significant quantities, additional storm water management practices to remove pollutants from storm water discharges shall be implemented and design criteria shall be described.

f. Sediment and erosion control

Measures to minimize erosion around the storm water drainage and discharge points, such as riprap, revegetation, slope stabilization, etc., shall be described.

g. Employee training

Employee training programs shall inform all personnel responsible for implementing the SWPP Plan. Training shall address spill response, good housekeeping, and material management practices. New employee and refresher training schedules shall be identified.

h. Inspections

All inspections shall be done by trained personnel. Material handling areas shall be inspected for evidence of, or the potential for, pollutants entering storm water discharges. A tracking or follow up procedure shall be used to ensure appropriate response has been taken in response to an inspection. Inspections and maintenance activities shall be documented and recorded. Inspection records shall be retained for five years.

i. Records

A tracking and follow-up procedure shall be described to ensure that adequate response and corrective actions have been taken in response to inspections.

4. Annual Verification of SWPP Plan

An annual facility inspection shall be conducted to verify that all elements of the SWPP Plan are accurate and up-to-date. The results of this review shall be reported in the Annual Report to the Regional Water Board described in Section V.C.f.

K. Biosolids Management – This section is an addition to Standard Provisions (Attachment D)

Biosolids must meet the following requirements prior to land application. The Discharger must either demonstrate compliance or, if it sends the biosolids to another party for further treatment or distribution, must give the recipient the information necessary to ensure compliance.

1. Exceptional quality biosolids meet the pollutant concentration limits in Table III of 40 CFR Part 503.13, Class A pathogen limits, and one of the vector attraction reduction requirements in 503.33(b)(1)-(b)(8). Such biosolids do not have to be tracked further for compliance with general requirements (503.12) and management practices (503.14).

2. Biosolids used for agricultural land, forest, or reclamation shall meet the pollutant limits in Table I (ceiling concentrations) and Table II or Table III (cumulative loadings or pollutant concentration limits) of 503.13. They shall also meet the general requirements (503.12) and management practices (503.14) (if not exceptional quality biosolids) for Class A or Class B pathogen levels with associated access restrictions (503.32) and one of the 10 vector attraction reduction requirements in 503.33(b)(1)-(b)(10).

3. Biosolids used for lawn or home gardens must meet exceptional quality biosolids limits.

4. Biosolids sold or given away in a bag or other container must meet the pollutant limits in either Table III or Table IV (pollutant concentration limits or annual pollutant loading rate limits) of 503.13. If Table IV is used, a label or information sheet must be attached to the biosolids packing that explains Table IV (see 503.14). The biosolids must also meet the Class A pathogen limits and one of the vector attraction reduction requirements in 503.33(b)(1)-(b)(8).

II. STANDARD PROVISIONS – PERMIT ACTION – Not Supplemented

III. STANDARD PROVISIONS – MONITORING

A. Sampling and Analyses – This section is a supplement to III.A and III.B of Standard Provisions (Attachment D)

1. Use of Certified Laboratories

Water and waste analyses shall be performed by a laboratory certified for these analyses in accordance with California Water Code Section 13176.

2. Use of Appropriate Minimum Levels

Table C lists the suggested analytical methods for the 126 priority pollutants and other toxic pollutants that should be used, unless a particular method or minimum level (ML) is required in the MRP.

For priority pollutant monitoring, when there is more than one ML value for a given substance, the Discharger may select any one of the analytical methods cited in Table C for compliance determination, or any other method described in 40 CFR part 136 or approved by U.S. EPA (such as the 1600 series) if authorized by the Regional Water Board. However, the ML must be below the effluent limitation and water quality objective. If no ML value is below the effluent limitation and water quality objective, then the method must achieve an ML no greater than the lowest ML value indicated in Table C. All monitoring instruments and equipment shall be properly calibrated and maintained to ensure accuracy of measurements.

3. Frequency of Monitoring

The minimum schedule of sampling analysis is specified in the MRP portion of the permit.

a. Timing of Sample Collection

1) The Discharger shall collect samples of influent on varying days selected at random and shall not include any plant recirculation or other sidestream wastes, unless otherwise stipulated by the MRP.

2) The Discharger shall collect samples of effluent on days coincident with influent sampling unless otherwise stipulated by the MRP or the Executive Officer. The Executive Officer may approve an alternative sampling plan if it is demonstrated to be representative of plant discharge flow and in compliance with all other permit requirements.

3) The Discharger shall collect grab samples of effluent during periods of day-time maximum peak effluent flows (or peak flows through secondary treatment units for facilities that recycle effluent flows).

4) Effluent sampling for conventional pollutants shall occur on at least one day of any multiple-day bioassay test the MRP requires. During the course of the test, on at least one day, the Discharger shall collect and retain samples of the discharge. In the event a bioassay test does

not comply with permit limits, the Discharger shall analyze these retained samples for pollutants that could be toxic to aquatic life and for which it has effluent limits.

i. The Discharger shall perform bioassay tests on final effluent samples; when chlorine is used for disinfection, bioassay tests shall be performed on effluent after chlorination-dechlorination; and

ii. The Discharger shall analyze for total ammonia nitrogen and calculate the amount of un-ionized ammonia whenever test results fail to meet the percent survival specified in the permit.

b. Conditions Triggering Accelerated Monitoring

1) If the results from two consecutive samples of a constituent monitored in a 30-day period exceed the monthly average limit for any parameter (or if the required sampling frequency is once per month and the monthly sample exceeds the monthly average limit), the Discharger shall, within 24 hours after the results are received, increase its sampling frequency to daily until the results from the additional sampling show that the parameter is in compliance with the monthly average limit.

2) If any maximum daily limit is exceeded, the Discharger shall increase its sampling frequency to daily within 24 hours after the results are received that indicate the exceedance of the maximum daily limit until two samples collected on consecutive days show compliance with the maximum daily limit.

3) If final or intermediate results of an acute bioassay test indicate a violation or threatened violation (e.g., the percentage of surviving test organisms of any single acute bioassay test is less than 70 percent), the Discharger shall initiate a new test as soon as practical, and the Discharger shall investigate the cause of the mortalities and report its findings in the next self monitoring report (SMR).

4) The Discharger shall calibrate chlorine residual analyzers against grab samples as frequently as necessary to maintain accurate control and reliable operation. If an effluent violation is detected, the Discharger shall collect grab samples at least every 30 minutes until compliance with the limit is achieved, unless the Discharger monitors chlorine residual continuously. In such cases, the Discharger shall continue to conduct continuous monitoring as required by its permit.

5) When a bypass occurs (except one subject to provision III.A.3.b.6 below), the Discharger shall monitor flows and collect samples on a daily basis for all constituents at affected discharge points that have effluent limits for the duration of the bypass (including acute toxicity using static renewals), except chronic toxicity, unless otherwise stipulated by the MRP.

6) Unless otherwise stipulated by the MRP, when a bypass approved pursuant to Attachment D, Standard Provisions, Sections I.G.2 or I.G.4, occurs, the Discharger shall monitor flows and, using appropriate procedures as specified in the MRP, collect and retain samples for affected discharge points on a daily basis for the duration of the bypass. The Discharger shall analyze for total suspended solids (TSS) using 24-hour composites (or more frequent increments) and for bacteria indicators with effluent limits using grab samples. If TSS exceeds 45 mg/L in any composite sample, the Discharger shall also analyze the retained samples for that discharge for all other constituents that have effluent limits, except oil and grease, mercury, dioxin-

TEQ, and acute and chronic toxicity. Additionally, at least once each year, the Discharger shall analyze the retained samples for one approved bypass discharge event for all other constituents that have effluent limits, except oil and grease, mercury, dioxin-TEQ, and acute and chronic toxicity. This monitoring shall be in addition to the minimum monitoring specified in the MRP.

c. Storm Water Monitoring

The requirements of this section only apply to facilities that are not covered by an NPDES permit for storm water discharges and where not all site storm drainage from process areas (i.e., areas of the treatment facility where chemicals or wastewater could come in contact with storm water) is directed to the headworks. For storm water not directed to the headworks during the wet season (October 1 to April 30), the Discharger shall:

1) Conduct visual observations of the storm water discharge locations during daylight hours at least once per month during a storm event that produces significant storm water discharge to observe the presence of floating and suspended materials, oil and grease, discoloration, turbidity, and odor, etc.

2) Measure (or estimate) the total volume of storm water discharge, collect grab samples of storm water discharge from at least two storm events that produce significant storm water discharge, and analyze the samples for oil and grease, pH, TSS, and specific conductance.

   The grab samples shall be taken during the first 30 minutes of the discharge. If collection of the grab samples during the first 30 minutes is impracticable, grab samples may be taken during the first hour of the discharge, and the Discharger shall explain in the Annual Report why the grab sample(s) could not be taken in the first 30 minutes.

3) Testing for the presence of non-storm water discharges shall be conducted no less than twice during the dry season (May 1 to September 30) at all storm water discharge locations. Tests may include visual observations of flows, stains, sludges, odors, and other abnormal conditions; dye tests; TV line surveys; or analysis and validation of accurate piping schematics. Records shall be maintained describing the method used, date of testing, locations observed, and test results.

4) Samples shall be collected from all locations where storm water is discharged. Samples shall represent the quality and quantity of storm water discharged from the facility. If a facility discharges storm water at multiple locations, the Discharger may sample a reduced number of locations if it establishes and documents through the monitoring program that storm water discharges from different locations are substantially identical.

5) Records of all storm water monitoring information and copies of all reports required by the permit shall be retained for a period of at least three years from the date of sample, observation, or report.

d. Receiving Water Monitoring

The requirements of this section only apply when the MRP requires receiving water sampling.

1) Receiving water samples shall be collected on days coincident with effluent sampling for conventional pollutants.

2) Receiving water samples shall be collected at each station on each sampling day during the period within one hour following low slack water. Where sampling during lower slack water is impractical, sampling shall be performed during higher slack water. Samples shall be collected within the discharge plume and down current of the discharge point so as to be representative, unless otherwise stipulated in the MRP.

3) Samples shall be collected within one foot of the surface of the receiving water, unless otherwise stipulated in the MRP.

B. Biosolids Monitoring – This section supplements III.B of Standard Provisions (Attachment D)

When biosolids are sent to a landfill, sent to a surface disposal site, or applied to land as a soil amendment, they must be monitored as follows:

1. Biosolids Monitoring Frequency

Biosolids disposal must be monitored at the following frequency:

Metric tons biosolids/365 days	Frequency
0-290	Once per year
290-1500	Quarterly
1500-15,000	Six times per year
Over 15,000	Once per month

(Metric tons are on a dry weight basis)

2. Biosolids Pollutants to Monitor

Biosolids shall be monitored for the following constituents:

- Land Application: Arsenic, cadmium, copper, mercury, molybdenum, nickel, lead, selenium, and zinc
- Municipal Landfill: Paint filter test (pursuant to 40 CFR 258)
- Biosolids-only Landfill or Surface Disposal Site (if no liner and leachate system): arsenic, chromium, and nickel

C. Standard Observations – This section is an addition to III of Standard Provisions (AttachmentD)

1. Receiving Water Observations

The requirements of this section only apply when the MRP requires standard observations of the receiving water. Standard observations shall include the following:

a. *Floating and suspended materials* (e.g., oil, grease, algae, and other macroscopic particulate matter): presence or absence, source, and size of affected area.

b. *Discoloration and turbidity*: description of color, source, and size of affected area.

c. *Odor*: presence or absence, characterization, source, distance of travel, and wind direction.

d. *Beneficial water use*: presence of water-associated waterfowl or wildlife, fisherpeople, and other recreational activities in the vicinity of each sampling station.

e. *Hydrographic condition*: time and height of corrected high and low tides (corrected to nearest National Oceanic and Atmospheric Administration location for the sampling date and time of sample collection).

f. *Weather conditions*:

1) Air temperature; and

2) Total precipitation during the five days prior to observation.

2. Wastewater Effluent Observations

The requirements of this section only apply when the MRP requires wastewater effluent standard observations. Standard observations shall include the following:

a. *Floating and suspended material of wastewater origin* (e.g., oil, grease, algae, and other macroscopic particulate matter): presence or absence.

b. *Odor*: presence or absence, characterization, source, distance of travel, and wind direction.

3. Beach and Shoreline Observations

The requirements of this section only apply when the MRP requires beach and shoreline standard observations. Standard observations shall include the following:

a. *Material of wastewater origin*: presence or absence, description of material, estimated size of affected area, and source.

b. *Beneficial use*: estimate number of people participating in recreational water contact, non-water contact, or fishing activities.

4. Land Retention or Disposal Area Observations

The requirements of this section only apply to facilities with on-site surface impoundments or disposal areas that are in use. This section applies to both liquid and solid wastes, whether confined or unconfined. The Discharger shall conduct the following for each impoundment:

a. Determine the amount of freeboard at the lowest point of dikes confining liquid wastes.

b. Report evidence of leaching liquid from area of confinement and estimated size of affected area. Show affected area on a sketch and volume of flow (e.g., gallons per minute [gpm]).

c. Regarding odor, describe presence or absence, characterization, source, distance of travel, and wind direction.

d. Estimate number of waterfowl and other water-associated birds in the disposal area and vicinity.

5. Periphery of Waste Treatment and/or Disposal Facilities Observations

The requirements of this section only apply when the MRP specifies periphery standard observations. Standard observations shall include the following:

a. *Odor*: presence or absence, characterization, source, and distance of travel.

b. *Weather conditions*: wind direction and estimated velocity.

IV. STANDARD PROVISIONS – RECORDS

A. Records to be Maintained – This supplements IV.A of Standard Provisions (Attachment D)

The Discharger shall maintain records in a manner and at a location (e.g., wastewater treatment plant or Discharger offices) such that the records are accessible to Regional Water Board staff. The minimum period of retention specified in Section IV, Records, of the Federal Standard Provisions shall be extended during the course of any unresolved litigation regarding the subject discharge, or when requested by the Regional Water Board or Regional Administrator of U.S. EPA, Region IX.

A copy of the permit shall be maintained at the discharge facility and be available at all times to operating personnel.

B. Records of monitoring information shall include – This supplements IV.B of Standard Provision (Attachment D)

1. Analytical Information

Records shall include analytical method detection limits, minimum levels, reporting levels, and related quantification parameters.

2. Flow Monitoring Data

For all required flow monitoring (e.g., influent and effluent flows), the additional records shall include the following, unless otherwise stipulated by the MRP:

a. Total volume for each day; and

b. Maximum, minimum, and average daily flows for each calendar month.

3. Wastewater Treatment Process Solids

a. For each treatment unit process that involves solids removal from the wastewater stream, records shall include the following:

1) Total volume or mass of solids removed from each collection unit (e.g., grit, skimmings, undigested biosolids, or combination) for each calendar month or other time period as appropriate, but not to exceed annually; and

2) Final disposition of such solids (e.g., landfill, other subsequent treatment unit).

b. For final dewatered biosolids from the treatment plant as a whole, records shall include the following:

1) Total volume or mass of dewatered biosolids for each calendar month;

2) Solids content of the dewatered biosolids; and

3) Final disposition of dewatered biosolids (disposal location and disposal method).

4. Disinfection Process

For the disinfection process, these additional records shall be maintained documenting process operation and performance:

a. For bacteriological analyses:

1) Wastewater flow rate at the time of sample collection; and

2) Required statistical parameters for cumulative bacterial values (e.g., moving median or geometric mean for the number of samples or sampling period identified in this Order).

b. For the chlorination process, when chlorine is used for disinfection, at least daily average values for the following:

1) Chlorine residual of treated wastewater as it enters the contact basin (mg/L);

2) Chlorine dosage (kg/day); and

3) Dechlorination chemical dosage (kg/day).

5. Treatment Process Bypasses

A chronological log of all treatment process bypasses, including wet weather blending, shall include the following:

a. Identification of the treatment process bypassed;

b. Dates and times of bypass beginning and end;

c. Total bypass duration;

d. Estimated total bypass volume; and

e. Description of, or reference to other reports describing, the bypass event, the cause, the corrective actions taken (except for wet weather blending that is in compliance with permit conditions), and any additional monitoring conducted.

6. Treatment Facility Overflows

This section applies to records for overflows at the treatment facility. This includes the headworks and all units and appurtenances downstream. The Discharger shall retain a chronological log of overflows at the treatment facility and records supporting the information provided in section V.E.2.

C. Claims of Confidentiality – Not Supplemented

V. STANDARD PROVISIONS – REPORTING

A. Duty to Provide Information – Not Supplemented

B. Signatory and Certification Requirements – Not Supplemented

C. Monitoring Reports – This section supplements V.C of Standard Provisions (Attachment D)

1. Self Monitoring Reports

For each reporting period established in the MRP, the Discharger shall submit an SMR to the Regional Water Board in accordance with the requirements listed in this document and at the frequency the MRP specifies. The purpose of the SMR is to document treatment performance, effluent quality, and compliance with the waste discharge requirements of this Order.

a. Transmittal letter

Each SMR shall be submitted with a transmittal letter. This letter shall include the following:

1) Identification of all violations of effluent limits or other waste discharge requirements found during the reporting period;

2) Details regarding violations: parameters, magnitude, test results, frequency, and dates;

3) Causes of violations;

4) Discussion of corrective actions taken or planned to resolve violations and prevent recurrences, and dates or time schedule of action implementation (if previous reports have been submitted that address corrective actions, reference to the earlier reports is satisfactory);

5) Data invalidation (Data should not be submitted in an SMR if it does not meet quality assurance/quality control standards. However, if the Discharger wishes to invalidate any measurement after it was submitted in an SMR, a letter shall identify the measurement suspected to be invalid and state the Discharger’s intent to submit, within 60 days, a formal request to invalidate the measurement. This request shall include the original measurement in question, the reason for invalidating the measurement, all relevant documentation that supports invalidation [e.g., laboratory sheet, log entry, test results, etc.], and discussion of the

corrective actions taken or planned [with a time schedule for completion] to prevent recurrence of the sampling or measurement problem.);

6) If the Discharger blends, the letter shall describe the duration of blending events and certify whether blended effluent was in compliance with the conditions for blending; and

7) Signature (The transmittal letter shall be signed according to Section V.B of this Order, Attachment D – Standard Provisions.).

b. Compliance evaluation summary

Each report shall include a compliance evaluation summary. This summary shall include each parameter for which the permit specifies effluent limits, the number of samples taken during the monitoring period, and the number of samples that exceed applicable effluent limits.

c. Results of analyses and observations

1) Tabulations of all required analyses and observations, including parameter, date, time, sample station, type of sample, test result, method detection limit, method minimum level, and method reporting level, if applicable, signed by the laboratory director or other responsible official.

2) When determining compliance with an average monthly effluent limitation and more than one sample result is available in a month, the Discharger shall compute the arithmetic mean unless the data set contains one or more reported determinations of detected but not quantified (DNQ) or nondetect (ND). In those cases, the Discharger shall compute the median in place of the arithmetic mean in accordance with the following procedure:

i. The data set shall be ranked from low to high, reported ND determinations lowest, DNQ determinations next, followed by quantified values (if any). The order of the individual ND or DNQ determinations is unimportant.

ii. The median value of the data set shall be determined. If the data set has an odd number of data points, then the median is the middle value. If the data set has an even number of data points, then the median is the average of the two values around the middle unless one or both of the points are ND or DNQ, in which case the median value shall be the lower of the two data points where DNQ is lower than a value and ND is lower than DNQ.

If a sample result, or the arithmetic mean or median of multiple sample results, is below the reporting limit, and there is evidence that the priority pollutant is present in the effluent above an effluent limitation and the Discharger conducts a Pollutant Minimization Program, the Discharger shall not be deemed out of compliance.

3) Dioxin-TEQ Reporting: The Discharger shall report for each dioxin and furan congener the analytical results of effluent monitoring, including the quantifiable limit (reporting level), the method detection limit, and the measured concentration. The Discharger shall report all measured values of individual congeners, including data qualifiers. When calculating dioxin-TEQ, the Discharger shall set congener concentrations below the minimum levels (ML) to zero. The Discharger shall calculate and report dioxin-TEQs using the following formula, where the MLs, toxicity equivalency factors (TEFs), and bioaccumulation equivalency factors (BEFs) are as provided in Table A:

$$\text{Dioxin-TEQ} = \Sigma\ (C_x \times TEF_x \times BEF_x)$$

where: C_x = measured or estimated concentration of congener *x*
TEF_x = toxicity equivalency factor for congener x
BEFx = bioaccumulation equivalency factor for congener *x*

Table A
Minimum Levels, Toxicity Equivalency Factors,
and Bioaccumulation Equivalency Factors

Dioxin or Furan Congener	Minimum Level (pg/L)	1998 Toxicity Equivalency Factor (TEF)	Bioaccumulation Equivalency Factor (BEF)
2,3,7,8-TCDD	10	1.0	1.0
1,2,3,7,8-PeCDD	50	1.0	0.9
1,2,3,4,7,8-HxCDD	50	0.1	0.3
1,2,3,6,7,8-HxCDD	50	0.1	0.1
1,2,3,7,8,9-HxCDD	50	0.1	0.1
1,2,3,4,6,7,8-HpCDD	50	0.01	0.05
OCDD	100	0.0001	0.01
2,3,7,8-TCDF	10	0.1	0.8
1,2,3,7,8-PeCDF	50	0.05	0.2
2,3,4,7,8-PeCDF	50	0.5	1.6
1,2,3,4,7,8-HxCDF	50	0.1	0.08
1,2,3,6,7,8-HxCDF	50	0.1	0.2
1,2,3,7,8,9-HxCDF	50	0.1	0.6
2,3,4,6,7,8-HxCDF	50	0.1	0.7
1,2,3,4,6,7,8-HpCDF	50	0.01	0.01
1,2,3,4,7,8,9-HpCDF	50	0.01	0.4
OCDF	100	0.0001	0.02

d. Data reporting for results not yet available

The Discharger shall make all reasonable efforts to obtain analytical data for required parameter sampling in a timely manner. Certain analyses require additional time to complete analytical processes and report results. For cases where required monitoring parameters require additional time to complete analytical processes and reports, and results are not available in time to be included in the SMR for the subject monitoring period, the Discharger shall describe such circumstances in the SMR and include the data for these parameters and relevant discussions of any observed exceedances in the next SMR due after the results are available.

e. Flow data

The Discharger shall provide flow data tabulation pursuant to Section IV.B.2.

f. Annual self monitoring report requirements

By the date specified in the MRP, the Discharger shall submit an annual report to the Regional Water Board covering the previous calendar year. The report shall contain the following:

1) Annual compliance summary table of treatment plant performance, including documentation of any blending events;

2) Comprehensive discussion of treatment plant performance and compliance with the permit (This discussion shall include any corrective actions taken or planned, such as changes to facility equipment or operation practices that may be needed to achieve compliance, and any other actions taken or planned that are intended to improve performance and reliability of the Discharger's wastewater collection, treatment, or disposal practices.);

3) Both tabular and graphical summaries of the monitoring data for the previous year if parameters are monitored at a frequency of monthly or greater;

4) List of approved analyses, including the following:

   (i) List of analyses for which the Discharger is certified;

   (ii) List of analyses performed for the Discharger by a separate certified laboratory (copies of reports signed by the laboratory director of that laboratory shall not be submitted but be retained onsite); and

   (iii) List of "waived" analyses, as approved;

5) Plan view drawing or map showing the Discharger's facility, flow routing, and sampling and observation station locations;

6) Results of annual facility inspection to verify that all elements of the SWPP Plan are accurate and up to date (only required if the Discharger does not route all storm water to the headworks of its wastewater treatment plant); and

7) Results of facility report reviews (The Discharger shall regularly review, revise, and update, as necessary, the O&M Manual, the Contingency Plan, the Spill Prevention Plan, and Wastewater Facilities Status Report so that these documents remain useful and relevant to current practices. At a minimum, reviews shall be conducted annually. The Discharger shall include, in each Annual Report, a description or summary of review and evaluation procedures, recommended or planned actions, and an estimated time schedule for implementing these actions. The Discharger shall complete changes to these documents to ensure they are up-to-date.).

g. Report submittal

The Discharger shall submit SMRs to:

California Regional Water Quality Control Board

San Francisco Bay Region
1515 Clay Street, Suite 1400
Oakland, CA 94612
Attn: NPDES Wastewater Division

h. Reporting data in electronic format

The Discharger has the option to submit all monitoring results in an electronic reporting format approved by the Executive Officer. If the Discharger chooses to submit SMRs electronically, the following shall apply:

1) *Reporting Method*: The Discharger shall submit SMRs electronically via a process approved by the Executive Officer (see, for example, the letter dated December 17, 1999, "Official Implementation of Electronic Reporting System [ERS]" and the progress report letter dated December 17, 2000).

2) *Monthly or Quarterly Reporting Requirements*: For each reporting period (monthly or quarterly as specified in the MRP), the Discharger shall submit an electronic SMR to the Regional Water Board in accordance with the provisions of Section V.C.1.a-e, except for requirements under Section V.C.1.c(1) where ERS does not have fields for dischargers to input certain information (e.g., sample time). However, until U.S. EPA approves the electronic signature or other signature technologies, dischargers that use ERS shall submit a hard copy of the original transmittal letter, an ERS printout of the data sheet, and a violation report (a receipt of the electronic transmittal shall be retained by the Discharger). This electronic SMR submittal suffices for the signed tabulations specified under Section V.C.1.c(1).

3) *Annual Reporting Requirements*: Dischargers who have submitted data using the ERS for at least one calendar year are exempt from submitting the portion of the annual report required under Section V.C.1.f(1) and (3).

D. Compliance Schedules – Not supplemented

E. Twenty-Four Hour Reporting – This section supplements V.E of Standard Provision (Attachment D)

1. Spill of Oil or Other Hazardous Material Reports

a. Within 24 hours of becoming aware of a spill of oil or other hazardous material that is not contained onsite and completely cleaned up, the Discharger shall report by telephone to the Regional Water Board at (510) 622-2369.

b. The Discharger shall also report such spills to the State Office of Emergency Services [telephone (800) 852-7550] only when the spills are in accordance with applicable reporting quantities for hazardous materials.

c. The Discharger shall submit a written report to the Regional Water Board within five working days following telephone notification unless directed otherwise by Regional Water Board staff. A report submitted electronically is acceptable. The written report shall include the following:

1) Date and time of spill, and duration if known;

2) Location of spill (street address or description of location);

3) Nature of material spilled;

4) Quantity of material involved;

5) Receiving water body affected, if any;

6) Cause of spill;

7) Estimated size of affected area;

8) Observed impacts to receiving waters (e.g., oil sheen, fish kill, water discoloration);

9) Corrective actions taken to contain, minimize, or clean up the spill;

10) Future corrective actions planned to be taken to prevent recurrence, and schedule of implementation; and

11) Persons or agencies notified.

2. Unauthorized Discharges from Municipal Wastewater Treatment Plants[1]

The following requirements apply to municipal wastewater treatment plants that experience an unauthorized discharge at their treatment facilities and are consistent with and supercede requirements imposed on the Discharger by the Executive Officer by letter of May 1, 2008, issued pursuant to California Water Code Section 13383.

a. Two (2)-Hour Notification

For any unauthorized discharges that result in a discharge to a drainage channel or a surface water, the Discharger shall, as soon as possible, but not later than two (2) hours after becoming aware of the discharge, notify the State Office of Emergency Services (telephone 800-852-7550), the local health officers or directors of environmental health with jurisdiction over the affected water bodies, and the Regional Water Board. The notification to the Regional Water Board shall be via the Regional Water Board’s online reporting system at www.wbers.net, and shall include the following:

1) Incident description and cause;

2) Location of threatened or involved waterway(s) or storm drains;

3) Date and time the unauthorized discharge started;

4) Estimated quantity and duration of the unauthorized discharge (to the extent known), and the estimated amount recovered;

[1] California Code of Regulations, Title 23, Section 2250(b), defines an unauthorized discharge to be a discharge, not regulated by waste discharge requirements, of treated, partially treated, or untreated wastewater resulting from the intentional or unintentional diversion of wastewater from a collection, treatment or disposal system.

5) Level of treatment prior to discharge (e.g., raw wastewater, primary treated, undisinfected secondary treated, and so on); and

6) Identity of the person reporting the unauthorized discharge.

b. 24-hour Certification

Within 24 hours, the Discharger shall certify to the Regional Water Board, at www.wbers.net, that the State Office of Emergency Services and the local health officers or directors of environmental health with jurisdiction over the affected water bodies have been notified of the unauthorized discharge.

c. 5-Day Written Report

Within five business days, the Discharger shall submit a written report, via the Regional Water Board's online reporting system at www.wbers.net, that includes, in addition to the information required above, the following:

1) Methods used to delineate the geographical extent of the unauthorized discharge within receiving waters;

2) Efforts implemented to minimize public exposure to the unauthorized discharge;

3) Visual observations of the impacts (if any) noted in the receiving waters (e.g., fish kill, discoloration of water) and the extent of sampling if conducted;

4) Corrective measures taken to minimize the impact of the unauthorized discharge;

5) Measures to be taken to minimize the chances of a similar unauthorized discharge occurring in the future;

6) Summary of Spill Prevention Plan or O&M Manual modifications to be made, if necessary, to minimize the chances of future unauthorized discharges; and

7) Quantity and duration of the unauthorized discharge, and the amount recovered.

d. Communication Protocol

To clarify the multiple levels of notification, certification, and reporting, the current communication requirements for unauthorized discharges from municipal wastewater treatment plants are summarized in Table B that follows.

Table B

Summary of Communication Requirements for Unauthorized Discharges[1] from Municipal Wastewater Treatment Plants

Discharger is required to:	Agency Receiving Information	Time frame	Method for Contact
1. Notify	California Emergency Management Agency (Cal EMA)	As soon as possible, but not later than **2 hours** after becoming aware of the unauthorized discharge.	Telephone – (800) 852-7550 (obtain a control number from Cal EMA)
	Local health department	As soon as possible, but not later than **2 hours** after becoming aware of the unauthorized discharge.	Depends on local health department
	Regional Water Board	As soon as possible, but not later than **2 hours** after becoming aware of the unauthorized discharge.	Electronic[2] www.wbers.net
2. Certify	Regional Water Board	As soon as possible, but not later than **24 hours** after becoming aware of the unauthorized discharge.	Electronic[3] www.wbers.net
3. Report	Regional Water Board	Within **5 business days** of becoming aware of the unauthorized discharge.	Electronic[4] www.wbers.net

[1] California Code of Regulations, Title 23, Section 2250(b), defines an unauthorized discharge to be a discharge, not regulated by waste discharge requirements, of treated, partially treated, or untreated wastewater resulting from the intentional or unintentional diversion of wastewater from a collection, treatment or disposal system.

[2] In the event that the Discharger is unable to provide online notification within 2 hours of becoming aware of an unauthorized discharge, it shall phone the Regional Water Board's spill hotline at (510) 622-2369 and convey the same information contained in the notification form. In addition, within 3 business days of becoming aware of the unauthorized discharge, the Discharger shall enter the notification information into the Regional Water Board's online system in electronic format.

[3] In most instances, the 2-hour notification will also satisfy 24-hour certification requirements. This is because the notification form includes fields for documenting that OES and the local health department have been contacted. In other words, if the Discharger is able to complete all the fields in the notification form within 2 hours, certification requirements are also satisfied. In the event that the Discharger is unable to provide online certification within 24 hours of becoming aware of an unauthorized discharge, it shall phone the Regional Water Board's spill hotline at (510) 622-2369 and convey the same information contained in the certification form. In addition, within 3 business days of becoming aware of the unauthorized discharge, the Discharger shall enter the certification information into the Regional Water Board's online system in electronic format.

[4] If the Discharger cannot satisfy the 5-day reporting requirements via the Regional Water Board's online reporting system, it shall submit a written report (preferably electronically in pdf) to the appropriate Regional Water Board case manager. In cases where the Discharger cannot satisfy the 5-day reporting requirements via the online reporting system, it must still complete the Regional Water Board's online reporting requirements within 15 calendar days of becoming aware of the unauthorized discharge.

F. Planned Changes – Not supplemented

G. Anticipated Noncompliance – Not supplemented

H. Other Noncompliance – Not supplemented

I. Other Information – Not supplemented

VI. STANDARD PROVISION – ENFORCEMENT – Not Supplemented

VII. ADDITIONAL PROVISIONS – NOTIFICATION LEVELS – Not Supplemented

VIII. DEFINITIONS – This section is an addition to Standard Provisions (Attachment D)

More definitions can be found in Attachment A of this NPDES Permit.

1. Arithmetic Calculations

   a. Geometric mean is the antilog of the log mean or the back-transformed mean of the logarithmically transformed variables, which is equivalent to the multiplication of the antilogarithms. The geometric mean can be calculated with either of the following equations:

   $$\text{Geometric Mean} = Anti\log\left(\frac{1}{N}\sum_{i=1}^{N} Log(C_i)\right)$$

   or

   $$\text{Geometric Mean} = (C_1 * C_2 * \ldots * C_N)^{1/N}$$

   Where "N" is the number of data points for the period analyzed and "C" is the concentration for each of the "N" data points.

   b. Mass emission rate is obtained from the following calculation for any calendar day:

   $$\text{Mass emission rate (lb/day)} = \frac{8.345}{N}\sum_{i=1}^{N} Q_i C_i$$

   $$\text{Mass emission rate (kg/day)} = \frac{3.785}{N}\sum_{i=1}^{N} Q_i C_i$$

   In which "N" is the number of samples analyzed in any calendar day and "Q_i" and "C_i" are the flow rate (MGD) and the constituent concentration (mg/L) associated with each of the "N" grab samples that may be taken in any calendar day. If a composite sample is taken, "C_i" is the concentration measured in the composite sample and "Q_i" is the average flow rate occurring during the period over which the samples are composited. The daily concentration of a constituent measured over any calendar day shall be determined from the flow-weighted average of the same constituent in the combined waste streams as follows:

Cd = Average daily concentration = $\frac{1}{Q_t}\sum_{i=1}^{N} Q_i C_i$

In which "N" is the number of component waste streams and "Q" and "C" are the flow rate (MGD) and the constituent concentration (mg/L) associated with each of the "N" waste streams. "Q_t" is the total flow rate of the combined waste streams.

c. Maximum allowable mass emission rate, whether for a 24-hour, weekly 7-day, monthly 30-day, or 6-month period, is a limitation expressed as a daily rate determined with the formulas in the paragraph above, using the effluent concentration limit specified in the permit for the period and the specified allowable flow.

d. POTW removal efficiency is the ratio of pollutants removed by the treatment facilities to pollutants entering the treatment facilities (expressed as a percentage). The Discharger shall determine removal efficiencies using monthly averages (by calendar month unless otherwise specified) of pollutant concentration of influent and effluent samples collected at about the same time and using the following equation (or its equivalent):

Removal Efficiency (%) = 100 × [1-(Effluent Concentration/Influent Concentration)]

2. Biosolids means the solids, semi-liquid suspensions of solids, residues, screenings, grit, scum, and precipitates separated from or created in wastewater by the unit processes of a treatment system. It also includes, but is not limited to, all supernatant, filtrate, centrate, decantate, and thickener overflow and underflow in the solids handling parts of the wastewater treatment system.

3. Blending is the practice of recombining wastewater that has been biologically treated with wastewater that has bypassed around biological treatment units.

4. Bottom sediment sample is (1) a separate grab sample taken at each sampling station for the determination of selected physical-chemical parameters, or (2) four grab samples collected from different locations in the immediate vicinity of a sampling station while the boat is anchored and analyzed separately for macroinvertebrates.

5. Composite sample is a sample composed of individual grab samples collected manually or by an automatic sampling device on the basis of time or flow as specified in the MRP. For flow-based composites, the proportion of each grab sample included in the composite sample shall be within plus or minus five percent (+/-5%) of the representative flow rate of the waste stream being measured at the time of grab sample collection. Alternatively, equal volume grab samples may be individually analyzed with the flow-weighted average calculated by averaging flow-weighted ratios of each grab sample analytical result. Grab samples comprising time-based composite samples shall be collected at intervals not greater than those specified in the MRP. The quantity of each grab sample comprising a time-based composite sample shall be a set of flow proportional volumes as specified in the MRP. If a particular time-based or flow-based composite sampling protocol is not specified in the MRP, the Discharger shall determine and implement the most representative sampling protocol for the given parameter subject to Executive Officer approval.

6. Depth-integrated sample is defined as a water or waste sample collected by allowing a sampling device to fill during a vertical traverse in the waste or receiving water body being sampled. The Discharger shall collect depth-integrated samples in such a manner that the collected sample will be representative of the waste or water body at that sampling point.

7. Flow sample is an accurate measurement of the average daily flow volume using a properly calibrated and maintained flow measuring device.

8. Grab sample is an individual sample collected in a short period of time not exceeding 15 minutes. Grab samples represent only the condition that exists at the time the wastewater is collected.

9. Initial dilution is the process that results in the rapid and irreversible turbulent mixing of wastewater with receiving water around the point of discharge.

10. Overflow is the intentional or unintentional spilling or forcing out of untreated or partially treated wastes from a transport system (e.g., through manholes, at pump stations, and at collection points) upstream from the treatment plant headworks or from any part of a treatment plant facility.

11. Priority pollutants are those constituents referred to in 40 CFR Part 122 as promulgated in the Federal Register, Vol. 65, No. 97, Thursday, May 18, 2000, also known as the California Toxics Rule, the presence or discharge of which could reasonably be expected to interfere with maintaining designated uses.

12. Storm water means storm water runoff, snow melt runoff, and surface runoff and drainage. It excludes infiltration and runoff from agricultural land.

13. Toxic pollutant means any pollutant listed as toxic under federal Clean Water Act section 307(a)(1) or under 40 CFR 401.15.

14. Untreated waste is raw wastewater.

15. Waste, waste discharge, discharge of waste, and discharge are used interchangeably in the permit. The requirements of the permit apply to the entire volume of water, and the material therein, that is disposed of to surface and ground waters of the State of California.

Table C

List of Monitoring Parameters and Analytical Methods

CTR No.	Pollutant/Parameter	Analytical Method[10]	Minimum Levels[11] (µg/l)											
			GC	GCMS	LC	Color	FAA	GFAA	ICP	ICP MS	SPGFAA	HYD RIDE	CVAA	DCP
1.	Antimony	204.2					10	5	50	0.5	5	0.5		1000
2.	Arsenic	206.3				20		2	10	2	2	1		1000
3.	Beryllium						20	0.5	2	0.5	1			1000
4.	Cadmium	200 or 213					10	0.5	10	0.25	0.5			1000
5a.	Chromium (III)	SM 3500												
5b.	Chromium (VI)	SM 3500				10	5							1000
	Chromium (total)[12]	SM 3500					50	2	10	0.5	1			1000
6.	Copper	200.9					25	5	10	0.5	2			1000
7.	Lead	200.9					20	5	5	0.5	2			10,000
8.	Mercury	1631 (note)[13]												
9.	Nickel	249.2					50	5	20	1	5			1000
10.	Selenium	200.8 or SM 3114B or C						5	10	2	5	1		1000
11.	Silver	272.2					10	1	10	0.25	2			1000
12.	Thallium	279.2					10	2	10	1	5			1000
13.	Zinc	200 or 289					20		20	1	10			
14.	Cyanide	SM 4500 CN^- C or I				5								
15.	Asbestos (only required for dischargers to MUN waters)[14]	0100.2 [15]												
16.	2,3,7,8-TCDD and 17 congeners (Dioxin)	1613												
17.	Acrolein	603	2.0	5										
18.	Acrylonitrile	603	2.0	2										
19.	Benzene	602	0.5	2										
33.	Ethylbenzene	602	0.5	2										
39.	Toluene	602	0.5	2										
20.	Bromoform	601	0.5	2										
21.	Carbon Tetrachloride	601	0.5	2										
22.	Chlorobenzene	601	0.5	2										
23.	Chlorodibromomethane	601	0.5	2										
24.	Chloroethane	601	0.5	2										

10 The suggested method is the U.S. EPA Method unless otherwise specified (SM = Standard Methods). The Discharger may use another U.S. EPA-approved or recognized method if that method has a level of quantification below the applicable water quality objective. Where no method is suggested, the Discharger has the discretion to use any standard method.

11 Minimum levels are from the *State Implementation Policy*. They are the concentration of the lowest calibration standard for that technique based on a survey of contract laboratories. Laboratory techniques are defined as follows: GC = Gas Chromatography; GCMS = Gas Chromatography/Mass Spectrometry; LC = High Pressure Liquid Chromatography; Color = Colorimetric; FAA = Flame Atomic Absorption; GFAA = Graphite Furnace Atomic Absorption; ICP = Inductively Coupled Plasma; ICPMS = Inductively Coupled Plasma/Mass Spectrometry; SPGFAA = Stabilized Platform Graphite Furnace Atomic Absorption (i.e., U.S. EPA 200.9); Hydride = Gaseous Hydride Atomic Absorption; CVAA = Cold Vapor Atomic Absorption; DCP = Direct Current Plasma.

12 Analysis for total chromium may be substituted for analysis of chromium (III) and chromium (VI) if the concentration measured is below the lowest hexavalent chromium criterion (11 ug/l).

13 The Discharger shall use ultra-clean sampling (U.S. EPA Method 1669) and ultra-clean analytical methods (U.S. EPA Method 1631) for mercury monitoring. The minimum level for mercury is 2 ng/l (or 0.002 ug/l).

14 MUN = Municipal and Domestic Supply. This designation, if applicable, is in the Findings of the permit.

15 Determination of Asbestos Structures over 10 [micrometers] in Length in Drinking Water Using MCE Filters, U.S. EPA 600/R-94-134, June 1994.

CTR No.	Pollutant/Parameter	Analytical Method[10]	Minimum Levels[11] (µg/l)											
			GC	GCMS	LC	Color	FAA	GFAA	ICP	ICP MS	SPGFAA	HYD RIDE	CVAA	DCP
25.	2-Chloroethylvinyl Ether	601	1	1										
26.	Chloroform	601	0.5	2										
75.	1,2-Dichlorobenzene	601	0.5	2										
76.	1,3-Dichlorobenzene	601	0.5	2										
77.	1,4-Dichlorobenzene	601	0.5	2										
27.	Dichlorobromomethane	601	0.5	2										
28.	1,1-Dichloroethane	601	0.5	1										
29.	1,2-Dichloroethane	601	0.5	2										
30.	1,1-Dichloroethylene or 1,1-Dichloroethene	601	0.5	2										
31.	1,2-Dichloropropane	601	0.5	1										
32.	1,3-Dichloropropylene or 1,3-Dichloropropene	601	0.5	2										
34.	Methyl Bromide or Bromomethane	601	1.0	2										
35.	Methyl Chloride or Chloromethane	601	0.5	2										
36.	Methylene Chloride or Dichlorormethane	601	0.5	2										
37.	1,1,2,2-Tetrachloroethane	601	0.5	1										
38.	Tetrachloroethylene	601	0.5	2										
40.	1,2-Trans-Dichloroethylene	601	0.5	1										
41.	1,1,1-Trichloroethane	601	0.5	2										
42.	1,1,2-Trichloroethane	601	0.5	2										
43.	Trichloroethene	601	0.5	2										
44.	Vinyl Chloride	601	0.5	2										
45.	2-Chlorophenol	604	2	5										
46.	2,4-Dichlorophenol	604	1	5										
47.	2,4-Dimethylphenol	604	1	2										
48.	2-Methyl-4,6-Dinitrophenol or Dinitro-2-methylphenol	604	10	5										
49.	2,4-Dinitrophenol	604	5	5										
50.	2-Nitrophenol	604		10										
51.	4-Nitrophenol	604	5	10										
52.	3-Methyl-4-Chlorophenol	604	5	1										
53.	Pentachlorophenol	604	1	5										
54.	Phenol	604	1	1		50								
55.	2,4,6-Trichlorophenol	604	10	10										
56.	Acenaphthene	610 HPLC	1	1	0.5									
57.	Acenaphthylene	610 HPLC		10	0.2									
58.	Anthracene	610 HPLC		10	2									
60.	Benzo(a)Anthracene or 1,2 Benzanthracene	610 HPLC	10	5										
61.	Benzo(a)Pyrene	610 HPLC		10	2									
62.	Benzo(b)Fluoranthene or 3,4 Benzofluoranthene	610 HPLC		10	10									
63.	Benzo(ghi)Perylene	610 HPLC		5	0.1									
64.	Benzo(k)Fluoranthene	610 HPLC		10	2									
74.	Dibenzo(a,h)Anthracene	610 HPLC		10	0.1									
86.	Fluoranthene	610 HPLC	10	1	0.05									
87.	Fluorene	610 HPLC		10	0.1									
92.	Indeno(1,2,3-cd) Pyrene	610 HPLC		10	0.05									
100.	Pyrene	610 HPLC		10	0.05									
68.	Bis(2-Ethylhexyl)Phthalate	606 or 625	10	5										

CTR No.	Pollutant/Parameter	Analytical Method[10]	Minimum Levels[11] (µg/l)											
			GC	GCMS	LC	Color	FAA	GFAA	ICP	ICP MS	SPGFAA	HYD RIDE	CVAA	DCP
70.	Butylbenzyl Phthalate	606 or 625	10	10										
79.	Diethyl Phthalate	606 or 625	10	2										
80.	Dimethyl Phthalate	606 or 625	10	2										
81.	Di-n-Butyl Phthalate	606 or 625		10										
84.	Di-n-Octyl Phthalate	606 or 625		10										
59.	Benzidine	625		5										
65.	Bis(2-Chloroethoxy)Methane	625		5										
66.	Bis(2-Chloroethyl)Ether	625	10	1										
67.	Bis(2-Chloroisopropyl)Ether	625	10	2										
69.	4-Bromophenyl Phenyl Ether	625	10	5										
71.	2-Chloronaphthalene	625		10										
72.	4-Chlorophenyl Phenyl Ether	625		5										
73.	Chrysene	625		10	5									
78.	3,3'-Dichlorobenzidine	625		5										
82.	2,4-Dinitrotoluene	625	10	5										
83.	2,6-Dinitrotoluene	625		5										
85.	1,2-Diphenylhydrazine (note)[16]	625		1										
88.	Hexachlorobenzene	625	5	1										
89.	Hexachlorobutadiene	625	5	1										
90.	Hexachlorocyclopentadiene	625	5	5										
91.	Hexachloroethane	625	5	1										
93.	Isophorone	625	10	1										
94.	Naphthalene	625	10	1	0.2									
95.	Nitrobenzene	625	10	1										
96.	N-Nitrosodimethylamine	625	10	5										
97.	N-Nitrosodi-n-Propylamine	625	10	5										
98.	N-Nitrosodiphenylamine	625	10	1										
99.	Phenanthrene	625		5	0.05									
101.	1,2,4-Trichlorobenzene	625	1	5										
102.	Aldrin	608	0.005											
103.	α-BHC	608	0.01											
104.	β-BHC	608	0.005											
105.	γ-BHC (Lindane)	608	0.02											
106.	δ-BHC	608	0.005											
107.	Chlordane	608	0.1											
108.	4,4'-DDT	608	0.01											
109.	4,4'-DDE	608	0.05											
110.	4,4'-DDD	608	0.05											
111.	Dieldrin	608	0.01											
112.	Endosulfan (alpha)	608	0.02											
113.	Endosulfan (beta)	608	0.01											
114.	Endosulfan Sulfate	608	0.05											
115.	Endrin	608	0.01											
116.	Endrin Aldehyde	608	0.01											
117.	Heptachlor	608	0.01											
118.	Heptachlor Epoxide	608	0.01											

[16] Measurement for 1,2-Diphenylhydrazine may use azobenzene as a screen: if azobenzene is measured at >1 ug/l, then the Discharger shall analyze for 1,2-Diphenylhydrazine.

CTR No.	Pollutant/Parameter	Analytical Method[10]	Minimum Levels[11] (µg/l)											
			GC	GCMS	LC	Color	FAA	GFAA	ICP	ICP MS	SPGFAA	HYD RIDE	CVAA	DCP
119-125	PCBs: Aroclors 1016, 1221, 1232, 1242, 1248, 1254, 1260	608	0.5											
126.	Toxaphene	608	0.5											

APPENDIX B

WATER RECLAMATION PERMIT (ORDER NO. 87-090)

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER NO. 87-090

WATER RECLAMATION REQUIREMENTS FOR:

CITY OF ST. HELENA
NAPA COUNTY

The California Regional Water Quality Control Board, San Francisco Bay Region, (hereinafter called the Board) finds that:

1. The City of St. Helena (hereinafter called the discharger) presently operates a secondary sewage treatment plant consisting of a series of 5 ponds with a designed capacity of 0.5 million gallons per day (MGD). During the period of December 1 through April 30, pond effluent is disinfected prior to discharging to the Napa River, a water of the United States, under the National Pollutant Discharge Elimination System (NPDES). The Board has adopted a separate set of waste discharge requirements (NPDES Permit No. CA0038016) for this discharge.

2. The discharger, by application dated July 13, 1983 and supplemental technical report dated April, 1985, proposed a summertime golf course irrigation project. The Board, on November 20, 1985, has adopted water reclamation requirements in Order No. 85-133 for this project. The golf course project was never implemented. The discharger hence studied other alternatives.

3. The discharger, on March 31, 1987, submitted an amended facilities plan and proposed a summertime grassland irrigation project. Secondary treated wastewater will be disinfected and stored in pond 5 prior to being pumped to a grassland through sprinkler spray during dry months. The grassland irrigation site is located on the west bank of the Napa River, adjacent to and southeast of the treatment plant, with 87.6 acres of net irrigable land. The discharger will purchase the land, plant grass and operate the irrigation site. The discharger is both the producer and user of the reclaimed wastewater. Attachment A is a location map of the irrigation site and is hereby made a part of this Order.

4. The discharger will apply reclaimed wastewater to the grassland through low trajectory sprinklers at a controlled rate corresponding to grass evapotranspiration rate. The irrigation pumps will be provided with shutoff switches controlled by an anemometer to stop spraying when wind velocity in the field is high. A minimum of 50-foot wide buffer zone will be maintained along the Napa River bank and along the southeast and southwest boundaries. Along the southeast and southwest boundaries, the buffer zones will be irrigated by well water using spray irrigation through a separate sprinkler system. During the irrigation season, runoff from the site will be collected in perimeter ditches leading to two tail water sumps and be pumped back to the field.

5. The Board adopted a revised Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) on December 17, 1986. The water quality goals to be used in regulating water quality factors as set forth in the Basin Plan include maximum feasible reclamation or reuse of municipal, industrial, and agricultural wastewaters.

6. Section 13523 of the California Water Code provides that a Regional Board, after consultation with and reception of recommendations from the State Department of Health, and if it is determined such action to be necessary to protect the public health, safety, or welfare, shall prescribe water reclamation requirements for water which is used or proposed to be used as reclaimed water.

7. These water reclamation requirements are in conformance with the statewide reclamation criteria established by the State Department of Health Services as prescribed in Title 22, Section 60301 through Section 60355, California Administrative Code.

8. The City of St. Helena, on February 2, 1987, certified as complete a Supplemental Environmental Impact Report (EIR) on the proposed wastewater reclamation project. The EIR finds that, with the mitigation measures included in the project, the project will not have a significant adverse impact on the environment.

9. The Board has notified the discharger, and interested agencies and persons of its intent to prescribe water reclamation requirements for the proposed reuse.

10. The Board, in a public meeting, heard and considered all comments pertaining to this reuse.

IT IS HEREBY ORDERED, that the discharger, in order to meet the provisions contained in Division 7 of the California Water code and regulations adopted thereunder, shall comply with the following:

A. Prohibitions

1. The treatment, storage, distribution, or reuse of reclaimed water shall not create a nuisance as defined in Section 13050(m) of the California Water Code.

2. No reclaimed water shall be allowed to escape from the designated use area via surface flow or airborne spray.

3. Reclaimed water shall not be used as a domestic or animal water supply. There shall be no cross-connection between potable water supply and piping containing reclaimed water. Supplementing reclaimed water with water used for domestic supply shall not be allowed except through an air-gap separation.

4. No waste shall be applied to the irrigation site during rainfall, or when soils are saturated to a point where runoff is likely.

5. Reclaimed wastewater shall not be sprayed on any facility or area not designated for reclamation such as walkways, passing

vehicles, buildings, domestic water facilities or food handling facilities. Drinking water facilities shall be protected from direct or windblown reclaimed water spray.

6. The use of reclaimed water shall not cause the degradation of groundwater suitable for domestic use or cause any change in a quality parameter which would make the groundwater less suitable for irrigation use.

7. There shall be no irrigation or impoundment of reclaimed water within 500 feet of any well used for domestic supply or 100 feet of any irrigation well unless it can be demonstrated that special circumstances justify lesser distances to be acceptable.

B. Reclaimed Water Use Specifications

1. The discharger shall assure that the reclaimed wastewater is at all times an adequately oxidized, disinfected wastewater that meets the following quality limits at all times:

   In any grab sample:

a. 5-day Biochemical Oxygen Demand	40.0 mg/l, maximum
b. Dissolved Oxygen	1.0 mg/l, minimum
c. Dissolved Sulfides	0.1 mg/l, maximum

   At any point in the disinfection facilities where adequate contact with disinfectant is assured:

   d. The median number of total coliform organisms shall not exceed 23 MPN/100 ml as determined from the bacteriological results of the last seven days for which analyses have been completed, and the number of total coliform organisms shall not exceed 240 MPN/100ml in any two consecutive samples.

2. The discharger shall discontinue the pumping of reclaimed water to the irrigation site during any period in which he has reason to believe that the limits specified in B.1 above are not being met. The pumping of reclaimed water shall not be resumed until all conditions which caused the limits specified in B.1 to be violated have been corrected.

3. All equipment, including pumps, piping, valves, etc. with public access which may at any time contain reclaimed water shall be adequately and clearly identified with warning signs and the discharger shall make all necessary provisions, in addition, to inform the public that the liquid contained is reclaimed water and is unfit for human consumption.

4. The buffer zones along the site perimeter shall have a minimum allowable width of 50 feet, as measured from the end of sprinkler radius of throw to the property line. The Board may require a buffer zone width beyond 50 feet in certain areas if deemed necessary. Under no circumstances may the buffer zones

along the southeast and southwest boundaries be spray irrigated by reclaimed wastewater. Surface irrigation of these buffer zones by reclaimed wastewater is not allowed, unless a specific plan is submitted for review and approval by the Executive Officer.

5. Under no circumstances may reclaimed wastewater be used to irrigate within 100 feet of the two wells located on the reclamation site.

6. The anemometer controlled irrigation pumps must be automatically shut down whenever wind velocity at the irrigation site exceeds a preset level. The discharger shall monitor the irrigation system performance with respect to wind velocity and direction to develop an operating envelop within which the irrigation system can operate without resulting in the escaping of wastewater from the irrigation site in the form of droplets, or airborne spray. An engineering report must be generated from this monitoring effort within three months of the start of the reclamation project and be submitted, to the satisfaction of the Executive Officer, for review and approval.

7. The discharger shall manage its spray irrigation so as to minimize wastewater ponding in the spray field which could cause mosquito breeding problem.

8. Adequate time should be provided between the last irrigation and grass mowing to allow the grass to dry.

9. Irrigation site shall be fenced to restrict public access. Perimeter warning signs indicating that the reclaimed wastewater is not safe for drinking or contact should be posted at least every 500 feet with a minimum of one sign at each corner and one at each access road.

10. There shall be at least a 10-foot horizontal and 1-foot vertical separation (with the domestic water above the reclaimed water pipeline) between all pipelines transporting reclaimed water and those transporting domestic water.

11. Along the southeastern and southwestern boundaries, the operation of well water spray in the buffer zones should be managed in a manner to effectively prevent reclaimed wastewater from escaping the irrigation site in the form of droplets, airborne spray, or mist.

C. <u>Provisions</u>

1. The discharger shall comply with a Self-Monitoring Program as ordered by the Executive Officer.

2. The discharger shall permit the Board or its authorized representatives in accordance with California Water Code Section 13267(c):

(a) Entry upon premises in which an effluent source is located or in which any required records are kept.

(b) Access to copy any records required to be kept under terms and conditions of this Order.

(c) Inspection of any monitoring equipment or method required by this Order.

(d) Sampling of reclaimed water.

3. The discharger shall maintain in good working order and operate, as efficiently as possible, any facility or control system installed by the discharger to achieve compliance with this Order.

4. A contigency plan shall be developed outlining the action to be taken in the event effluent quality fails to meet required standards. The plan must be submitted for review, to the satisfaction of the Executive Officer, prior to the startup of the irrigation operation.

5. In the event of any change in control or ownership of land or water reclamation facilities presently owned or controlled by the discharger, the discharger shall notify the succeeding owner or operator of the existence of this Order by a letter, a copy of which shall be forwarded to this Board.

6. The discharger shall file with the Regional Board a report on waste discharge at least 180 days before making any material change or proposed change in the character, location, or volume of the reuse, except for emergency conditions in which case the Board shall be notified.

7. The Board will review this Order periodically and may revise the requirements when necessary.

8. After notice and opportunity for a hearing, this Order may be terminated or modified for cause, including, but not limited to:

   (a) Violation of any term or condition contained in this Order;

   (b) Obtaining this Order by misrepresentation, or failure to disclose fully all relevant facts; and

   (c) A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized reuse.

9. The water reclamation requirements previously prescribed by the Board in Order No. 85-133 is no longer applicable. Order No. 85-133 is hereby rescinded.

I, Roger B. James, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on July

15, 1987.

ROGER B. JAMES
Executive Officer

Attachments:
Location Map
Self-Monitoring Program

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

FINAL

SELF-MONITORING PROGRAM

FOR

CITY OF ST. HELENA

WASTEWATER RECLAMATION PROJECT

NAPA COUNTY

ORDER NO. 87-090

CONSISTS OF

PART A

PART A

CITY OF ST. HELENA
WASTEWATER RECLAMATION PROJECT

I. GENERAL

Reporting responsibilities of waste dischargers are specified in Sections 13225(a), 13267(b), 13268, 13383, and 13387(b) of the California Water Code and this Regional Board's Resolution No. 73-16.

The principal purposes of a monitoring program by a waste discharger or reclaimed water user, also referred to as a self-monitoring program, are:

1. To document compliance with waste discharge and/or water reclamation requirements and prohibitions established by the Regional Board.

2. To facilitate self-policing by the waste discharger or reclaimed water user in the prevention and abatement of pollution arising from waste discharge or water reclamation.

II. SAMPLING AND ANALYTICAL METHODS

Sample collection, storage, and analyses shall be performed according to the latest edition of "Standard Methods for the Examination of Water and Wastewater" prepared and published jointly by the American Public Health Association, American Water Works Association, and Water Pollution Control Federation, or other methods approved and specified by the Executive Officer of this Regional Board.

Water and waste analyses shall be performed by a laboratory approved for these analyses by the State Department of Health or a laboratory approved by the Executive Officer. The director of the laboratory whose name appears on the certification shall supervise all analytical work in his laboratory and shall sign all reports of such work submitted to the Regional Board.

All monitoring instruments and equipment shall be properly calibrated and maintained to ensure accuracy of measurements.

III. DEFINITION OF TERMS

1. A grab sample is defined as an individual sample collected in fewer than 15 minutes.

2. Standard Observations

   a. Land Retention or Pond Area

      This applies both to liquid and solid wastes confined or unconfined.

(1) Determine height of the freeboard at lowest point of dikes confining liquid wastes.

(2) Evidence of leaching liquid from area of confinement and estimated size of affected area. (Show affected area on a sketch.)

(3) Odor: presence or absence, characterization, source, and distance of travel.

(4) Estimated number of waterfowl and other water-associated birds in the pond area and vicinity.

b. Periphery of Spray Irrigation Site

(1) Evidence of reclaimed wastewater escaping the irrigation site through surface runoff or airborne spray. (Show affected area on a sketch.)

(2) Odor: presence or absence, characterization, source, and distance of travel.

(3) Evidence of surfacing or ponding of reclaimed water as well as mosquitoes breeding within the irrigation area due to excessive spray.

(4) Warning signs or notices adequately posted to inform public that the water used for irrigation is reclaimed waste.

IV. DESCRIPTION OF SAMPLING STATIONS AND SCHEDULE OF SAMPLING, ANALYSIS AND OBSERVATIONS

1. DESCRIPTION OF SAMPLING STATIONS

a. EFFLUENT

Station	Description
E-001	Located at any point in the effluent from the treatment plant, prior to being pumped to the irrigation site. (Maybe the same point as E-001-D.)
E-001-D	Located at any point in the effluent from disinfection facilities at which point adequate contact with the disinfectant is assured.

b. STORAGE PONDS

Station	Description

P-1	Located at a point in pond No. 5, within one foot of the water surface and no less than two feet from the bank, representative of the wastewater.

c. LAND OBSERVATION

Station	Description
L-1 thru L-'n'	Located at ends and midpoints of the perimeter levees of pond No.5.
I-1 thru I-'n'	Located at points spaced equidistantly around the periphery of the spray irrigation area. Points shall be separated by not more than 1000 feet. A sketch showing the stations shall be submitted with the first monitoring report and subsequent self-monitoring reports when station location is changed or a violation is noted.

d. GROUNDWATER

Station	Description
G-1	An existing well located within the irrigation site, along the southwest boundary, to be used as the irrigation source in buffer areas. This well will be sanitary sealed.
G-2	An existing well located within the irrigation site, northeastern to the center of the field. This well will be sanitary sealed.

2. SCHEDULE OF SAMPLING, ANALYSIS, AND OBSERVATIONS

a. This self-monitoring program is applicable when wastewater is reclaimed for irrigation.

b. The discharger is required to perform observations, sampling, and analyses according to the schedule given in Table I. (Attachment A)

V. REPORTS TO BE FILED WITH THE REGIONAL BOARD

1. Violation of Requirements:

In the event the discharger is unable to comply with the conditions of the water reclamation requirements and prohibitions due to:

(a) maintenance work, power failure, or breakdown of waste treatment equipment, or

(b) accidents caused by human error or negligence, or

(c) other causes such as acts of nature,

the discharger shall notify the Regional Board office by telephone as soon as he or his agents have hnowledge of the incident and confirm this notification in writing within two weeks of the telephone notification. The written report shall include pertinent information explaining reasons for the non-compliance and shall indicate what steps were taken to prevent the problems from recurring.

2. Self-Monitoring Reports

Written reports shall be filed regularly for each calendar month by the fifteenth day of the following month. The reports shall be comprised of the following:

a. Letter of Transmittal:

A letter transmitting self-monitoring reports should accompany each report. Such a letter shall include a discussion of requirement violations found during the past month and actions taken or planned for correcting violations, such as operation modifications and/or facilities expansion. If the discharger has previously submitted a detailed time schedule for correcting requirement violations, a reference to the correspondence transmitting such schedule will be satisfactory. The letter shall contain a statement by the official, under penalty of perjury, that to the best of the signer's knowledge the report is true and correct.

b. Results of Analyses and Observations

Tabulations of the results from each required analysis and/or observations specified in Table I by date, time, type of sample, and station.

c. List of Approved Analyses

(1) Listing of analyses for which the discharger is approved by the State Department of Health.

(2) List of analyses performed for the discharger by another approved laboratory (and copies of reports signed by the laboratory director of that laboratory shall also be submitted as part of the report).

I, Roger B. James, Executive Officer, do hereby certify that the foregoing Self-Monitoring Program:

1. Has been developed in accordance with the procedure set forth in this Regional Board's Resolution No. 73-16 in order to obtain data and document compliance with the Water Reclamation Requirements established in Regional Board Order No. 87-090.

2. Is effective on the date shown below.

3. May be reviewed at any time subsequent to the effective date upon written notice from the Executive Officer or request from the discharger, and revisions will be ordered by the Executive Officer.

Roger B. James

ROGER B. JAMES
Executive Officer

Effective Date: July 15, 1987

Attachments:
A. Table I
B. User's Self-Monitoring Report Form

ATTACHMENT A

TABLE I

SCHEDULE FOR SAMPLINGS, MEASUREMENTS, AND ANALYSES
CITY OF ST. HELENA

SAMPLING STATIONS	E-001		E-001-D	P-1	L-1 thru L-'n'	I-1 thru I-'n'	G-1 thru G-2
Type of Samples		G	G	G	O	O	G
Flow Rate, (MGD)	D						
5-day Biochemical Oxygen Demand		2W					
pH, (unit)		2W		M			
Dissolved Oxygen, (mg/l)		2W		M			
Dissolved Sulfides, (mg/l), (1)		2W		M			
Settleable Matter, (ml/l-hr)		2W					
Total Coliform, (MPN/100 ml)			D				M
Total Dissolved Solids, (mg/l)							Q
Nitrate, (mg/l)							Q
Applicable Standard Observations		2W			W	W (2)	

LEGEND FOR TABLE

G= Grab sample,
O= Observation,

D= Daily,
W= Once each week,
2W= Every two weeks,
M= Monthly,
Q= Quarterly,

Notes:

(1). Analyze for this item only when Dissolved Oxygen is below 2.0 mg/l.

(2). The discharger shall perform the designated observations and file the User's Report (in Attachment B) as part of the Self-Monitoring Report monthly during the irrigation period. The observation must be made during the period when reclaimed wastewater irrigation is in progress.

ATTACHMENT B

User's Self-Monitoring Report

1. Name of User: CITY OF ST. HELENA

2. Month and Year: ____________________

3. Circle dates that Reclaimed water being used: 1 2 3 4 5 6 7 8 9 10 11

12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

4. Total gallons used for the month: ____________________

5. Required weekly observations: (Fill in the date of the inspection and write "yes" or "no" for each observation.)

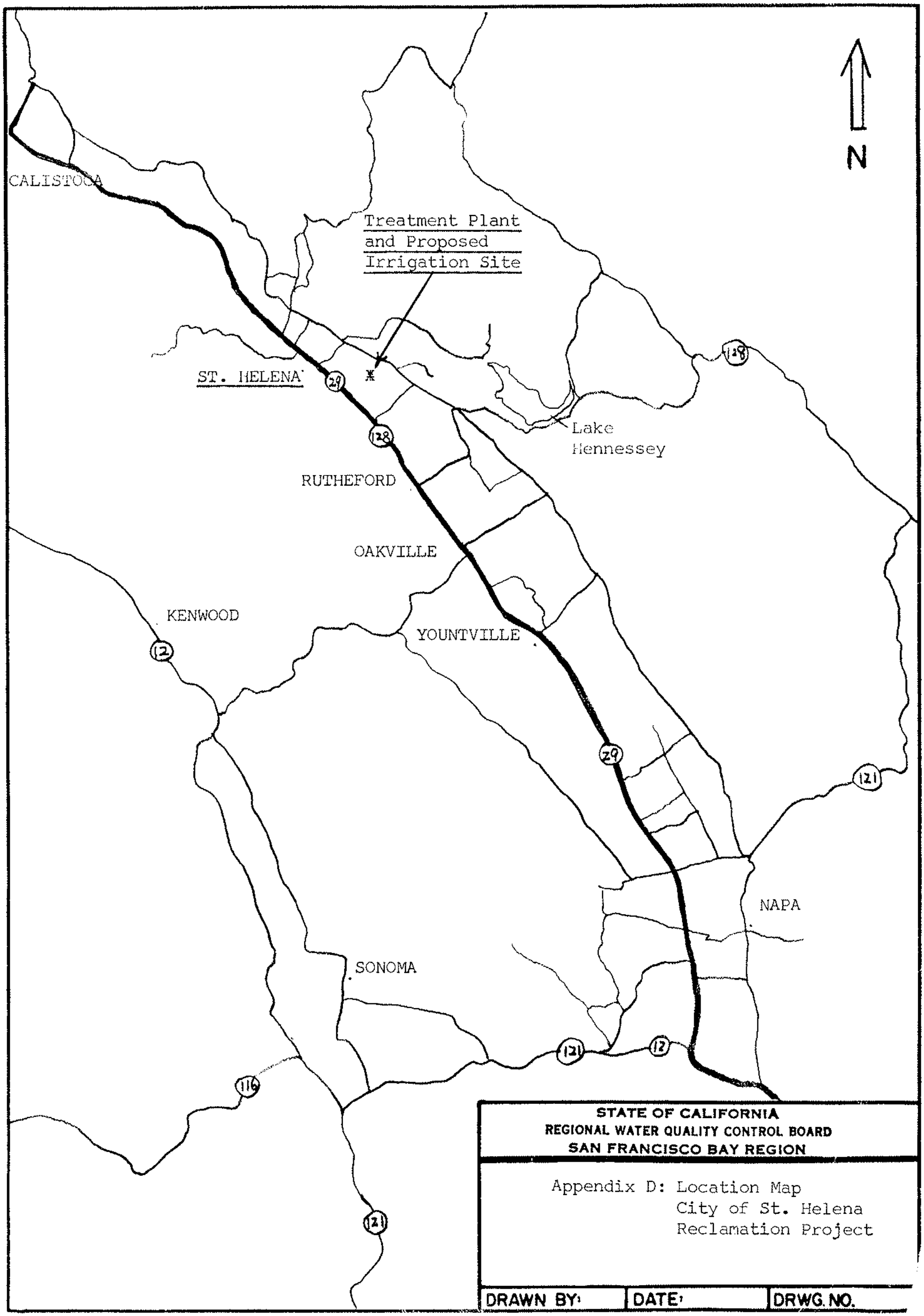
Date and Time					
Observed Escape of Wastewater from the Irrigation Site by Surface Flow or Airborne Spray					
Wastewater Used on Unauthorized Areas					
Odor from Wastewater					
Mosquitoes Breeding Resulted from Wastewater Ponding					
Warning Signs Properly Posted					
Public Contact with Wastewater					
Tailwater System Failure					
Automatic Shutoff switch being Tested and Functions Properly					

If any of the observations were yes, a written report containing the following information shall be submitted:

(1) State time when noted violation(s) was observed and show its location on a map.
(2) Explain cause and extent of violation(s) observed.
(3) Describe corrective action taken and the dates compliance was achieved and irrigation was resumed.

6. I certify that the information in this report, to the best of my knowledge, is true and correct.

____________________ Signature of Operator ________ Date



STATE OF CALIFORNIA
REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

Appendix D: Location Map
City of St. Helena
Reclamation Project

DRAWN BY:	DATE:	DRWG. NO.

APPENDIX C

CEASE AND DESIST ORDER NO. R2-2016-0004

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

CEASE AND DESIST ORDER No. R2-2016-0004

CITY OF ST. HELENA
WASTEWATER TREATMENT AND RECLAMATION PLANT
ST. HELENA, NAPA COUNTY

WHEREAS the California Regional Water Quality Control Board, San Francisco Bay Region (Regional Water Board), finds the following:

1. The City of St. Helena (Discharger) owns and operates the City of St. Helena Wastewater Treatment and Reclamation Plant (Plant), located at 1 Chaix/Thomann Lane, St. Helena. The Plant provides secondary treatment for domestic and commercial wastewater from the City of St. Helena. The Plant has an average dry weather treatment capacity of 0.5 million gallons per day (MGD) and can treat up to 2.8 MGD during wet weather. Plant treatment processes include a comminuter (solids grinder), a series of treatment ponds, chlorine disinfection, and dechlorination (by natural decomposition or ascorbic acid addition).

2. During dry weather conditions, the Plant discharges to spray irrigation fields in accordance with waste discharge requirements (Order No. 87-090). During wet weather, when the irrigation fields are saturated and discharge is necessary, the Plant discharges to the Napa River in accordance with NPDES permit No. CA0038016 (Order No. R2-2016-0003) (hereinafter, the 2016 Permit).

3. Basin Plan Table 4-1, Discharge Prohibition 1, prohibits discharges to non-tidal waters. The Napa River is non-tidal in the vicinity of St. Helena. Basin Plan section 4.2 provides for exceptions to Basin Plan Discharge Prohibition 1 under certain circumstances, including when an inordinate burden would be placed on a discharger relative to the beneficial uses protected, and an equivalent level of environmental protection can be achieved by alternate means. In reissuing the 2016 Permit, the Regional Water Board found that requiring the Discharger to build an outfall to tidal waters (over 40 miles away) or to not discharge under any circumstances, including wet weather, would impose an undue burden. In granting the exception to the discharge prohibition, the Regional Water Board determined that the Discharger must provide equivalent protection when discharging to the Napa River by ensuring that treated effluent meets the limits in Table 1 below. Therefore, the 2016 Permit imposed new, more stringent biochemical oxygen demand (BOD) and total suspended solids (TSS) effluent limits reflective of levels that can be met by implementing advanced secondary treatment:

Table 1: 2016 Permit BOD and TSS Effluent Limits

	Weekly Average	Monthly Average
BOD	25	15
TSS	20	15

Abbreviations:
BOD = biochemical oxygen demand
TSS = total dissolved solids

4. The Plant is currently designed to provide only secondary treatment, not advanced secondary treatment. Plant effluent monitoring data from January 2010 through August 2015 show many instances when the Discharger would not immediately comply with the 2016 Permit's new BOD and TSS effluent limits. Of 66 monthly results, 40 exceed the new monthly BOD limit and 58 exceed the new monthly TSS limit. Because samples were collected roughly weekly, individual results can be compared to the weekly average effluent limits. Of 162 results, 47 exceed the new weekly BOD limit and 95 exceed the new weekly TSS limits.

5. The Plant currently relies on a series of treatment ponds that use aerobic and anaerobic bacteria to reduce organic matter concentrations. To meet the 2016 Permit's new BOD and TSS effluent limits, the Discharger will likely need to incorporate filtration or another process into its treatment system. Such a process could offer an added benefit if the effluent met requirements for unrestricted recycled water use. In its May 2006 "Plant Upgrade and Water Recycling Design Memorandum," the Discharger identified about 65 acres of turf and 4,700 acres of vineyard area that could potentially be irrigated with recycled water. Of these 4,700 acres of vineyard area, 1,148 acres are within City of St. Helena limits.

6. In its March 2015 *Wastewater Facilities Evaluation Update* (Bennett Engineering Services), the Discharger described several potential modifications it could make to improve Plant performance. While the report did not analyze the feasibility of the various options to achieve advanced secondary treatment, it provided three recommendations: (1) construct solids management systems outside the treatment train to manage solids accumulation (in Pond 1) within design recommendations, (2) automate disinfection and dechlorination during river discharges, and (3) construct a rock filter system between Pond 3 and the disinfection facility to improve removal of TSS from algae growth in the ponds. If implemented, the construction of a rock filter system could facilitate compliance with the 2016 Permit's effluent limits.

7. Water Code section 13301 authorizes the Regional Water Board to issue a cease and desist order when it finds that a waste discharge is taking place, or threatening to take place, in violation of requirements or discharge prohibitions prescribed by the Regional Water Board.

8. Because the Discharger will violate or threatens to violate the effluent limits in the 2016 Permit shown in Table 1, this Cease and Desist Order is necessary to ensure that the Discharger achieves compliance. This Order establishes interim requirements and a time schedule for the Discharger to complete necessary actions to address its imminent and threatened violations.

9. Pursuant to Water Code section 13385(j)(3), mandatory minimum penalties required by Water Code sections 13385(h) and (i) do not apply when a discharger complies with a cease and desist order issued pursuant to Water Code section 13301 if the following conditions are met:

   a. The cease and desist order specifies actions the discharger must take to correct the violations that would otherwise be subject to mandatory minimum penalties;

   b. The discharger is unable to consistently comply with effluent limits because the effluent limits are new, more stringent, or modified regulatory requirements; new or modified control measures are necessary to comply with the effluent limits; and the new or modified control measures cannot be designed, installed, and put into operation within 30 calendar days;

c. The Regional Water Board establishes a time schedule of no more than five years for bringing the discharge into compliance. The time schedule must be as short as possible, taking into account the technological, operational, and economic factors that affect the design, development, and implementation of the control measures necessary to comply with the effluent limits. If the time schedule exceeds one year, it must include interim requirements and the dates for their achievement. The interim requirements must include effluent limits for the pollutants of concern and actions and milestones leading to compliance with the limits; and

d. The discharger has prepared and is implementing in a timely and proper manner a pollution prevention plan pursuant to Water Code section 13263.3.

10. Based on Water Code section 13385(j)(3), mandatory minimum penalties required by Water Code sections 13385(h) and (i) do not apply for the following reasons:

a. This Cease and Desist Order (Provisions 1 and 2 below) specifies actions the Discharger must take to correct the violations that would otherwise be subject to mandatory minimum penalties.

b. As explained in Finding 4, above, the Discharger is unable to consistently comply with the new, more stringent effluent limits in the 2016 Permit. Moreover, any control measures necessary to comply with the effluent limits (described in Findings 5 and 6, above) cannot be designed, installed, and put into operation within 30 calendar days.

c. This Cease and Desist Order (Provision 2, below) establishes a time schedule of no more than five years for bringing the discharge into compliance. The time schedule is as short as possible because it is the minimum amount of time necessary for the Discharger to modify or rebuild its treatment plant to comply with its effluent limits. As specified in Table 2, the Discharger must evaluate its potential alternatives, and then fund, design, and construct the selected alternative. These tasks are likely to take the allotted time specified in the schedule.

Although the time schedule exceeds one year, this Cease and Desist Order (Provisions 1 and 2, below) imposes interim requirements that include interim BOD and TSS effluent limits and actions and milestones leading to compliance with the limits.

d. The Discharger has prepared and is implementing a pollution prevention plan pursuant to permit requirements. The Discharger's pollution prevention plan meets the substantive requirements of Water Code section 13263.3. The pollution prevention plan aims to reduce influent concentrations of all pollutants of concern.

11. The interim effluent limits in Table 2 are based on the NPDES permit effluent limits in place prior to adoption of the 2016 Permit (i.e., those in Order No. R2-2010-0105). They are intended to ensure that the Discharger maintains at least its existing performance while completing all tasks the time schedule requires.

12. This Cease and Desist Order is an enforcement action and, as such, is exempt from the provisions of the California Environmental Quality Act (Public Resources Code § 21000 et seq.) in accordance with Title 14 of the California Code of Regulations, section 15321.

13. The Regional Water Board notified the Discharger and other interested parties of its intent to consider adoption of this Cease and Desist Order and provided an opportunity to submit written comments and appear at a public hearing. The Regional Water Board, in a public hearing, heard and considered all comments.

IT IS HEREBY ORDERED, in accordance with Water Code section 13301, that the Discharger shall cease and desist from discharging and threatening to discharge wastes in violation of its NPDES permit by complying with the following provisions:

1. **Interim Effluent Limitations.** The Discharger shall comply with the following interim effluent limits:

Table 2: Interim BOD and TSS Effluent Limits

	Weekly Average (mg/L)	Monthly Average (mg/L)
BOD	45	30
TSS	45	30

Unit:

mg/L = milligrams per liter

Abbreviations:

BOD = biochemical oxygen demand
TSS = total dissolved solids

2. **Tasks and Time Schedule.** The Discharger shall complete the actions listed in Table 3 in accordance with the time schedule provided therein. The Discharger shall implement all actions set forth for each deliverable. Upon a written request from the Discharger, with justification, the Executive Officer may modify the deadlines for tasks 2.e through 2.g to account for delays beyond the reasonable control of the Discharger, such as permitting delays by other agencies.

Table 3: Tasks and Time Schedule

Task		Deadline
a.	Submit a Draft Feasibility Study that analyzes various options to meet the NPDES permit effluent limits in Table 1. The study shall analyze all of the options described in the March 2015 *Wastewater Facilities Evaluation Update* and include other options that would achieve compliance. For each option considered, evaluate (i) the anticipated effectiveness and reliability of the treatment, (ii) the amount of time it will take to implement, (iii) the ability to produce recycled water (recycled water uses to be considered shall include those that offset local potable water use or provide environmental enhancement, including but not limited to turf and vineyard irrigation) or the additional efforts required to produce such recycled water, and (iv) the costs.	September 1, 2016
b.	Submit a Final Feasibility Study that addresses any Executive Officer comments on the Draft Feasibility Study and identifies a preferred option.	December 1, 2016

Task	Deadline
c. Submit a Draft Workplan for implementation of the preferred option identified in task 2.b and a schedule for implementation. Include a plan and schedule for funding the project.	June 1, 2017
d. Submit a Final Workplan that addresses any Executive Officer comments on the Draft Workplan required by task 2.c.	September 1, 2017
e. Submit notification documenting the beginning of implementation of the Final Workplan.	March 1, 2019
f. Submit documentation of the completion of Final Workplan implementation and begin operation of the new or modified treatment system.	September 1, 2020
g. Submit a report evaluating the effectiveness of the new or modified treatment system and whether it is likely to meet the requirements of the NPDES permit. If the system appears unlikely to meet the requirements of the NPDES permit, identify and implement measures to ensure compliance.	December 1, 2020
h. Achieve full compliance with the 2016 Permit effluent limits listed in Table 1 of this Cease and Desist Order.	February 28, 2021

3. **Consequences of Non-Compliance.** If the Discharger fails to comply with the provisions of this Cease and Desist Order, the Executive Officer is hereby authorized to request the Attorney General to take appropriate actions against the Discharger in accordance with Water Code sections 13331 and 13350. Such actions may include judicial injunctive and civil remedies and/or administrative civil liabilities.

4. **Force Majeure.**[1] If the Discharger is delayed, interrupted, or prevented from meeting the provisions and time schedules of this Cease and Desist Order due to a force majeure, the Discharger shall notify the Executive Officer in writing within ten days of the date the Discharger first knows of the force majeure. The Discharger shall demonstrate that timely compliance with the Cease and Desist Order or any affected deadlines will be actually and necessarily delayed, and that it has taken measures to avoid or mitigate the delay by exercising all reasonable precautions and efforts, whether before or after the occurrence of the force majeure.

5. **Mandatory Minimum Penalties.** Violations of the NPDES permit effluent limits listed in Table 1 shall not be subject to the mandatory minimum penalties required by Water Code sections 13385(h) and (i) as long as the Discharger complies with this Cease and Desist Order in its entirety. If the Discharger fails to comply with this Cease and Desist Order in any way, including but not limited to any interim effluent limit in Table 2 or any requirement of Table 3, the Discharger shall be subject to mandatory minimum penalties for all NPDES permit violations for the entire calendar month during which the Cease and Desist Order non-compliance occurs. If the Discharger returns to compliance, violations of the NPDES permit

[1] A "force majeure" is an event that could not have been anticipated by and is beyond the control of the Discharger, such as an act of God; earthquake, flood, or other natural disaster; civil disturbance or strike; fire or explosion; declared war within the United States; embargo; or other event of similar import and character. "Force majeure" does not include delays caused by funding, contractor performance, equipment delivery and quality, weather, permitting, other construction-related issues, CEQA challenges, initiative litigation, adverse legislation, or legal matters (with the exception of an injunction issued by a court of law specifically preventing construction from occurring).

effluent limits in Table 1 shall again not be subject to mandatory minimum penalties as of the first day of the month following the return to full compliance.

6. **Effective Date.** This Cease and Desist Order shall become effective on the effective date of the 2016 Permit.

I, Bruce H. Wolfe, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of a Cease and Desist Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on January 13, 2016.

____

Bruce H. Wolfe
Executive Officer

APPENDIX D

ST HELENA SCHEDULE UPDATE - 1-18 042919

CALIFORNIA
Water Boards

EDMUND G. BROWN JR.
GOVERNOR

MATTHEW RODRIQUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

San Francisco Bay Regional Water Quality Control Board

Sent by email
Confirmation of Receipt Requested

January 11, 2018
CW-258386

City of St. Helena
ATTN: Erica Ahmann Smithies
1480 Main Street
St. Helena, CA 94574

Subject: St. Helena Wastewater Treatment and Reclamation Plant – Groundwater Investigation and Cease and Desist Order Revised Compliance Schedule

Dear Ms. Ahmann Smithies:

We received the City's December 27, 2017, request to revise deadlines included in our September 15, 2017, letter to comply with Cease and Desist Order No. R2-2016-0004 (CDO) and the Water Board's Notice of Violation dated November 7, 2016. The City made this request because the Napa fires in October 2017 delayed the groundwater investigation. The City wishes to ensure there will be sufficient time to construct plant upgrades.

We agree that additional time to complete these tasks is appropriate. We will not initiate enforcement for the deadlines associated with CDO Table 3 or for failure to submit a complete Report of Waste Discharge as required by the November 7, 2016, Notice of Violation, as long as the City completes the following tasks according to the schedule below:

Task	Description	Due Date
1	Submit a Draft Groundwater Investigation/Fate and Transport Modeling report. The numerical model developed for the report must be capable of estimating the direction, speed, and volumetric flow of groundwater beneath and downgradient of the land application area. Additionally, the City shall characterize the impact of wastewater discharges on groundwater flow and levels. The City shall use the results of groundwater modeling work to determine the effect of wastewater discharges on groundwater. Based on these results, the City shall propose short-term strategies deemed necessary to minimize any impacts.	March 1, 2018
2	Submit the Final Groundwater Investigation/Fate and Transport Modeling report. This report shall incorporate any necessary changes in response to Water Board staff	June 1, 2018

	comments. It shall also include as-built construction drawings of the newly installed monitoring wells, a map showing the well locations, and the water quality information described in Sections 5.2 and 5.3 of the City's August 31, 2017, *Monitoring Well Installation and Monitoring Network Workplan*.	
3	Submit a Revised Feasibility Study that incorporates the groundwater report information and any necessary changes in response to Water Board staff comments.	June 1, 2018
4	Submit a Draft Interim Wastewater Discharge Management Plan that describes how the City will manage treated wastewater to protect groundwater from nutrient impacts while the City constructs its new or modified treatment system.	June 1, 2018
5	Submit the Final Feasibility Study that incorporates any necessary changes in response to Water Board staff comments.	August 1, 2018
6	Submit a Monitoring Well Installation Completion Report that documents installation of the monitoring wells.	April 1, 2018
7	Submit the Final Wastewater Discharge Management Plan that incorporates any necessary changes in response to Water Board staff comments.	August 1, 2018
8	Submit a Draft Workplan for implementing the preferred alternative selected in the Final Feasibility Study. This report shall include plans for financing the preferred alternative.	August 1, 2018
9	Submit the Final Workplan for implementing the preferred alternative that incorporates any necessary changes in response to Water Board staff comments.	October 1, 2018
10	Submit a Draft Design for the preferred alternative.	April 1, 2019
11	Submit the Final Design for the preferred alternative that incorporates any necessary changes in response to Water Board staff comments.	October 1, 2019
12	Submit documentation of the completion of Final Workplan implementation and begin operation of the new or modified treatment system. (CDO Table 3, task f)	December 1, 2021
13	Submit a report evaluating the effectiveness of the new or modified treatment system and whether it is likely to meet the requirements of the NPDES permit. Identify and implement measures to ensure compliance. (CDO Table 3, task g)	September 1, 2022
14	Achieve full compliance with the 2016 Permit effluent limits listed in CDO Table 1. (CDO Table 3, task h)	March 1, 2023
15	Submit Quarterly Groundwater Monitoring Reports providing the groundwater monitoring results of the previous quarter for the parameters listed in Section 5.2 of the City's August 31, 2017, *Monitoring Well Installation and Monitoring Network Workplan*.	Every January 1, April 1, July 1, and October 1 each year, starting April 1, 2018

You may contact Vincent Christian at (510) 622-2336 or vchristian@waterboards.ca.gov if you have any questions.

Sincerely,

Digitally signed by Bruce H. Wolfe
Date: 2018.01.11 16:07:07 -08'00'

Bruce H. Wolfe
Executive Officer

cc:

Danyal Kasapligil
Dellavalle Laboratory, Inc.
1920 W. McKinley Avenue, Suite 110
Fresno, CA 93728

Danyal Kasapligil
502 Mace Blvd, Suite 2B
Davis, CA 95618

Bean Family Vineyards, LLC
Attention: Mr. James Bean
420 Palm Street
Palo Alto, CA 94301

Jack Neal & Son Vineyard Management
Attention: Mr. Mark Neal
360 La Fata Street
St. Helena, CA 94574

Copy (sent by email):

Becky Mitschele, U.S. EPA, Region 9, becky.mitschele@epamail.epa.gov>
SWRCB DWQ, NPDES_Wastewater@waterboards.ca.gov
Ken Greenberg, U.S. EPA Region 9, greenberg.Ken@epamail.epa.gov
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Kristine Corneillie, Larry Walker Associates, KristineC@lwa.com
Friends of the Napa River, info@fonr.org
Melissa Thorme, mthorme@DowneyBrand.com

APPENDIX E
FLOW DATA

St Helena WWTRP Flow Data
Data Summary
4/22/2019
HydroScience Engineers
Data Range: February 1, 2017 to January 31, 2019 (516 Days)

Flow Parameter	**Value**	**Units**	**Notes**
Average Daily Flow	0.526	MGD	**Using February 1, 2017 to January 31, 2019 Data**
Average Dry Weather Flow	0.377	MGD	Using Average of June, July, & August of 2017 & 2018
Minimum Dry Weather Flow	0.243	MGD	Using Min of June, July, & August of 2017 & 2018
Maximum Dry Weather Flow	0.800	MGD	Using Max of June, July, & August of 2017 & 2018
Minimum Day Flow	0.197	MGD	Occurred on 10/10/2017
Average Day Max Month Flow	2.052	MGD	Using February 2017
Average Wet Weather Flow	0.772	MGD	Using Wet Months of February 1, 2017 to January 31, 2019
Peak Day Max Month Flow	3.777	MGD	Peak Day of February 2017
Peak Hour Wet Weather Flow	5.750	MGD	Using GHD Report
Min Wet Weather Flow	0.293	MGD	Using Wet Months of February 1, 2017 to January 31, 2019
Total Daily Observations	730	Days	

Influent Flow Distribution:

99 percentile of Daily Observations	2.71	MGD
98 percentile of Daily Observations	1.88	MGD
97 percentile of Daily Observations	1.542	MGD
96 percentile of Daily Observations	1.33	MGD
95 percentile of Daily Observations	1.189	MGD
90 percentile of Daily Observations	0.82	MGD
85 percentile of Daily Observations	0.65	MGD
80 percentile of Daily Observations	0.56	MGD
75 percentile of Daily Observations	0.49	MGD

Approximate Emergency Storage Volumes at Flow Percentile Plant Capacities:

98% of Daily Observations	9.74	MG	30
97% of Daily Observations	16.35	MG	44
96% of Daily Observations	21.12	MG	59
95% of Daily Observations	24.53	MG	77
90% of Daily Observations	35.06	MG	154

Available Emergency Storage	25.9	MG
Existing Tertiary Storage/EQ	34.4	MG
Approximate Storage Required at 1.33 MGD Plant Capacity	**21.12**	**MG**

	BOD	TSS	Ammonia
Average Loading, lb/day	1490	1550	300
Sustained Peak Loading, lb/day	2290	3380	460
Max Day Loading, lb/day	3630	3600	730

Initial Population (2018)	6118	Persons	
Period	25	years	
Growth Rate	0.005		Per 2006 West Yost Low Growth Approx
Future Population (2043)	6933	Persons	

Emergency Storage Volume Design Basis
St. Helena WWTRP Phase 1 Improvements

		98 Percentile Capacity 1.883 MGD		97 Percentile Capacity 1.542 MGD		**96 Percentile Capacity 1.330 MGD**		95 Percentile Capacity 1.189 MGD		90 Percentile Capacity 0.823 MGD		Design Pk Flow Capacity 1.500 MGD	
Sampling Date	**Flow (MGD)**	Flow Difference (MG)	Net Storage Volume Δ (MG)	Flow Difference (MGD)	Net Storage Volume Δ (MG)	Flow Difference (MG)	Net Storage Volume Δ (MG)	Flow Difference (MG)	Net Storage Volume Δ (MG)	Flow Difference (MG)	Net Storage Volume Δ (MG)	Flow Difference (MG)	Net Storage Volume Δ (MG)
2/1/2017	0.947	-0.936	0	-0.595	0	-0.383	0	-0.242	0	**0.124**	0.124	-0.553	0
2/2/2017	1.261	-0.622	0	-0.281	0	-0.069	0	**0.072**	0.072	**0.438**	0.562	-0.239	0
2/3/2017	1.721	-0.162	0	**0.179**	0.179	**0.391**	0.391	**0.532**	0.604	**0.898**	1.46	**0.221**	0.221
2/4/2017	1.596	-0.287	0	**0.054**	0.233	**0.266**	0.657	**0.407**	1.011	**0.773**	2.233	**0.096**	0.317
2/5/2017	1.727	-0.156	0	**0.185**	0.418	**0.397**	1.054	**0.538**	1.549	**0.904**	3.137	**0.227**	0.544
2/6/2017	2.144	**0.261**	0.261	**0.602**	1.020	**0.814**	1.868	**0.955**	2.504	**1.321**	4.458	**0.644**	1.188
2/7/2017	3.625	**1.742**	2.003	**2.083**	3.103	**2.295**	4.163	**2.436**	4.94	**2.802**	7.26	**2.125**	3.313
2/8/2017	3.438	**1.555**	3.558	**1.896**	4.999	**2.108**	6.271	**2.249**	7.189	**2.615**	9.875	**1.938**	5.251
2/9/2017	3.777	**1.894**	5.452	**2.235**	7.234	**2.447**	8.718	**2.588**	9.777	**2.954**	12.829	**2.277**	7.528
2/10/2017	2.783	**0.9**	6.352	**1.241**	8.475	**1.453**	10.171	**1.594**	11.371	**1.96**	14.789	**1.283**	8.811
2/11/2017	2.125	**0.242**	6.594	**0.583**	9.058	**0.795**	10.966	**0.936**	12.307	**1.302**	16.091	**0.625**	9.436
2/12/2017	1.778	-0.105	6.489	**0.236**	9.294	**0.448**	11.414	**0.589**	12.896	**0.955**	17.046	**0.278**	9.714
2/13/2017	1.542	-0.341	6.148	**0.000**	9.294	**0.212**	11.626	**0.353**	13.249	**0.719**	17.765	**0.042**	9.756
2/14/2017	1.37	-0.513	5.635	-0.172	9.122	**0.04**	11.666	**0.181**	13.43	**0.547**	18.312	-0.13	9.626
2/15/2017	1.338	-0.545	5.09	-0.204	8.918	**0.008**	11.674	**0.149**	13.579	**0.515**	18.827	-0.162	9.464
2/16/2017	1.591	-0.292	4.798	**0.049**	8.967	**0.261**	11.935	**0.402**	13.981	**0.768**	19.595	**0.091**	9.555
2/17/2017	2.753	**0.87**	5.668	**1.211**	10.178	**1.423**	13.358	**1.564**	15.545	**1.93**	21.525	**1.253**	10.808
2/18/2017	2.349	**0.466**	6.134	**0.807**	10.985	**1.019**	14.377	**1.16**	16.705	**1.526**	23.051	**0.849**	11.657
2/19/2017	2.125	**0.242**	6.376	**0.583**	11.568	**0.795**	15.172	**0.936**	17.641	**1.302**	24.353	**0.625**	12.282
2/20/2017	3.693	**1.81**	8.186	**2.151**	13.719	**2.363**	17.535	**2.504**	20.145	**2.87**	27.223	**2.193**	14.475
2/21/2017	3.027	**1.144**	9.33	**1.485**	15.204	**1.697**	19.232	**1.838**	21.983	**2.204**	29.427	**1.527**	16.002
2/22/2017	2.289	**0.406**	9.736	**0.747**	15.951	**0.959**	20.191	**1.1**	23.083	**1.466**	30.893	**0.789**	16.791
2/23/2017	1.883	0	9.736	**0.341**	16.292	**0.553**	20.744	**0.694**	23.777	**1.06**	31.953	**0.383**	17.174
2/24/2017	1.595	-0.288	9.448	**0.053**	16.345	**0.265**	21.009	**0.406**	24.183	**0.772**	32.725	**0.095**	17.269
2/25/2017	1.437	-0.446	9.002	-0.105	16.240	**0.107**	21.116	**0.248**	24.431	**0.614**	33.339	-0.063	17.206
2/26/2017	1.292	-0.591	8.411	-0.250	15.990	-0.038	21.078	**0.103**	24.534	**0.469**	33.808	-0.208	16.998
2/27/2017	1.189	-0.694	7.717	-0.353	15.637	-0.141	20.937	**0**	24.534	**0.366**	34.174	-0.311	16.687
2/28/2017	1.071	-0.812	6.905	-0.471	15.166	-0.259	20.678	-0.118	24.416	**0.248**	34.422	-0.429	16.258
3/1/2017	1.003	-0.88	6.025	-0.539	14.627	-0.327	20.351	-0.186	24.23	**0.18**	34.602	-0.497	15.761
3/2/2017	0.948	-0.935	5.09	-0.594	14.033	-0.382	19.969	-0.241	23.989	**0.125**	34.727	-0.552	15.209
3/3/2017	0.893	-0.99	4.1	-0.649	13.384	-0.437	19.532	-0.296	23.693	**0.07**	34.797	-0.607	14.602
3/4/2017	0.922	-0.961	3.139	-0.620	12.764	-0.408	19.124	-0.267	23.426	**0.099**	34.896	-0.578	14.024
3/5/2017	0.922	-0.961	2.178	-0.620	12.144	-0.408	18.716	-0.267	23.159	**0.099**	34.995	-0.578	13.446
3/6/2017	0.891	-0.992	1.186	-0.651	11.493	-0.439	18.277	-0.298	22.861	**0.068**	35.063	-0.609	12.837
3/7/2017	0.82	-1.063	0.123	-0.722	10.771	-0.51	17.767	-0.369	22.492	-0.003	35.06	-0.68	12.157
3/8/2017	0.758	-1.125	0	-0.784	9.987	-0.572	17.195	-0.431	22.061	-0.065	34.995	-0.742	11.415
3/9/2017	0.716	-1.167	0	-0.826	9.161	-0.614	16.581	-0.473	21.588	-0.107	34.888	-0.784	10.631
3/10/2017	0.675	-1.208	0	-0.867	8.294	-0.655	15.926	-0.514	21.074	-0.148	34.74	-0.825	9.806
3/11/2017	0.656	-1.227	0	-0.886	7.408	-0.674	15.252	-0.533	20.541	-0.167	34.573	-0.844	8.962
3/12/2017	0.608	-1.275	0	-0.934	6.474	-0.722	14.53	-0.581	19.96	-0.215	34.358	-0.892	8.07
3/13/2017	0.594	-1.289	0	-0.948	5.526	-0.736	13.794	-0.595	19.365	-0.229	34.129	-0.906	7.164
3/14/2017	0.565	-1.318	0	-0.977	4.549	-0.765	13.029	-0.624	18.741	-0.258	33.871	-0.935	6.229
3/15/2017	0.555	-1.328	0	-0.987	3.562	-0.775	12.254	-0.634	18.107	-0.268	33.603	-0.945	5.284
3/16/2017	0.546	-1.337	0	-0.996	2.566	-0.784	11.47	-0.643	17.464	-0.277	33.326	-0.954	4.33
3/17/2017	0.537	-1.346	0	-1.005	1.561	-0.793	10.677	-0.652	16.812	-0.286	33.04	-0.963	3.367
3/18/2017	0.525	-1.358	0	-1.017	0.544	-0.805	9.872	-0.664	16.148	-0.298	32.742	-0.975	2.392
3/19/2017	0.517	-1.366	0	-1.025	0	-0.813	9.059	-0.672	15.476	-0.306	32.436	-0.983	1.409
3/20/2017	0.569	-1.314	0	-0.973	0	-0.761	8.298	-0.62	14.856	-0.254	32.182	-0.931	0.478

3/21/2017	0.665	-1.218	0	-0.877	0	-0.665	7.633	-0.524	14.332	-0.158	32.024	-0.835	0
3/22/2017	0.674	-1.209	0	-0.868	0	-0.656	6.977	-0.515	13.817	-0.149	31.875	-0.826	0
3/23/2017	0.618	-1.265	0	-0.924	0	-0.712	6.265	-0.571	13.246	-0.205	31.67	-0.882	0
3/24/2017	1.058	-0.825	0	-0.484	0	-0.272	5.993	-0.131	13.115	**0.235**	31.905	-0.442	0
3/25/2017	0.924	-0.959	0	-0.618	0	-0.406	5.587	-0.265	12.85	**0.101**	32.006	-0.576	0
3/26/2017	0.833	-1.05	0	-0.709	0	-0.497	5.09	-0.356	12.494	**0.01**	32.016	-0.667	0
3/27/2017	0.824	-1.059	0	-0.718	0	-0.506	4.584	-0.365	12.129	**0.001**	32.017	-0.676	0
3/28/2017	0.717	-1.166	0	-0.825	0	-0.613	3.971	-0.472	11.657	-0.106	31.911	-0.783	0
3/29/2017	0.686	-1.197	0	-0.856	0	-0.644	3.327	-0.503	11.154	-0.137	31.774	-0.814	0
3/30/2017	0.651	-1.232	0	-0.891	0	-0.679	2.648	-0.538	10.616	-0.172	31.602	-0.849	0
3/31/2017	0.627	-1.256	0	-0.915	0	-0.703	1.945	-0.562	10.054	-0.196	31.406	-0.873	0
4/1/2017	0.595	-1.288	0	-0.947	0	-0.735	1.21	-0.594	9.46	-0.228	31.178	-0.905	0
4/2/2017	0.561	-1.322	0	-0.981	0	-0.769	0.441	-0.628	8.832	-0.262	30.916	-0.939	0
4/3/2017	0.541	-1.342	0	-1.001	0	-0.789	0	-0.648	8.184	-0.282	30.634	-0.959	0
4/4/2017	0.524	-1.359	0	-1.018	0	-0.806	0	-0.665	7.519	-0.299	30.335	-0.976	0
4/5/2017	0.517	-1.366	0	-1.025	0	-0.813	0	-0.672	6.847	-0.306	30.029	-0.983	0
4/6/2017	0.646	-1.237	0	-0.896	0	-0.684	0	-0.543	6.304	-0.177	29.852	-0.854	0
4/7/2017	0.962	-0.921	0	-0.580	0	-0.368	0	-0.227	6.077	**0.139**	29.991	-0.538	0
4/8/2017	1.017	-0.866	0	-0.525	0	-0.313	0	-0.172	5.905	**0.194**	30.185	-0.483	0
4/9/2017	0.867	-1.016	0	-0.675	0	-0.463	0	-0.322	5.583	**0.044**	30.229	-0.633	0
4/10/2017	0.792	-1.091	0	-0.750	0	-0.538	0	-0.397	5.186	-0.031	30.198	-0.708	0
4/11/2017	0.733	-1.15	0	-0.809	0	-0.597	0	-0.456	4.73	-0.09	30.108	-0.767	0
4/12/2017	0.734	-1.149	0	-0.808	0	-0.596	0	-0.455	4.275	-0.089	30.019	-0.766	0
4/13/2017	0.731	-1.152	0	-0.811	0	-0.599	0	-0.458	3.817	-0.092	29.927	-0.769	0
4/14/2017	0.672	-1.211	0	-0.870	0	-0.658	0	-0.517	3.3	-0.151	29.776	-0.828	0
4/15/2017	0.638	-1.245	0	-0.904	0	-0.692	0	-0.551	2.749	-0.185	29.591	-0.862	0
4/16/2017	0.651	-1.232	0	-0.891	0	-0.679	0	-0.538	2.211	-0.172	29.419	-0.849	0
4/17/2017	0.637	-1.246	0	-0.905	0	-0.693	0	-0.552	1.659	-0.186	29.233	-0.863	0
4/18/2017	0.616	-1.267	0	-0.926	0	-0.714	0	-0.573	1.086	-0.207	29.026	-0.884	0
4/19/2017	0.604	-1.279	0	-0.938	0	-0.726	0	-0.585	0.501	-0.219	28.807	-0.896	0
4/20/2017	0.642	-1.241	0	-0.900	0	-0.688	0	-0.547	0	-0.181	28.626	-0.858	0
4/21/2017	0.583	-1.3	0	-0.959	0	-0.747	0	-0.606	0	-0.24	28.386	-0.917	0
4/22/2017	0.563	-1.32	0	-0.979	0	-0.767	0	-0.626	0	-0.26	28.126	-0.937	0
4/23/2017	0.544	-1.339	0	-0.998	0	-0.786	0	-0.645	0	-0.279	27.847	-0.956	0
4/24/2017	0.54	-1.343	0	-1.002	0	-0.79	0	-0.649	0	-0.283	27.564	-0.96	0
4/25/2017	0.524	-1.359	0	-1.018	0	-0.806	0	-0.665	0	-0.299	27.265	-0.976	0
4/26/2017	0.517	-1.366	0	-1.025	0	-0.813	0	-0.672	0	-0.306	26.959	-0.983	0
4/27/2017	0.509	-1.374	0	-1.033	0	-0.821	0	-0.68	0	-0.314	26.645	-0.991	0
4/28/2017	0.505	-1.378	0	-1.037	0	-0.825	0	-0.684	0	-0.318	26.327	-0.995	0
4/29/2017	0.493	-1.39	0	-1.049	0	-0.837	0	-0.696	0	-0.33	25.997	-1.007	0
4/30/2017	0.483	-1.4	0	-1.059	0	-0.847	0	-0.706	0	-0.34	25.657	-1.017	0
5/1/2017	0.468	-1.415	0	-1.074	0	-0.862	0	-0.721	0	-0.355	25.302	-1.032	0
5/2/2017	0.486	-1.397	0	-1.056	0	-0.844	0	-0.703	0	-0.337	24.965	-1.014	0
5/3/2017	0.458	-1.425	0	-1.084	0	-0.872	0	-0.731	0	-0.365	24.6	-1.042	0
5/4/2017	0.456	-1.427	0	-1.086	0	-0.874	0	-0.733	0	-0.367	24.233	-1.044	0
5/5/2017	0.453	-1.43	0	-1.089	0	-0.877	0	-0.736	0	-0.37	23.863	-1.047	0
5/6/2017	0.463	-1.42	0	-1.079	0	-0.867	0	-0.726	0	-0.36	23.503	-1.037	0
5/7/2017	0.46	-1.423	0	-1.082	0	-0.87	0	-0.729	0	-0.363	23.14	-1.04	0
5/8/2017	0.44	-1.443	0	-1.102	0	-0.89	0	-0.749	0	-0.383	22.757	-1.06	0
5/9/2017	0.459	-1.424	0	-1.083	0	-0.871	0	-0.73	0	-0.364	22.393	-1.041	0
5/10/2017	0.423	-1.46	0	-1.119	0	-0.907	0	-0.766	0	-0.4	21.993	-1.077	0
5/11/2017	0.423	-1.46	0	-1.119	0	-0.907	0	-0.766	0	-0.4	21.593	-1.077	0
5/12/2017	0.45	-1.433	0	-1.092	0	-0.88	0	-0.739	0	-0.373	21.22	-1.05	0

5/13/2017	0.433	-1.45	0	-1.109	0	-0.897	0	-0.756	0	-0.39	20.83	-1.067	0
5/14/2017	0.43	-1.453	0	-1.112	0	-0.9	0	-0.759	0	-0.393	20.437	-1.07	0
5/15/2017	0.429	-1.454	0	-1.113	0	-0.901	0	-0.76	0	-0.394	20.043	-1.071	0
5/16/2017	0.416	-1.467	0	-1.126	0	-0.914	0	-0.773	0	-0.407	19.636	-1.084	0
5/17/2017	0.422	-1.461	0	-1.120	0	-0.908	0	-0.767	0	-0.401	19.235	-1.078	0
5/18/2017	0.43	-1.453	0	-1.112	0	-0.9	0	-0.759	0	-0.393	18.842	-1.07	0
5/19/2017	0.491	-1.392	0	-1.051	0	-0.839	0	-0.698	0	-0.332	18.51	-1.009	0
5/20/2017	0.436	-1.447	0	-1.106	0	-0.894	0	-0.753	0	-0.387	18.123	-1.064	0
5/21/2017	0.431	-1.452	0	-1.111	0	-0.899	0	-0.758	0	-0.392	17.731	-1.069	0
5/22/2017	0.428	-1.455	0	-1.114	0	-0.902	0	-0.761	0	-0.395	17.336	-1.072	0
5/23/2017	0.422	-1.461	0	-1.120	0	-0.908	0	-0.767	0	-0.401	16.935	-1.078	0
5/24/2017	0.423	-1.46	0	-1.119	0	-0.907	0	-0.766	0	-0.4	16.535	-1.077	0
5/25/2017	0.425	-1.458	0	-1.117	0	-0.905	0	-0.764	0	-0.398	16.137	-1.075	0
5/26/2017	0.458	-1.425	0	-1.084	0	-0.872	0	-0.731	0	-0.365	15.772	-1.042	0
5/27/2017	0.445	-1.438	0	-1.097	0	-0.885	0	-0.744	0	-0.378	15.394	-1.055	0
5/28/2017	0.429	-1.454	0	-1.113	0	-0.901	0	-0.76	0	-0.394	15	-1.071	0
5/29/2017	0.44	-1.443	0	-1.102	0	-0.89	0	-0.749	0	-0.383	14.617	-1.06	0
5/30/2017	0.414	-1.469	0	-1.128	0	-0.916	0	-0.775	0	-0.409	14.208	-1.086	0
5/31/2017	0.437	-1.446	0	-1.105	0	-0.893	0	-0.752	0	-0.386	13.822	-1.063	0
6/1/2017	0.458	-1.425	0	-1.084	0	-0.872	0	-0.731	0	-0.365	13.457	-1.042	0
6/2/2017	0.411	-1.472	0	-1.131	0	-0.919	0	-0.778	0	-0.412	13.045	-1.089	0
6/3/2017	0.409	-1.474	0	-1.133	0	-0.921	0	-0.78	0	-0.414	12.631	-1.091	0
6/4/2017	0.414	-1.469	0	-1.128	0	-0.916	0	-0.775	0	-0.409	12.222	-1.086	0
6/5/2017	0.415	-1.468	0	-1.127	0	-0.915	0	-0.774	0	-0.408	11.814	-1.085	0
6/6/2017	0.408	-1.475	0	-1.134	0	-0.922	0	-0.781	0	-0.415	11.399	-1.092	0
6/7/2017	0.41	-1.473	0	-1.132	0	-0.92	0	-0.779	0	-0.413	10.986	-1.09	0
6/8/2017	0.469	-1.414	0	-1.073	0	-0.861	0	-0.72	0	-0.354	10.632	-1.031	0
6/9/2017	0.439	-1.444	0	-1.103	0	-0.891	0	-0.75	0	-0.384	10.248	-1.061	0
6/10/2017	0.433	-1.45	0	-1.109	0	-0.897	0	-0.756	0	-0.39	9.858	-1.067	0
6/11/2017	0.422	-1.461	0	-1.120	0	-0.908	0	-0.767	0	-0.401	9.457	-1.078	0
6/12/2017	0.419	-1.464	0	-1.123	0	-0.911	0	-0.77	0	-0.404	9.053	-1.081	0
6/13/2017	0.4	-1.483	0	-1.142	0	-0.93	0	-0.789	0	-0.423	8.63	-1.1	0
6/14/2017	0.406	-1.477	0	-1.136	0	-0.924	0	-0.783	0	-0.417	8.213	-1.094	0
6/15/2017	0.453	-1.43	0	-1.089	0	-0.877	0	-0.736	0	-0.37	7.843	-1.047	0
6/16/2017	0.413	-1.47	0	-1.129	0	-0.917	0	-0.776	0	-0.41	7.433	-1.087	0
6/17/2017	0.406	-1.477	0	-1.136	0	-0.924	0	-0.783	0	-0.417	7.016	-1.094	0
6/18/2017	0.394	-1.489	0	-1.148	0	-0.936	0	-0.795	0	-0.429	6.587	-1.106	0
6/19/2017	0.407	-1.476	0	-1.135	0	-0.923	0	-0.782	0	-0.416	6.171	-1.093	0
6/20/2017	0.393	-1.49	0	-1.149	0	-0.937	0	-0.796	0	-0.43	5.741	-1.107	0
6/21/2017	0.399	-1.484	0	-1.143	0	-0.931	0	-0.79	0	-0.424	5.317	-1.101	0
6/22/2017	0.452	-1.431	0	-1.090	0	-0.878	0	-0.737	0	-0.371	4.946	-1.048	0
6/23/2017	0.41	-1.473	0	-1.132	0	-0.92	0	-0.779	0	-0.413	4.533	-1.09	0
6/24/2017	0.407	-1.476	0	-1.135	0	-0.923	0	-0.782	0	-0.416	4.117	-1.093	0
6/25/2017	0.4	-1.483	0	-1.142	0	-0.93	0	-0.789	0	-0.423	3.694	-1.1	0
6/26/2017	0.402	-1.481	0	-1.140	0	-0.928	0	-0.787	0	-0.421	3.273	-1.098	0
6/27/2017	0.385	-1.498	0	-1.157	0	-0.945	0	-0.804	0	-0.438	2.835	-1.115	0
6/28/2017	0.395	-1.488	0	-1.147	0	-0.935	0	-0.794	0	-0.428	2.407	-1.105	0
6/29/2017	0.434	-1.449	0	-1.108	0	-0.896	0	-0.755	0	-0.389	2.018	-1.066	0
6/30/2017	0.411	-1.472	0	-1.131	0	-0.919	0	-0.778	0	-0.412	1.606	-1.089	0
7/1/2017	0.428	-1.455	0	-1.114	0	-0.902	0	-0.761	0	-0.395	1.211	-1.072	0
7/2/2017	0.43	-1.453	0	-1.112	0	-0.9	0	-0.759	0	-0.393	0.818	-1.07	0
7/3/2017	0.441	-1.442	0	-1.101	0	-0.889	0	-0.748	0	-0.382	0.436	-1.059	0
7/4/2017	0.397	-1.486	0	-1.145	0	-0.933	0	-0.792	0	-0.426	0.01	-1.103	0

7/5/2017	0.414	-1.469	0	-1.128	0	-0.916	0	-0.775	0	-0.409	0	-1.086	0
7/6/2017	0.447	-1.436	0	-1.095	0	-0.883	0	-0.742	0	-0.376	0	-1.053	0
7/7/2017	0.393	-1.49	0	-1.149	0	-0.937	0	-0.796	0	-0.43	0	-1.107	0
7/8/2017	0.397	-1.486	0	-1.145	0	-0.933	0	-0.792	0	-0.426	0	-1.103	0
7/9/2017	0.382	-1.501	0	-1.160	0	-0.948	0	-0.807	0	-0.441	0	-1.118	0
7/10/2017	0.384	-1.499	0	-1.158	0	-0.946	0	-0.805	0	-0.439	0	-1.116	0
7/11/2017	0.386	-1.497	0	-1.156	0	-0.944	0	-0.803	0	-0.437	0	-1.114	0
7/12/2017	0.393	-1.49	0	-1.149	0	-0.937	0	-0.796	0	-0.43	0	-1.107	0
7/13/2017	0.445	-1.438	0	-1.097	0	-0.885	0	-0.744	0	-0.378	0	-1.055	0
7/14/2017	0.392	-1.491	0	-1.150	0	-0.938	0	-0.797	0	-0.431	0	-1.108	0
7/15/2017	0.404	-1.479	0	-1.138	0	-0.926	0	-0.785	0	-0.419	0	-1.096	0
7/16/2017	0.391	-1.492	0	-1.151	0	-0.939	0	-0.798	0	-0.432	0	-1.109	0
7/17/2017	0.394	-1.489	0	-1.148	0	-0.936	0	-0.795	0	-0.429	0	-1.106	0
7/18/2017	0.391	-1.492	0	-1.151	0	-0.939	0	-0.798	0	-0.432	0	-1.109	0
7/19/2017	0.395	-1.488	0	-1.147	0	-0.935	0	-0.794	0	-0.428	0	-1.105	0
7/20/2017	0.433	-1.45	0	-1.109	0	-0.897	0	-0.756	0	-0.39	0	-1.067	0
7/21/2017	0.398	-1.485	0	-1.144	0	-0.932	0	-0.791	0	-0.425	0	-1.102	0
7/22/2017	0.391	-1.492	0	-1.151	0	-0.939	0	-0.798	0	-0.432	0	-1.109	0
7/23/2017	0.391	-1.492	0	-1.151	0	-0.939	0	-0.798	0	-0.432	0	-1.109	0
7/24/2017	0.398	-1.485	0	-1.144	0	-0.932	0	-0.791	0	-0.425	0	-1.102	0
7/25/2017	0.386	-1.497	0	-1.156	0	-0.944	0	-0.803	0	-0.437	0	-1.114	0
7/26/2017	0.426	-1.457	0	-1.116	0	-0.904	0	-0.763	0	-0.397	0	-1.074	0
7/27/2017	0.393	-1.49	0	-1.149	0	-0.937	0	-0.796	0	-0.43	0	-1.107	0
7/28/2017	0.389	-1.494	0	-1.153	0	-0.941	0	-0.8	0	-0.434	0	-1.111	0
7/29/2017	0.403	-1.48	0	-1.139	0	-0.927	0	-0.786	0	-0.42	0	-1.097	0
7/30/2017	0.394	-1.489	0	-1.148	0	-0.936	0	-0.795	0	-0.429	0	-1.106	0
7/31/2017	0.393	-1.49	0	-1.149	0	-0.937	0	-0.796	0	-0.43	0	-1.107	0
8/1/2017	0.384	-1.499	0	-1.158	0	-0.946	0	-0.805	0	-0.439	0	-1.116	0
8/2/2017	0.37	-1.513	0	-1.172	0	-0.96	0	-0.819	0	-0.453	0	-1.13	0
8/3/2017	0.431	-1.452	0	-1.111	0	-0.899	0	-0.758	0	-0.392	0	-1.069	0
8/4/2017	0.368	-1.515	0	-1.174	0	-0.962	0	-0.821	0	-0.455	0	-1.132	0
8/5/2017	0.401	-1.482	0	-1.141	0	-0.929	0	-0.788	0	-0.422	0	-1.099	0
8/6/2017	0.369	-1.514	0	-1.173	0	-0.961	0	-0.82	0	-0.454	0	-1.131	0
8/7/2017	0.386	-1.497	0	-1.156	0	-0.944	0	-0.803	0	-0.437	0	-1.114	0
8/8/2017	0.8	-1.083	0	-0.742	0	-0.53	0	-0.389	0	-0.023	0	-0.7	0
8/9/2017	0.378	-1.505	0	-1.164	0	-0.952	0	-0.811	0	-0.445	0	-1.122	0
8/10/2017	0.433	-1.45	0	-1.109	0	-0.897	0	-0.756	0	-0.39	0	-1.067	0
8/11/2017	0.369	-1.514	0	-1.173	0	-0.961	0	-0.82	0	-0.454	0	-1.131	0
8/12/2017	0.39	-1.493	0	-1.152	0	-0.94	0	-0.799	0	-0.433	0	-1.11	0
8/13/2017	0.377	-1.506	0	-1.165	0	-0.953	0	-0.812	0	-0.446	0	-1.123	0
8/14/2017	0.383	-1.5	0	-1.159	0	-0.947	0	-0.806	0	-0.44	0	-1.117	0
8/15/2017	0.386	-1.497	0	-1.156	0	-0.944	0	-0.803	0	-0.437	0	-1.114	0
8/16/2017	0.318	-1.565	0	-1.224	0	-1.012	0	-0.871	0	-0.505	0	-1.182	0
8/17/2017	0.244	-1.639	0	-1.298	0	-1.086	0	-0.945	0	-0.579	0	-1.256	0
8/18/2017	0.243	-1.64	0	-1.299	0	-1.087	0	-0.946	0	-0.58	0	-1.257	0
8/19/2017	0.393	-1.49	0	-1.149	0	-0.937	0	-0.796	0	-0.43	0	-1.107	0
8/20/2017	0.389	-1.494	0	-1.153	0	-0.941	0	-0.8	0	-0.434	0	-1.111	0
8/21/2017	0.388	-1.495	0	-1.154	0	-0.942	0	-0.801	0	-0.435	0	-1.112	0
8/22/2017	0.353	-1.53	0	-1.189	0	-0.977	0	-0.836	0	-0.47	0	-1.147	0
8/23/2017	0.392	-1.491	0	-1.150	0	-0.938	0	-0.797	0	-0.431	0	-1.108	0
8/24/2017	0.438	-1.445	0	-1.104	0	-0.892	0	-0.751	0	-0.385	0	-1.062	0
8/25/2017	0.395	-1.488	0	-1.147	0	-0.935	0	-0.794	0	-0.428	0	-1.105	0
8/26/2017	0.401	-1.482	0	-1.141	0	-0.929	0	-0.788	0	-0.422	0	-1.099	0

8/27/2017	0.382	-1.501	0	-1.160	0	-0.948	0	-0.807	0	-0.441	0	-1.118	0
8/28/2017	0.395	-1.488	0	-1.147	0	-0.935	0	-0.794	0	-0.428	0	-1.105	0
8/29/2017	0.384	-1.499	0	-1.158	0	-0.946	0	-0.805	0	-0.439	0	-1.116	0
8/30/2017	0.388	-1.495	0	-1.154	0	-0.942	0	-0.801	0	-0.435	0	-1.112	0
8/31/2017	0.424	-1.459	0	-1.118	0	-0.906	0	-0.765	0	-0.399	0	-1.076	0
9/1/2017	0.385	-1.498	0	-1.157	0	-0.945	0	-0.804	0	-0.438	0	-1.115	0
9/2/2017	0.403	-1.48	0	-1.139	0	-0.927	0	-0.786	0	-0.42	0	-1.097	0
9/3/2017	0.392	-1.491	0	-1.150	0	-0.938	0	-0.797	0	-0.431	0	-1.108	0
9/4/2017	0.396	-1.487	0	-1.146	0	-0.934	0	-0.793	0	-0.427	0	-1.104	0
9/5/2017	0.391	-1.492	0	-1.151	0	-0.939	0	-0.798	0	-0.432	0	-1.109	0
9/6/2017	0.379	-1.504	0	-1.163	0	-0.951	0	-0.81	0	-0.444	0	-1.121	0
9/7/2017	0.448	-1.435	0	-1.094	0	-0.882	0	-0.741	0	-0.375	0	-1.052	0
9/8/2017	0.418	-1.465	0	-1.124	0	-0.912	0	-0.771	0	-0.405	0	-1.082	0
9/9/2017	0.384	-1.499	0	-1.158	0	-0.946	0	-0.805	0	-0.439	0	-1.116	0
9/10/2017	0.348	-1.535	0	-1.194	0	-0.982	0	-0.841	0	-0.475	0	-1.152	0
9/11/2017	0.389	-1.494	0	-1.153	0	-0.941	0	-0.8	0	-0.434	0	-1.111	0
9/12/2017	0.383	-1.5	0	-1.159	0	-0.947	0	-0.806	0	-0.44	0	-1.117	0
9/13/2017	0.4	-1.483	0	-1.142	0	-0.93	0	-0.789	0	-0.423	0	-1.1	0
9/14/2017	0.443	-1.44	0	-1.099	0	-0.887	0	-0.746	0	-0.38	0	-1.057	0
9/15/2017	0.407	-1.476	0	-1.135	0	-0.923	0	-0.782	0	-0.416	0	-1.093	0
9/16/2017	0.401	-1.482	0	-1.141	0	-0.929	0	-0.788	0	-0.422	0	-1.099	0
9/17/2017	0.41	-1.473	0	-1.132	0	-0.92	0	-0.779	0	-0.413	0	-1.09	0
9/18/2017	0.431	-1.452	0	-1.111	0	-0.899	0	-0.758	0	-0.392	0	-1.069	0
9/19/2017	0.347	-1.536	0	-1.195	0	-0.983	0	-0.842	0	-0.476	0	-1.153	0
9/20/2017	0.385	-1.498	0	-1.157	0	-0.945	0	-0.804	0	-0.438	0	-1.115	0
9/21/2017	0.425	-1.458	0	-1.117	0	-0.905	0	-0.764	0	-0.398	0	-1.075	0
9/22/2017	0.417	-1.466	0	-1.125	0	-0.913	0	-0.772	0	-0.406	0	-1.083	0
9/23/2017	0.392	-1.491	0	-1.150	0	-0.938	0	-0.797	0	-0.431	0	-1.108	0
9/24/2017	0.374	-1.509	0	-1.168	0	-0.956	0	-0.815	0	-0.449	0	-1.126	0
9/25/2017	0.384	-1.499	0	-1.158	0	-0.946	0	-0.805	0	-0.439	0	-1.116	0
9/26/2017	0.372	-1.511	0	-1.170	0	-0.958	0	-0.817	0	-0.451	0	-1.128	0
9/27/2017	0.375	-1.508	0	-1.167	0	-0.955	0	-0.814	0	-0.448	0	-1.125	0
9/28/2017	0.432	-1.451	0	-1.110	0	-0.898	0	-0.757	0	-0.391	0	-1.068	0
9/29/2017	0.409	-1.474	0	-1.133	0	-0.921	0	-0.78	0	-0.414	0	-1.091	0
9/30/2017	0.379	-1.504	0	-1.163	0	-0.951	0	-0.81	0	-0.444	0	-1.121	0
10/1/2017	0.355	-1.528	0	-1.187	0	-0.975	0	-0.834	0	-0.468	0	-1.145	0
10/2/2017	0.376	-1.507	0	-1.166	0	-0.954	0	-0.813	0	-0.447	0	-1.124	0
10/3/2017	0.379	-1.504	0	-1.163	0	-0.951	0	-0.81	0	-0.444	0	-1.121	0
10/4/2017	0.372	-1.511	0	-1.170	0	-0.958	0	-0.817	0	-0.451	0	-1.128	0
10/5/2017	0.434	-1.449	0	-1.108	0	-0.896	0	-0.755	0	-0.389	0	-1.066	0
10/6/2017	0.414	-1.469	0	-1.128	0	-0.916	0	-0.775	0	-0.409	0	-1.086	0
10/7/2017	0.321	-1.562	0	-1.221	0	-1.009	0	-0.868	0	-0.502	0	-1.179	0
10/8/2017	0.469	-1.414	0	-1.073	0	-0.861	0	-0.72	0	-0.354	0	-1.031	0
10/9/2017	0.209	-1.674	0	-1.333	0	-1.121	0	-0.98	0	-0.614	0	-1.291	0
10/10/2017	0.197	-1.686	0	-1.345	0	-1.133	0	-0.992	0	-0.626	0	-1.303	0
10/11/2017	0.365	-1.518	0	-1.177	0	-0.965	0	-0.824	0	-0.458	0	-1.135	0
10/12/2017	0.215	-1.668	0	-1.327	0	-1.115	0	-0.974	0	-0.608	0	-1.285	0
10/13/2017	0.251	-1.632	0	-1.291	0	-1.079	0	-0.938	0	-0.572	0	-1.249	0
10/14/2017	0.229	-1.654	0	-1.313	0	-1.101	0	-0.96	0	-0.594	0	-1.271	0
10/15/2017	0.263	-1.62	0	-1.279	0	-1.067	0	-0.926	0	-0.56	0	-1.237	0
10/16/2017	0.32	-1.563	0	-1.222	0	-1.01	0	-0.869	0	-0.503	0	-1.18	0
10/17/2017	0.325	-1.558	0	-1.217	0	-1.005	0	-0.864	0	-0.498	0	-1.175	0
10/18/2017	0.347	-1.536	0	-1.195	0	-0.983	0	-0.842	0	-0.476	0	-1.153	0

10/19/2017	0.399	-1.484	0	-1.143	0	-0.931	0	-0.79	0	-0.424	0	-1.101	0
10/20/2017	0.402	-1.481	0	-1.140	0	-0.928	0	-0.787	0	-0.421	0	-1.098	0
10/21/2017	0.34	-1.543	0	-1.202	0	-0.99	0	-0.849	0	-0.483	0	-1.16	0
10/22/2017	0.318	-1.565	0	-1.224	0	-1.012	0	-0.871	0	-0.505	0	-1.182	0
10/23/2017	0.373	-1.51	0	-1.169	0	-0.957	0	-0.816	0	-0.45	0	-1.127	0
10/24/2017	0.357	-1.526	0	-1.185	0	-0.973	0	-0.832	0	-0.466	0	-1.143	0
10/25/2017	0.365	-1.518	0	-1.177	0	-0.965	0	-0.824	0	-0.458	0	-1.135	0
10/26/2017	0.402	-1.481	0	-1.140	0	-0.928	0	-0.787	0	-0.421	0	-1.098	0
10/27/2017	0.385	-1.498	0	-1.157	0	-0.945	0	-0.804	0	-0.438	0	-1.115	0
10/28/2017	0.365	-1.518	0	-1.177	0	-0.965	0	-0.824	0	-0.458	0	-1.135	0
10/29/2017	0.407	-1.476	0	-1.135	0	-0.923	0	-0.782	0	-0.416	0	-1.093	0
10/30/2017	0.379	-1.504	0	-1.163	0	-0.951	0	-0.81	0	-0.444	0	-1.121	0
10/31/2017	0.357	-1.526	0	-1.185	0	-0.973	0	-0.832	0	-0.466	0	-1.143	0
11/1/2017	0.365	-1.518	0	-1.177	0	-0.965	0	-0.824	0	-0.458	0	-1.135	0
11/2/2017	0.456	-1.427	0	-1.086	0	-0.874	0	-0.733	0	-0.367	0	-1.044	0
11/3/2017	0.433	-1.45	0	-1.109	0	-0.897	0	-0.756	0	-0.39	0	-1.067	0
11/4/2017	0.367	-1.516	0	-1.175	0	-0.963	0	-0.822	0	-0.456	0	-1.133	0
11/5/2017	0.371	-1.512	0	-1.171	0	-0.959	0	-0.818	0	-0.452	0	-1.129	0
11/6/2017	0.386	-1.497	0	-1.156	0	-0.944	0	-0.803	0	-0.437	0	-1.114	0
11/7/2017	0.379	-1.504	0	-1.163	0	-0.951	0	-0.81	0	-0.444	0	-1.121	0
11/8/2017	0.434	-1.449	0	-1.108	0	-0.896	0	-0.755	0	-0.389	0	-1.066	0
11/9/2017	0.471	-1.412	0	-1.071	0	-0.859	0	-0.718	0	-0.352	0	-1.029	0
11/10/2017	0.435	-1.448	0	-1.107	0	-0.895	0	-0.754	0	-0.388	0	-1.065	0
11/11/2017	0.436	-1.447	0	-1.106	0	-0.894	0	-0.753	0	-0.387	0	-1.064	0
11/12/2017	0.402	-1.481	0	-1.140	0	-0.928	0	-0.787	0	-0.421	0	-1.098	0
11/13/2017	0.403	-1.48	0	-1.139	0	-0.927	0	-0.786	0	-0.42	0	-1.097	0
11/14/2017	0.396	-1.487	0	-1.146	0	-0.934	0	-0.793	0	-0.427	0	-1.104	0
11/15/2017	0.533	-1.35	0	-1.009	0	-0.797	0	-0.656	0	-0.29	0	-0.967	0
11/16/2017	0.532	-1.351	0	-1.010	0	-0.798	0	-0.657	0	-0.291	0	-0.968	0
11/17/2017	0.421	-1.462	0	-1.121	0	-0.909	0	-0.768	0	-0.402	0	-1.079	0
11/18/2017	0.43	-1.453	0	-1.112	0	-0.9	0	-0.759	0	-0.393	0	-1.07	0
11/19/2017	0.451	-1.432	0	-1.091	0	-0.879	0	-0.738	0	-0.372	0	-1.049	0
11/20/2017	0.418	-1.465	0	-1.124	0	-0.912	0	-0.771	0	-0.405	0	-1.082	0
11/21/2017	0.408	-1.475	0	-1.134	0	-0.922	0	-0.781	0	-0.415	0	-1.092	0
11/22/2017	0.393	-1.49	0	-1.149	0	-0.937	0	-0.796	0	-0.43	0	-1.107	0
11/23/2017	0.468	-1.415	0	-1.074	0	-0.862	0	-0.721	0	-0.355	0	-1.032	0
11/24/2017	0.408	-1.475	0	-1.134	0	-0.922	0	-0.781	0	-0.415	0	-1.092	0
11/25/2017	0.408	-1.475	0	-1.134	0	-0.922	0	-0.781	0	-0.415	0	-1.092	0
11/26/2017	0.501	-1.382	0	-1.041	0	-0.829	0	-0.688	0	-0.322	0	-0.999	0
11/27/2017	0.484	-1.399	0	-1.058	0	-0.846	0	-0.705	0	-0.339	0	-1.016	0
11/28/2017	0.431	-1.452	0	-1.111	0	-0.899	0	-0.758	0	-0.392	0	-1.069	0
11/29/2017	0.434	-1.449	0	-1.108	0	-0.896	0	-0.755	0	-0.389	0	-1.066	0
11/30/2017	0.415	-1.468	0	-1.127	0	-0.915	0	-0.774	0	-0.408	0	-1.085	0
12/1/2017	0.47	-1.413	0	-1.072	0	-0.86	0	-0.719	0	-0.353	0	-1.03	0
12/2/2017	0.417	-1.466	0	-1.125	0	-0.913	0	-0.772	0	-0.406	0	-1.083	0
12/3/2017	0.416	-1.467	0	-1.126	0	-0.914	0	-0.773	0	-0.407	0	-1.084	0
12/4/2017	0.413	-1.47	0	-1.129	0	-0.917	0	-0.776	0	-0.41	0	-1.087	0
12/5/2017	0.398	-1.485	0	-1.144	0	-0.932	0	-0.791	0	-0.425	0	-1.102	0
12/6/2017	0.398	-1.485	0	-1.144	0	-0.932	0	-0.791	0	-0.425	0	-1.102	0
12/7/2017	0.392	-1.491	0	-1.150	0	-0.938	0	-0.797	0	-0.431	0	-1.108	0
12/8/2017	0.404	-1.479	0	-1.138	0	-0.926	0	-0.785	0	-0.419	0	-1.096	0
12/9/2017	0.404	-1.479	0	-1.138	0	-0.926	0	-0.785	0	-0.419	0	-1.096	0
12/10/2017	0.404	-1.479	0	-1.138	0	-0.926	0	-0.785	0	-0.419	0	-1.096	0

12/11/2017	0.403	-1.48	0	-1.139	0	-0.927	0	-0.786	0	-0.42	0	-1.097	0
12/12/2017	0.376	-1.507	0	-1.166	0	-0.954	0	-0.813	0	-0.447	0	-1.124	0
12/13/2017	0.393	-1.49	0	-1.149	0	-0.937	0	-0.796	0	-0.43	0	-1.107	0
12/14/2017	0.448	-1.435	0	-1.094	0	-0.882	0	-0.741	0	-0.375	0	-1.052	0
12/15/2017	0.387	-1.496	0	-1.155	0	-0.943	0	-0.802	0	-0.436	0	-1.113	0
12/16/2017	0.394	-1.489	0	-1.148	0	-0.936	0	-0.795	0	-0.429	0	-1.106	0
12/17/2017	0.389	-1.494	0	-1.153	0	-0.941	0	-0.8	0	-0.434	0	-1.111	0
12/18/2017	0.393	-1.49	0	-1.149	0	-0.937	0	-0.796	0	-0.43	0	-1.107	0
12/19/2017	0.402	-1.481	0	-1.140	0	-0.928	0	-0.787	0	-0.421	0	-1.098	0
12/20/2017	0.397	-1.486	0	-1.145	0	-0.933	0	-0.792	0	-0.426	0	-1.103	0
12/21/2017	0.441	-1.442	0	-1.101	0	-0.889	0	-0.748	0	-0.382	0	-1.059	0
12/22/2017	0.387	-1.496	0	-1.155	0	-0.943	0	-0.802	0	-0.436	0	-1.113	0
12/23/2017	0.38	-1.503	0	-1.162	0	-0.95	0	-0.809	0	-0.443	0	-1.12	0
12/24/2017	0.377	-1.506	0	-1.165	0	-0.953	0	-0.812	0	-0.446	0	-1.123	0
12/25/2017	0.335	-1.548	0	-1.207	0	-0.995	0	-0.854	0	-0.488	0	-1.165	0
12/26/2017	0.399	-1.484	0	-1.143	0	-0.931	0	-0.79	0	-0.424	0	-1.101	0
12/27/2017	0.402	-1.481	0	-1.140	0	-0.928	0	-0.787	0	-0.421	0	-1.098	0
12/28/2017	0.449	-1.434	0	-1.093	0	-0.881	0	-0.74	0	-0.374	0	-1.051	0
12/29/2017	0.395	-1.488	0	-1.147	0	-0.935	0	-0.794	0	-0.428	0	-1.105	0
12/30/2017	0.395	-1.488	0	-1.147	0	-0.935	0	-0.794	0	-0.428	0	-1.105	0
12/31/2017	0.395	-1.488	0	-1.147	0	-0.935	0	-0.794	0	-0.428	0	-1.105	0
1/1/2018	0.337	-1.546	0	-1.205	0	-0.993	0	-0.852	0	-0.486	0	-1.163	0
1/2/2018	0.374	-1.509	0	-1.168	0	-0.956	0	-0.815	0	-0.449	0	-1.126	0
1/3/2018	0.375	-1.508	0	-1.167	0	-0.955	0	-0.814	0	-0.448	0	-1.125	0
1/4/2018	0.449	-1.434	0	-1.093	0	-0.881	0	-0.74	0	-0.374	0	-1.051	0
1/5/2018	0.441	-1.442	0	-1.101	0	-0.889	0	-0.748	0	-0.382	0	-1.059	0
1/6/2018	0.406	-1.477	0	-1.136	0	-0.924	0	-0.783	0	-0.417	0	-1.094	0
1/7/2018	0.407	-1.476	0	-1.135	0	-0.923	0	-0.782	0	-0.416	0	-1.093	0
1/8/2018	1.002	-0.881	0	-0.540	0	-0.328	0	-0.187	0	**0.179**	0.179	-0.498	0
1/9/2018	0.845	-1.038	0	-0.697	0	-0.485	0	-0.344	0	**0.022**	0.201	-0.655	0
1/10/2018	0.652	-1.231	0	-0.890	0	-0.678	0	-0.537	0	-0.171	0.03	-0.848	0
1/11/2018	0.579	-1.304	0	-0.963	0	-0.751	0	-0.61	0	-0.244	0	-0.921	0
1/12/2018	0.578	-1.305	0	-0.964	0	-0.752	0	-0.611	0	-0.245	0	-0.922	0
1/13/2018	0.52	-1.363	0	-1.022	0	-0.81	0	-0.669	0	-0.303	0	-0.98	0
1/14/2018	0.491	-1.392	0	-1.051	0	-0.839	0	-0.698	0	-0.332	0	-1.009	0
1/15/2018	0.489	-1.394	0	-1.053	0	-0.841	0	-0.7	0	-0.334	0	-1.011	0
1/16/2018	0.471	-1.412	0	-1.071	0	-0.859	0	-0.718	0	-0.352	0	-1.029	0
1/17/2018	0.447	-1.436	0	-1.095	0	-0.883	0	-0.742	0	-0.376	0	-1.053	0
1/18/2018	0.428	-1.455	0	-1.114	0	-0.902	0	-0.761	0	-0.395	0	-1.072	0
1/19/2018	0.58	-1.303	0	-0.962	0	-0.75	0	-0.609	0	-0.243	0	-0.92	0
1/20/2018	0.48	-1.403	0	-1.062	0	-0.85	0	-0.709	0	-0.343	0	-1.02	0
1/21/2018	0.293	-1.59	0	-1.249	0	-1.037	0	-0.896	0	-0.53	0	-1.207	0
1/22/2018	0.639	-1.244	0	-0.903	0	-0.691	0	-0.55	0	-0.184	0	-0.861	0
1/23/2018	0.563	-1.32	0	-0.979	0	-0.767	0	-0.626	0	-0.26	0	-0.937	0
1/24/2018	0.653	-1.23	0	-0.889	0	-0.677	0	-0.536	0	-0.17	0	-0.847	0
1/25/2018	0.687	-1.196	0	-0.855	0	-0.643	0	-0.502	0	-0.136	0	-0.813	0
1/26/2018	0.595	-1.288	0	-0.947	0	-0.735	0	-0.594	0	-0.228	0	-0.905	0
1/27/2018	0.533	-1.35	0	-1.009	0	-0.797	0	-0.656	0	-0.29	0	-0.967	0
1/28/2018	0.494	-1.389	0	-1.048	0	-0.836	0	-0.695	0	-0.329	0	-1.006	0
1/29/2018	0.472	-1.411	0	-1.070	0	-0.858	0	-0.717	0	-0.351	0	-1.028	0
1/30/2018	0.459	-1.424	0	-1.083	0	-0.871	0	-0.73	0	-0.364	0	-1.041	0
1/31/2018	0.423	-1.46	0	-1.119	0	-0.907	0	-0.766	0	-0.4	0	-1.077	0
2/1/2018	0.42199	-1.46101	0	-1.120	0	-0.90801	0	-0.76701	0	-0.40101	0	-1.07801	0

2/2/2018	0.4	-1.483	0	-1.142	0	-0.93	0	-0.789	0	-0.423	0	-1.1	0
2/3/2018	0.385	-1.498	0	-1.157	0	-0.945	0	-0.804	0	-0.438	0	-1.115	0
2/4/2018	0.402	-1.481	0	-1.140	0	-0.928	0	-0.787	0	-0.421	0	-1.098	0
2/5/2018	0.39599	-1.48701	0	-1.146	0	-0.93401	0	-0.79301	0	-0.42701	0	-1.10401	0
2/6/2018	0.397	-1.486	0	-1.145	0	-0.933	0	-0.792	0	-0.426	0	-1.103	0
2/7/2018	0.373	-1.51	0	-1.169	0	-0.957	0	-0.816	0	-0.45	0	-1.127	0
2/8/2018	0.42899	-1.45401	0	-1.113	0	-0.90101	0	-0.76001	0	-0.39401	0	-1.07101	0
2/9/2018	0.405	-1.478	0	-1.137	0	-0.925	0	-0.784	0	-0.418	0	-1.095	0
2/10/2018	0.4	-1.483	0	-1.142	0	-0.93	0	-0.789	0	-0.423	0	-1.1	0
2/11/2018	0.369	-1.514	0	-1.173	0	-0.961	0	-0.82	0	-0.454	0	-1.131	0
2/12/2018	0.401	-1.482	0	-1.141	0	-0.929	0	-0.788	0	-0.422	0	-1.099	0
2/13/2018	0.4	-1.483	0	-1.142	0	-0.93	0	-0.789	0	-0.423	0	-1.1	0
2/14/2018	0.373	-1.51	0	-1.169	0	-0.957	0	-0.816	0	-0.45	0	-1.127	0
2/15/2018	0.363	-1.52	0	-1.179	0	-0.967	0	-0.826	0	-0.46	0	-1.137	0
2/16/2018	0.363	-1.52	0	-1.179	0	-0.967	0	-0.826	0	-0.46	0	-1.137	0
2/17/2018	0.374	-1.509	0	-1.168	0	-0.956	0	-0.815	0	-0.449	0	-1.126	0
2/18/2018	0.371	-1.512	0	-1.171	0	-0.959	0	-0.818	0	-0.452	0	-1.129	0
2/19/2018	0.375	-1.508	0	-1.167	0	-0.955	0	-0.814	0	-0.448	0	-1.125	0
2/20/2018	0.359	-1.524	0	-1.183	0	-0.971	0	-0.83	0	-0.464	0	-1.141	0
2/21/2018	0.355	-1.528	0	-1.187	0	-0.975	0	-0.834	0	-0.468	0	-1.145	0
2/22/2018	0.406	-1.477	0	-1.136	0	-0.924	0	-0.783	0	-0.417	0	-1.094	0
2/23/2018	0.352	-1.531	0	-1.190	0	-0.978	0	-0.837	0	-0.471	0	-1.148	0
2/24/2018	0.364	-1.519	0	-1.178	0	-0.966	0	-0.825	0	-0.459	0	-1.136	0
2/25/2018	0.363	-1.52	0	-1.179	0	-0.967	0	-0.826	0	-0.46	0	-1.137	0
2/26/2018	0.358	-1.525	0	-1.184	0	-0.972	0	-0.831	0	-0.465	0	-1.142	0
2/27/2018	0.342	-1.541	0	-1.200	0	-0.988	0	-0.847	0	-0.481	0	-1.158	0
2/28/2018	0.44	-1.443	0	-1.102	0	-0.89	0	-0.749	0	-0.383	0	-1.06	0
3/1/2018	0.97	-0.913	0	-0.572	0	-0.36	0	-0.219	0	**0.147**	0.147	-0.53	0
3/2/2018	0.84	-1.043	0	-0.702	0	-0.49	0	-0.349	0	**0.017**	0.164	-0.66	0
3/3/2018	0.84	-1.043	0	-0.702	0	-0.49	0	-0.349	0	**0.017**	0.181	-0.66	0
3/4/2018	0.84	-1.043	0	-0.702	0	-0.49	0	-0.349	0	**0.017**	0.198	-0.66	0
3/5/2018	0.631	-1.252	0	-0.911	0	-0.699	0	-0.558	0	-0.192	0.006	-0.869	0
3/6/2018	0.58	-1.303	0	-0.962	0	-0.75	0	-0.609	0	-0.243	0	-0.92	0
3/7/2018	0.554	-1.329	0	-0.988	0	-0.776	0	-0.635	0	-0.269	0	-0.946	0
3/8/2018	0.559	-1.324	0	-0.983	0	-0.771	0	-0.63	0	-0.264	0	-0.941	0
3/9/2018	0.53	-1.353	0	-1.012	0	-0.8	0	-0.659	0	-0.293	0	-0.97	0
3/10/2018	0.495	-1.388	0	-1.047	0	-0.835	0	-0.694	0	-0.328	0	-1.005	0
3/11/2018	0.47	-1.413	0	-1.072	0	-0.86	0	-0.719	0	-0.353	0	-1.03	0
3/12/2018	0.465	-1.418	0	-1.077	0	-0.865	0	-0.724	0	-0.358	0	-1.035	0
3/13/2018	0.6	-1.283	0	-0.942	0	-0.73	0	-0.589	0	-0.223	0	-0.9	0
3/14/2018	0.584	-1.299	0	-0.958	0	-0.746	0	-0.605	0	-0.239	0	-0.916	0
3/15/2018	0.75	-1.133	0	-0.792	0	-0.58	0	-0.439	0	-0.073	0	-0.75	0
3/16/2018	0.784	-1.099	0	-0.758	0	-0.546	0	-0.405	0	-0.039	0	-0.716	0
3/17/2018	0.713	-1.17	0	-0.829	0	-0.617	0	-0.476	0	-0.11	0	-0.787	0
3/18/2018	0.651	-1.232	0	-0.891	0	-0.679	0	-0.538	0	-0.172	0	-0.849	0
3/19/2018	0.593	-1.29	0	-0.949	0	-0.737	0	-0.596	0	-0.23	0	-0.907	0
3/20/2018	0.71	-1.173	0	-0.832	0	-0.62	0	-0.479	0	-0.113	0	-0.79	0
3/21/2018	1.483	-0.4	0	-0.059	0	**0.153**	0.153	**0.294**	0.294	**0.66**	0.66	-0.017	0
3/22/2018	1.16	-0.723	0	-0.382	0	-0.17	0	-0.029	0.265	**0.337**	0.997	-0.34	0
3/23/2018	1.33	-0.553	0	-0.212	0	0	0	0.141	0.406	**0.507**	1.504	-0.17	0
3/24/2018	1.106	-0.777	0	-0.436	0	-0.224	0	-0.083	0.323	**0.283**	1.787	-0.394	0
3/25/2018	0.951	-0.932	0	-0.591	0	-0.379	0	-0.238	0.085	**0.128**	1.915	-0.549	0
3/26/2018	0.842	-1.041	0	-0.700	0	-0.488	0	-0.347	0	**0.019**	1.934	-0.658	0

3/27/2018	0.76	-1.123	0	-0.782	0	-0.57	0	-0.429	0	-0.063	1.871	-0.74	0
3/28/2018	0.718	-1.165	0	-0.824	0	-0.612	0	-0.471	0	-0.105	1.766	-0.782	0
3/29/2018	0.674	-1.209	0	-0.868	0	-0.656	0	-0.515	0	-0.149	1.617	-0.826	0
3/30/2018	0.639	-1.244	0	-0.903	0	-0.691	0	-0.55	0	-0.184	1.433	-0.861	0
3/31/2018	0.608	-1.275	0	-0.934	0	-0.722	0	-0.581	0	-0.215	1.218	-0.892	0
4/1/2018	0.589	-1.294	0	-0.953	0	-0.741	0	-0.6	0	-0.234	0.984	-0.911	0
4/2/2018	0.529	-1.354	0	-1.013	0	-0.801	0	-0.66	0	-0.294	0.69	-0.971	0
4/3/2018	0.504	-1.379	0	-1.038	0	-0.826	0	-0.685	0	-0.319	0.371	-0.996	0
4/4/2018	0.485	-1.398	0	-1.057	0	-0.845	0	-0.704	0	-0.338	0.033	-1.015	0
4/5/2018	0.562	-1.321	0	-0.980	0	-0.768	0	-0.627	0	-0.261	0	-0.938	0
4/6/2018	1.255	-0.628	0	-0.287	0	-0.075	0	**0.066**	0.066	**0.432**	0.432	-0.245	0
4/7/2018	1.239	-0.644	0	-0.303	0	-0.091	0	**0.05**	0.116	**0.416**	0.848	-0.261	0
4/8/2018	0.971	-0.912	0	-0.571	0	-0.359	0	-0.218	0	**0.148**	0.996	-0.529	0
4/9/2018	0.836	-1.047	0	-0.706	0	-0.494	0	-0.353	0	**0.013**	1.009	-0.664	0
4/10/2018	0.742	-1.141	0	-0.800	0	-0.588	0	-0.447	0	-0.081	0.928	-0.758	0
4/11/2018	0.725	-1.158	0	-0.817	0	-0.605	0	-0.464	0	-0.098	0.83	-0.775	0
4/12/2018	0.668	-1.215	0	-0.874	0	-0.662	0	-0.521	0	-0.155	0.675	-0.832	0
4/13/2018	0.63	-1.253	0	-0.912	0	-0.7	0	-0.559	0	-0.193	0.482	-0.87	0
4/14/2018	0.613	-1.27	0	-0.929	0	-0.717	0	-0.576	0	-0.21	0.272	-0.887	0
4/15/2018	0.604	-1.279	0	-0.938	0	-0.726	0	-0.585	0	-0.219	0.053	-0.896	0
4/16/2018	0.584	-1.299	0	-0.958	0	-0.746	0	-0.605	0	-0.239	0	-0.916	0
4/17/2018	0.548	-1.335	0	-0.994	0	-0.782	0	-0.641	0	-0.275	0	-0.952	0
4/18/2018	0.535	-1.348	0	-1.007	0	-0.795	0	-0.654	0	-0.288	0	-0.965	0
4/19/2018	0.56	-1.323	0	-0.982	0	-0.77	0	-0.629	0	-0.263	0	-0.94	0
4/20/2018	0.499	-1.384	0	-1.043	0	-0.831	0	-0.69	0	-0.324	0	-1.001	0
4/21/2018	0.488	-1.395	0	-1.054	0	-0.842	0	-0.701	0	-0.335	0	-1.012	0
4/22/2018	0.479	-1.404	0	-1.063	0	-0.851	0	-0.71	0	-0.344	0	-1.021	0
4/23/2018	0.465	-1.418	0	-1.077	0	-0.865	0	-0.724	0	-0.358	0	-1.035	0
4/24/2018	0.443	-1.44	0	-1.099	0	-0.887	0	-0.746	0	-0.38	0	-1.057	0
4/25/2018	0.425	-1.458	0	-1.117	0	-0.905	0	-0.764	0	-0.398	0	-1.075	0
4/26/2018	0.447	-1.436	0	-1.095	0	-0.883	0	-0.742	0	-0.376	0	-1.053	0
4/27/2018	0.443	-1.44	0	-1.099	0	-0.887	0	-0.746	0	-0.38	0	-1.057	0
4/28/2018	0.427	-1.456	0	-1.115	0	-0.903	0	-0.762	0	-0.396	0	-1.073	0
4/29/2018	0.426	-1.457	0	-1.116	0	-0.904	0	-0.763	0	-0.397	0	-1.074	0
4/30/2018	0.408	-1.475	0	-1.134	0	-0.922	0	-0.781	0	-0.415	0	-1.092	0
5/1/2018	0.416	-1.467	0	-1.126	0	-0.914	0	-0.773	0	-0.407	0	-1.084	0
5/2/2018	0.397	-1.486	0	-1.145	0	-0.933	0	-0.792	0	-0.426	0	-1.103	0
5/3/2018	0.406	-1.477	0	-1.136	0	-0.924	0	-0.783	0	-0.417	0	-1.094	0
5/4/2018	0.406	-1.477	0	-1.136	0	-0.924	0	-0.783	0	-0.417	0	-1.094	0
5/5/2018	0.402	-1.481	0	-1.140	0	-0.928	0	-0.787	0	-0.421	0	-1.098	0
5/6/2018	0.4	-1.483	0	-1.142	0	-0.93	0	-0.789	0	-0.423	0	-1.1	0
5/7/2018	0.436	-1.447	0	-1.106	0	-0.894	0	-0.753	0	-0.387	0	-1.064	0
5/8/2018	0.374	-1.509	0	-1.168	0	-0.956	0	-0.815	0	-0.449	0	-1.126	0
5/9/2018	0.377	-1.506	0	-1.165	0	-0.953	0	-0.812	0	-0.446	0	-1.123	0
5/10/2018	0.392	-1.491	0	-1.150	0	-0.938	0	-0.797	0	-0.431	0	-1.108	0
5/11/2018	0.375	-1.508	0	-1.167	0	-0.955	0	-0.814	0	-0.448	0	-1.125	0
5/12/2018	0.401	-1.482	0	-1.141	0	-0.929	0	-0.788	0	-0.422	0	-1.099	0
5/13/2018	0.394	-1.489	0	-1.148	0	-0.936	0	-0.795	0	-0.429	0	-1.106	0
5/14/2018	0.392	-1.491	0	-1.150	0	-0.938	0	-0.797	0	-0.431	0	-1.108	0
5/15/2018	0.396	-1.487	0	-1.146	0	-0.934	0	-0.793	0	-0.427	0	-1.104	0
5/16/2018	0.383	-1.5	0	-1.159	0	-0.947	0	-0.806	0	-0.44	0	-1.117	0
5/17/2018	0.441	-1.442	0	-1.101	0	-0.889	0	-0.748	0	-0.382	0	-1.059	0
5/18/2018	0.389	-1.494	0	-1.153	0	-0.941	0	-0.8	0	-0.434	0	-1.111	0

5/19/2018	0.391	-1.492	0	-1.151	0	-0.939	0	-0.798	0	-0.432	0	-1.109	0
5/20/2018	0.4	-1.483	0	-1.142	0	-0.93	0	-0.789	0	-0.423	0	-1.1	0
5/21/2018	0.369	-1.514	0	-1.173	0	-0.961	0	-0.82	0	-0.454	0	-1.131	0
5/22/2018	0.375	-1.508	0	-1.167	0	-0.955	0	-0.814	0	-0.448	0	-1.125	0
5/23/2018	0.383	-1.5	0	-1.159	0	-0.947	0	-0.806	0	-0.44	0	-1.117	0
5/24/2018	0.427	-1.456	0	-1.115	0	-0.903	0	-0.762	0	-0.396	0	-1.073	0
5/25/2018	0.39	-1.493	0	-1.152	0	-0.94	0	-0.799	0	-0.433	0	-1.11	0
5/26/2018	0.402	-1.481	0	-1.140	0	-0.928	0	-0.787	0	-0.421	0	-1.098	0
5/27/2018	0.388	-1.495	0	-1.154	0	-0.942	0	-0.801	0	-0.435	0	-1.112	0
5/28/2018	0.385	-1.498	0	-1.157	0	-0.945	0	-0.804	0	-0.438	0	-1.115	0
5/29/2018	0.382	-1.501	0	-1.160	0	-0.948	0	-0.807	0	-0.441	0	-1.118	0
5/30/2018	0.37	-1.513	0	-1.172	0	-0.96	0	-0.819	0	-0.453	0	-1.13	0
5/31/2018	0.419	-1.464	0	-1.123	0	-0.911	0	-0.77	0	-0.404	0	-1.081	0
6/1/2018	0.39	-1.493	0	-1.152	0	-0.94	0	-0.799	0	-0.433	0	-1.11	0
6/2/2018	0.382	-1.501	0	-1.160	0	-0.948	0	-0.807	0	-0.441	0	-1.118	0
6/3/2018	0.354	-1.529	0	-1.188	0	-0.976	0	-0.835	0	-0.469	0	-1.146	0
6/4/2018	0.379	-1.504	0	-1.163	0	-0.951	0	-0.81	0	-0.444	0	-1.121	0
6/5/2018	0.356	-1.527	0	-1.186	0	-0.974	0	-0.833	0	-0.467	0	-1.144	0
6/6/2018	0.368	-1.515	0	-1.174	0	-0.962	0	-0.821	0	-0.455	0	-1.132	0
6/7/2018	0.315	-1.568	0	-1.227	0	-1.015	0	-0.874	0	-0.508	0	-1.185	0
6/8/2018	0.363	-1.52	0	-1.179	0	-0.967	0	-0.826	0	-0.46	0	-1.137	0
6/9/2018	0.378	-1.505	0	-1.164	0	-0.952	0	-0.811	0	-0.445	0	-1.122	0
6/10/2018	0.369	-1.514	0	-1.173	0	-0.961	0	-0.82	0	-0.454	0	-1.131	0
6/11/2018	0.352	-1.531	0	-1.190	0	-0.978	0	-0.837	0	-0.471	0	-1.148	0
6/12/2018	0.344	-1.539	0	-1.198	0	-0.986	0	-0.845	0	-0.479	0	-1.156	0
6/13/2018	0.339	-1.544	0	-1.203	0	-0.991	0	-0.85	0	-0.484	0	-1.161	0
6/14/2018	0.389	-1.494	0	-1.153	0	-0.941	0	-0.8	0	-0.434	0	-1.111	0
6/15/2018	0.358	-1.525	0	-1.184	0	-0.972	0	-0.831	0	-0.465	0	-1.142	0
6/16/2018	0.36	-1.523	0	-1.182	0	-0.97	0	-0.829	0	-0.463	0	-1.14	0
6/17/2018	0.337	-1.546	0	-1.205	0	-0.993	0	-0.852	0	-0.486	0	-1.163	0
6/18/2018	0.356	-1.527	0	-1.186	0	-0.974	0	-0.833	0	-0.467	0	-1.144	0
6/19/2018	0.356	-1.527	0	-1.186	0	-0.974	0	-0.833	0	-0.467	0	-1.144	0
6/20/2018	0.347	-1.536	0	-1.195	0	-0.983	0	-0.842	0	-0.476	0	-1.153	0
6/21/2018	0.398	-1.485	0	-1.144	0	-0.932	0	-0.791	0	-0.425	0	-1.102	0
6/22/2018	0.355	-1.528	0	-1.187	0	-0.975	0	-0.834	0	-0.468	0	-1.145	0
6/23/2018	0.341	-1.542	0	-1.201	0	-0.989	0	-0.848	0	-0.482	0	-1.159	0
6/24/2018	0.35	-1.533	0	-1.192	0	-0.98	0	-0.839	0	-0.473	0	-1.15	0
6/25/2018	0.346	-1.537	0	-1.196	0	-0.984	0	-0.843	0	-0.477	0	-1.154	0
6/26/2018	0.338	-1.545	0	-1.204	0	-0.992	0	-0.851	0	-0.485	0	-1.162	0
6/27/2018	0.344	-1.539	0	-1.198	0	-0.986	0	-0.845	0	-0.479	0	-1.156	0
6/28/2018	0.391	-1.492	0	-1.151	0	-0.939	0	-0.798	0	-0.432	0	-1.109	0
6/29/2018	0.353	-1.53	0	-1.189	0	-0.977	0	-0.836	0	-0.47	0	-1.147	0
6/30/2018	0.366	-1.517	0	-1.176	0	-0.964	0	-0.823	0	-0.457	0	-1.134	0
7/1/2018	0.345	-1.538	0	-1.197	0	-0.985	0	-0.844	0	-0.478	0	-1.155	0
7/2/2018	0.36	-1.523	0	-1.182	0	-0.97	0	-0.829	0	-0.463	0	-1.14	0
7/3/2018	0.351	-1.532	0	-1.191	0	-0.979	0	-0.838	0	-0.472	0	-1.149	0
7/4/2018	0.334	-1.549	0	-1.208	0	-0.996	0	-0.855	0	-0.489	0	-1.166	0
7/5/2018	0.416	-1.467	0	-1.126	0	-0.914	0	-0.773	0	-0.407	0	-1.084	0
7/6/2018	0.376	-1.507	0	-1.166	0	-0.954	0	-0.813	0	-0.447	0	-1.124	0
7/7/2018	0.357	-1.526	0	-1.185	0	-0.973	0	-0.832	0	-0.466	0	-1.143	0
7/8/2018	0.346	-1.537	0	-1.196	0	-0.984	0	-0.843	0	-0.477	0	-1.154	0
7/9/2018	0.332	-1.551	0	-1.210	0	-0.998	0	-0.857	0	-0.491	0	-1.168	0
7/10/2018	0.336	-1.547	0	-1.206	0	-0.994	0	-0.853	0	-0.487	0	-1.164	0

7/11/2018	0.344	-1.539	0	-1.198	0	-0.986	0	-0.845	0	-0.479	0	-1.156	0
7/12/2018	0.4	-1.483	0	-1.142	0	-0.93	0	-0.789	0	-0.423	0	-1.1	0
7/13/2018	0.342	-1.541	0	-1.200	0	-0.988	0	-0.847	0	-0.481	0	-1.158	0
7/14/2018	0.358	-1.525	0	-1.184	0	-0.972	0	-0.831	0	-0.465	0	-1.142	0
7/15/2018	0.354	-1.529	0	-1.188	0	-0.976	0	-0.835	0	-0.469	0	-1.146	0
7/16/2018	0.338	-1.545	0	-1.204	0	-0.992	0	-0.851	0	-0.485	0	-1.162	0
7/17/2018	0.343	-1.54	0	-1.199	0	-0.987	0	-0.846	0	-0.48	0	-1.157	0
7/18/2018	0.345	-1.538	0	-1.197	0	-0.985	0	-0.844	0	-0.478	0	-1.155	0
7/19/2018	0.379	-1.504	0	-1.163	0	-0.951	0	-0.81	0	-0.444	0	-1.121	0
7/20/2018	0.353	-1.53	0	-1.189	0	-0.977	0	-0.836	0	-0.47	0	-1.147	0
7/21/2018	0.338	-1.545	0	-1.204	0	-0.992	0	-0.851	0	-0.485	0	-1.162	0
7/22/2018	0.343	-1.54	0	-1.199	0	-0.987	0	-0.846	0	-0.48	0	-1.157	0
7/23/2018	0.33	-1.553	0	-1.212	0	-1	0	-0.859	0	-0.493	0	-1.17	0
7/24/2018	0.341	-1.542	0	-1.201	0	-0.989	0	-0.848	0	-0.482	0	-1.159	0
7/25/2018	0.335	-1.548	0	-1.207	0	-0.995	0	-0.854	0	-0.488	0	-1.165	0
7/26/2018	0.381	-1.502	0	-1.161	0	-0.949	0	-0.808	0	-0.442	0	-1.119	0
7/27/2018	0.354	-1.529	0	-1.188	0	-0.976	0	-0.835	0	-0.469	0	-1.146	0
7/28/2018	0.355	-1.528	0	-1.187	0	-0.975	0	-0.834	0	-0.468	0	-1.145	0
7/29/2018	0.345	-1.538	0	-1.197	0	-0.985	0	-0.844	0	-0.478	0	-1.155	0
7/30/2018	0.344	-1.539	0	-1.198	0	-0.986	0	-0.845	0	-0.479	0	-1.156	0
7/31/2018	0.332	-1.551	0	-1.210	0	-0.998	0	-0.857	0	-0.491	0	-1.168	0
8/1/2018	0.346	-1.537	0	-1.196	0	-0.984	0	-0.843	0	-0.477	0	-1.154	0
8/2/2018	0.388	-1.495	0	-1.154	0	-0.942	0	-0.801	0	-0.435	0	-1.112	0
8/3/2018	0.342	-1.541	0	-1.200	0	-0.988	0	-0.847	0	-0.481	0	-1.158	0
8/4/2018	0.338	-1.545	0	-1.204	0	-0.992	0	-0.851	0	-0.485	0	-1.162	0
8/5/2018	0.346	-1.537	0	-1.196	0	-0.984	0	-0.843	0	-0.477	0	-1.154	0
8/6/2018	0.329	-1.554	0	-1.213	0	-1.001	0	-0.86	0	-0.494	0	-1.171	0
8/7/2018	0.339	-1.544	0	-1.203	0	-0.991	0	-0.85	0	-0.484	0	-1.161	0
8/8/2018	0.326	-1.557	0	-1.216	0	-1.004	0	-0.863	0	-0.497	0	-1.174	0
8/9/2018	0.376	-1.507	0	-1.166	0	-0.954	0	-0.813	0	-0.447	0	-1.124	0
8/10/2018	0.339	-1.544	0	-1.203	0	-0.991	0	-0.85	0	-0.484	0	-1.161	0
8/11/2018	0.342	-1.541	0	-1.200	0	-0.988	0	-0.847	0	-0.481	0	-1.158	0
8/12/2018	0.326	-1.557	0	-1.216	0	-1.004	0	-0.863	0	-0.497	0	-1.174	0
8/13/2018	0.325	-1.558	0	-1.217	0	-1.005	0	-0.864	0	-0.498	0	-1.175	0
8/14/2018	0.341	-1.542	0	-1.201	0	-0.989	0	-0.848	0	-0.482	0	-1.159	0
8/15/2018	0.329	-1.554	0	-1.213	0	-1.001	0	-0.86	0	-0.494	0	-1.171	0
8/16/2018	0.373	-1.51	0	-1.169	0	-0.957	0	-0.816	0	-0.45	0	-1.127	0
8/17/2018	0.337	-1.546	0	-1.205	0	-0.993	0	-0.852	0	-0.486	0	-1.163	0
8/18/2018	0.331	-1.552	0	-1.211	0	-0.999	0	-0.858	0	-0.492	0	-1.169	0
8/19/2018	0.331	-1.552	0	-1.211	0	-0.999	0	-0.858	0	-0.492	0	-1.169	0
8/20/2018	0.328	-1.555	0	-1.214	0	-1.002	0	-0.861	0	-0.495	0	-1.172	0
8/21/2018	0.333	-1.55	0	-1.209	0	-0.997	0	-0.856	0	-0.49	0	-1.167	0
8/22/2018	0.32	-1.563	0	-1.222	0	-1.01	0	-0.869	0	-0.503	0	-1.18	0
8/23/2018	0.37	-1.513	0	-1.172	0	-0.96	0	-0.819	0	-0.453	0	-1.13	0
8/24/2018	0.341	-1.542	0	-1.201	0	-0.989	0	-0.848	0	-0.482	0	-1.159	0
8/25/2018	0.327	-1.556	0	-1.215	0	-1.003	0	-0.862	0	-0.496	0	-1.173	0
8/26/2018	0.33	-1.553	0	-1.212	0	-1	0	-0.859	0	-0.493	0	-1.17	0
8/27/2018	0.33	-1.553	0	-1.212	0	-1	0	-0.859	0	-0.493	0	-1.17	0
8/28/2018	0.314	-1.569	0	-1.228	0	-1.016	0	-0.875	0	-0.509	0	-1.186	0
8/29/2018	0.334	-1.549	0	-1.208	0	-0.996	0	-0.855	0	-0.489	0	-1.166	0
8/30/2018	0.356	-1.527	0	-1.186	0	-0.974	0	-0.833	0	-0.467	0	-1.144	0
8/31/2018	0.327	-1.556	0	-1.215	0	-1.003	0	-0.862	0	-0.496	0	-1.173	0
9/1/2018	0.333	-1.55	0	-1.209	0	-0.997	0	-0.856	0	-0.49	0	-1.167	0

9/2/2018	0.325	-1.558	0	-1.217	0	-1.005	0	-0.864	0	-0.498	0	-1.175	0
9/3/2018	0.335	-1.548	0	-1.207	0	-0.995	0	-0.854	0	-0.488	0	-1.165	0
9/4/2018	0.325	-1.558	0	-1.217	0	-1.005	0	-0.864	0	-0.498	0	-1.175	0
9/5/2018	0.306	-1.577	0	-1.236	0	-1.024	0	-0.883	0	-0.517	0	-1.194	0
9/6/2018	0.367	-1.516	0	-1.175	0	-0.963	0	-0.822	0	-0.456	0	-1.133	0
9/7/2018	0.323	-1.56	0	-1.219	0	-1.007	0	-0.866	0	-0.5	0	-1.177	0
9/8/2018	0.325	-1.558	0	-1.217	0	-1.005	0	-0.864	0	-0.498	0	-1.175	0
9/9/2018	0.327	-1.556	0	-1.215	0	-1.003	0	-0.862	0	-0.496	0	-1.173	0
9/10/2018	0.319	-1.564	0	-1.223	0	-1.011	0	-0.87	0	-0.504	0	-1.181	0
9/11/2018	0.336	-1.547	0	-1.206	0	-0.994	0	-0.853	0	-0.487	0	-1.164	0
9/12/2018	0.324	-1.559	0	-1.218	0	-1.006	0	-0.865	0	-0.499	0	-1.176	0
9/13/2018	0.373	-1.51	0	-1.169	0	-0.957	0	-0.816	0	-0.45	0	-1.127	0
9/14/2018	0.345	-1.538	0	-1.197	0	-0.985	0	-0.844	0	-0.478	0	-1.155	0
9/15/2018	0.323	-1.56	0	-1.219	0	-1.007	0	-0.866	0	-0.5	0	-1.177	0
9/16/2018	0.323	-1.56	0	-1.219	0	-1.007	0	-0.866	0	-0.5	0	-1.177	0
9/17/2018	0.317	-1.566	0	-1.225	0	-1.013	0	-0.872	0	-0.506	0	-1.183	0
9/18/2018	0.32	-1.563	0	-1.222	0	-1.01	0	-0.869	0	-0.503	0	-1.18	0
9/19/2018	0.323	-1.56	0	-1.219	0	-1.007	0	-0.866	0	-0.5	0	-1.177	0
9/20/2018	0.375	-1.508	0	-1.167	0	-0.955	0	-0.814	0	-0.448	0	-1.125	0
9/21/2018	0.343	-1.54	0	-1.199	0	-0.987	0	-0.846	0	-0.48	0	-1.157	0
9/22/2018	0.34	-1.543	0	-1.202	0	-0.99	0	-0.849	0	-0.483	0	-1.16	0
9/23/2018	0.316	-1.567	0	-1.226	0	-1.014	0	-0.873	0	-0.507	0	-1.184	0
9/24/2018	0.326	-1.557	0	-1.216	0	-1.004	0	-0.863	0	-0.497	0	-1.174	0
9/25/2018	0.317	-1.566	0	-1.225	0	-1.013	0	-0.872	0	-0.506	0	-1.183	0
9/26/2018	0.319	-1.564	0	-1.223	0	-1.011	0	-0.87	0	-0.504	0	-1.181	0
9/27/2018	0.366	-1.517	0	-1.176	0	-0.964	0	-0.823	0	-0.457	0	-1.134	0
9/28/2018	0.338	-1.545	0	-1.204	0	-0.992	0	-0.851	0	-0.485	0	-1.162	0
9/29/2018	0.333	-1.55	0	-1.209	0	-0.997	0	-0.856	0	-0.49	0	-1.167	0
9/30/2018	0.363	-1.52	0	-1.179	0	-0.967	0	-0.826	0	-0.46	0	-1.137	0
10/1/2018	0.321	-1.562	0	-1.221	0	-1.009	0	-0.868	0	-0.502	0	-1.179	0
10/2/2018	0.406	-1.477	0	-1.136	0	-0.924	0	-0.783	0	-0.417	0	-1.094	0
10/3/2018	0.369	-1.514	0	-1.173	0	-0.961	0	-0.82	0	-0.454	0	-1.131	0
10/4/2018	0.381	-1.502	0	-1.161	0	-0.949	0	-0.808	0	-0.442	0	-1.119	0
10/5/2018	0.372	-1.511	0	-1.170	0	-0.958	0	-0.817	0	-0.451	0	-1.128	0
10/6/2018	0.346	-1.537	0	-1.196	0	-0.984	0	-0.843	0	-0.477	0	-1.154	0
10/7/2018	0.332	-1.551	0	-1.210	0	-0.998	0	-0.857	0	-0.491	0	-1.168	0
10/8/2018	0.323	-1.56	0	-1.219	0	-1.007	0	-0.866	0	-0.5	0	-1.177	0
10/9/2018	0.32	-1.563	0	-1.222	0	-1.01	0	-0.869	0	-0.503	0	-1.18	0
10/10/2018	0.33	-1.553	0	-1.212	0	-1	0	-0.859	0	-0.493	0	-1.17	0
10/11/2018	0.374	-1.509	0	-1.168	0	-0.956	0	-0.815	0	-0.449	0	-1.126	0
10/12/2018	0.343	-1.54	0	-1.199	0	-0.987	0	-0.846	0	-0.48	0	-1.157	0
10/13/2018	0.354	-1.529	0	-1.188	0	-0.976	0	-0.835	0	-0.469	0	-1.146	0
10/14/2018	0.337	-1.546	0	-1.205	0	-0.993	0	-0.852	0	-0.486	0	-1.163	0
10/15/2018	0.344	-1.539	0	-1.198	0	-0.986	0	-0.845	0	-0.479	0	-1.156	0
10/16/2018	0.313	-1.57	0	-1.229	0	-1.017	0	-0.876	0	-0.51	0	-1.187	0
10/17/2018	0.304	-1.579	0	-1.238	0	-1.026	0	-0.885	0	-0.519	0	-1.196	0
10/18/2018	0.373	-1.51	0	-1.169	0	-0.957	0	-0.816	0	-0.45	0	-1.127	0
10/19/2018	0.355	-1.528	0	-1.187	0	-0.975	0	-0.834	0	-0.468	0	-1.145	0
10/20/2018	0.337	-1.546	0	-1.205	0	-0.993	0	-0.852	0	-0.486	0	-1.163	0
10/21/2018	0.343	-1.54	0	-1.199	0	-0.987	0	-0.846	0	-0.48	0	-1.157	0
10/22/2018	0.337	-1.546	0	-1.205	0	-0.993	0	-0.852	0	-0.486	0	-1.163	0
10/23/2018	0.326	-1.557	0	-1.216	0	-1.004	0	-0.863	0	-0.497	0	-1.174	0
10/24/2018	0.336	-1.547	0	-1.206	0	-0.994	0	-0.853	0	-0.487	0	-1.164	0

10/25/2018	0.376	-1.507	0	-1.166	0	-0.954	0	-0.813	0	-0.447	0	-1.124	0
10/26/2018	0.339	-1.544	0	-1.203	0	-0.991	0	-0.85	0	-0.484	0	-1.161	0
10/27/2018	0.337	-1.546	0	-1.205	0	-0.993	0	-0.852	0	-0.486	0	-1.163	0
10/28/2018	0.329	-1.554	0	-1.213	0	-1.001	0	-0.86	0	-0.494	0	-1.171	0
10/29/2018	0.33	-1.553	0	-1.212	0	-1	0	-0.859	0	-0.493	0	-1.17	0
10/30/2018	0.31	-1.573	0	-1.232	0	-1.02	0	-0.879	0	-0.513	0	-1.19	0
10/31/2018	0.308	-1.575	0	-1.234	0	-1.022	0	-0.881	0	-0.515	0	-1.192	0
11/1/2018	0.356	-1.527	0	-1.186	0	-0.974	0	-0.833	0	-0.467	0	-1.144	0
11/2/2018	0.316	-1.567	0	-1.226	0	-1.014	0	-0.873	0	-0.507	0	-1.184	0
11/3/2018	0.33	-1.553	0	-1.212	0	-1	0	-0.859	0	-0.493	0	-1.17	0
11/4/2018	0.335	-1.548	0	-1.207	0	-0.995	0	-0.854	0	-0.488	0	-1.165	0
11/5/2018	0.322	-1.561	0	-1.220	0	-1.008	0	-0.867	0	-0.501	0	-1.178	0
11/6/2018	0.328	-1.555	0	-1.214	0	-1.002	0	-0.861	0	-0.495	0	-1.172	0
11/7/2018	0.315	-1.568	0	-1.227	0	-1.015	0	-0.874	0	-0.508	0	-1.185	0
11/8/2018	0.361	-1.522	0	-1.181	0	-0.969	0	-0.828	0	-0.462	0	-1.139	0
11/9/2018	0.333	-1.55	0	-1.209	0	-0.997	0	-0.856	0	-0.49	0	-1.167	0
11/10/2018	0.337	-1.546	0	-1.205	0	-0.993	0	-0.852	0	-0.486	0	-1.163	0
11/11/2018	0.322	-1.561	0	-1.220	0	-1.008	0	-0.867	0	-0.501	0	-1.178	0
11/12/2018	0.306	-1.577	0	-1.236	0	-1.024	0	-0.883	0	-0.517	0	-1.194	0
11/13/2018	0.328	-1.555	0	-1.214	0	-1.002	0	-0.861	0	-0.495	0	-1.172	0
11/14/2018	0.304	-1.579	0	-1.238	0	-1.026	0	-0.885	0	-0.519	0	-1.196	0
11/15/2018	0.362	-1.521	0	-1.180	0	-0.968	0	-0.827	0	-0.461	0	-1.138	0
11/16/2018	0.347	-1.536	0	-1.195	0	-0.983	0	-0.842	0	-0.476	0	-1.153	0
11/17/2018	0.319	-1.564	0	-1.223	0	-1.011	0	-0.87	0	-0.504	0	-1.181	0
11/18/2018	0.3	-1.583	0	-1.242	0	-1.03	0	-0.889	0	-0.523	0	-1.2	0
11/19/2018	0.326	-1.557	0	-1.216	0	-1.004	0	-0.863	0	-0.497	0	-1.174	0
11/20/2018	0.33	-1.553	0	-1.212	0	-1	0	-0.859	0	-0.493	0	-1.17	0
11/21/2018	0.41	-1.473	0	-1.132	0	-0.92	0	-0.779	0	-0.413	0	-1.09	0
11/22/2018	0.417	-1.466	0	-1.125	0	-0.913	0	-0.772	0	-0.406	0	-1.083	0
11/23/2018	0.459	-1.424	0	-1.083	0	-0.871	0	-0.73	0	-0.364	0	-1.041	0
11/24/2018	0.393	-1.49	0	-1.149	0	-0.937	0	-0.796	0	-0.43	0	-1.107	0
11/25/2018	0.356	-1.527	0	-1.186	0	-0.974	0	-0.833	0	-0.467	0	-1.144	0
11/26/2018	0.351	-1.532	0	-1.191	0	-0.979	0	-0.838	0	-0.472	0	-1.149	0
11/27/2018	0.356	-1.527	0	-1.186	0	-0.974	0	-0.833	0	-0.467	0	-1.144	0
11/28/2018	0.484	-1.399	0	-1.058	0	-0.846	0	-0.705	0	-0.339	0	-1.016	0
11/29/2018	0.636	-1.247	0	-0.906	0	-0.694	0	-0.553	0	-0.187	0	-0.864	0
11/30/2018	0.506	-1.377	0	-1.036	0	-0.824	0	-0.683	0	-0.317	0	-0.994	0
12/1/2018	0.51	-1.373	0	-1.032	0	-0.82	0	-0.679	0	-0.313	0	-0.99	0
12/2/2018	0.421	-1.462	0	-1.121	0	-0.909	0	-0.768	0	-0.402	0	-1.079	0
12/3/2018	0.424	-1.459	0	-1.118	0	-0.906	0	-0.765	0	-0.399	0	-1.076	0
12/4/2018	0.396	-1.487	0	-1.146	0	-0.934	0	-0.793	0	-0.427	0	-1.104	0
12/5/2018	0.422	-1.461	0	-1.120	0	-0.908	0	-0.767	0	-0.401	0	-1.078	0
12/6/2018	0.422	-1.461	0	-1.120	0	-0.908	0	-0.767	0	-0.401	0	-1.078	0
12/7/2018	0.387	-1.496	0	-1.155	0	-0.943	0	-0.802	0	-0.436	0	-1.113	0
12/8/2018	0.377	-1.506	0	-1.165	0	-0.953	0	-0.812	0	-0.446	0	-1.123	0
12/9/2018	0.354	-1.529	0	-1.188	0	-0.976	0	-0.835	0	-0.469	0	-1.146	0
12/10/2018	0.355	-1.528	0	-1.187	0	-0.975	0	-0.834	0	-0.468	0	-1.145	0
12/11/2018	0.357	-1.526	0	-1.185	0	-0.973	0	-0.832	0	-0.466	0	-1.143	0
12/12/2018	0.361	-1.522	0	-1.181	0	-0.969	0	-0.828	0	-0.462	0	-1.139	0
12/13/2018	0.397	-1.486	0	-1.145	0	-0.933	0	-0.792	0	-0.426	0	-1.103	0
12/14/2018	0.372	-1.511	0	-1.170	0	-0.958	0	-0.817	0	-0.451	0	-1.128	0
12/15/2018	0.361	-1.522	0	-1.181	0	-0.969	0	-0.828	0	-0.462	0	-1.139	0
12/16/2018	0.5	-1.383	0	-1.042	0	-0.83	0	-0.689	0	-0.323	0	-1	0

12/17/2018	0.489	-1.394	0	-1.053	0	-0.841	0	-0.7	0	-0.334	0	-1.011	0
12/18/2018	0.433	-1.45	0	-1.109	0	-0.897	0	-0.756	0	-0.39	0	-1.067	0
12/19/2018	0.416	-1.467	0	-1.126	0	-0.914	0	-0.773	0	-0.407	0	-1.084	0
12/20/2018	0.415	-1.468	0	-1.127	0	-0.915	0	-0.774	0	-0.408	0	-1.085	0
12/21/2018	0.457	-1.426	0	-1.085	0	-0.873	0	-0.732	0	-0.366	0	-1.043	0
12/22/2018	0.383	-1.5	0	-1.159	0	-0.947	0	-0.806	0	-0.44	0	-1.117	0
12/23/2018	0.391	-1.492	0	-1.151	0	-0.939	0	-0.798	0	-0.432	0	-1.109	0
12/24/2018	0.481	-1.402	0	-1.061	0	-0.849	0	-0.708	0	-0.342	0	-1.019	0
12/25/2018	0.439	-1.444	0	-1.103	0	-0.891	0	-0.75	0	-0.384	0	-1.061	0
12/26/2018	0.458	-1.425	0	-1.084	0	-0.872	0	-0.731	0	-0.365	0	-1.042	0
12/27/2018	0.445	-1.438	0	-1.097	0	-0.885	0	-0.744	0	-0.378	0	-1.055	0
12/28/2018	0.417	-1.466	0	-1.125	0	-0.913	0	-0.772	0	-0.406	0	-1.083	0
12/29/2018	0.402	-1.481	0	-1.140	0	-0.928	0	-0.787	0	-0.421	0	-1.098	0
12/30/2018	0.392	-1.491	0	-1.150	0	-0.938	0	-0.797	0	-0.431	0	-1.108	0
12/31/2018	0.399	-1.484	0	-1.143	0	-0.931	0	-0.79	0	-0.424	0	-1.101	0
1/1/2019	0.338	-1.545	0	-1.204	0	-0.992	0	-0.851	0	-0.485	0	-1.162	0
1/2/2019	0.35	-1.533	0	-1.192	0	-0.98	0	-0.839	0	-0.473	0	-1.15	0
1/3/2019	0.376	-1.507	0	-1.166	0	-0.954	0	-0.813	0	-0.447	0	-1.124	0
1/4/2019	0.412	-1.471	0	-1.130	0	-0.918	0	-0.777	0	-0.411	0	-1.088	0
1/5/2019	0.423	-1.46	0	-1.119	0	-0.907	0	-0.766	0	-0.4	0	-1.077	0
1/6/2019	1.478	-0.405	0	-0.064	0	**0.148**	0.148	**0.289**	0.289	**0.655**	0.655	-0.022	0
1/7/2019	1.126	-0.757	0	-0.416	0	-0.204	0	-0.063	0.226	**0.303**	0.958	-0.374	0
1/8/2019	0.939	-0.944	0	-0.603	0	-0.391	0	-0.25	0	**0.116**	1.074	-0.561	0
1/9/2019	1.372	-0.511	0	-0.170	0	**0.042**	0.042	**0.183**	0.183	**0.549**	1.623	-0.128	0
1/10/2019	1.123	-0.76	0	-0.419	0	-0.207	0	-0.066	0.117	**0.3**	1.923	-0.377	0
1/11/2019	0.998	-0.885	0	-0.544	0	-0.332	0	-0.191	0	**0.175**	2.098	-0.502	0
1/12/2019	0.821	-1.062	0	-0.721	0	-0.509	0	-0.368	0	-0.002	2.096	-0.679	0
1/13/2019	0.677	-1.206	0	-0.865	0	-0.653	0	-0.512	0	-0.146	1.95	-0.823	0
1/14/2019	0.717	-1.166	0	-0.825	0	-0.613	0	-0.472	0	-0.106	1.844	-0.783	0
1/15/2019	0.934	-0.949	0	-0.608	0	-0.396	0	-0.255	0	**0.111**	1.955	-0.566	0
1/16/2019	2.714	**0.831**	0.831	**1.172**	1.172	**1.384**	1.384	**1.525**	1.525	**1.891**	3.846	**1.214**	1.214
1/17/2019	2.064	**0.181**	1.012	**0.522**	1.694	**0.734**	2.118	**0.875**	2.4	**1.241**	5.087	**0.564**	1.778
1/18/2019	1.598	-0.285	0.727	**0.056**	1.750	**0.268**	2.386	**0.409**	2.809	**0.775**	5.862	**0.098**	1.876
1/19/2019	1.215	-0.668	0.059	-0.327	1.423	-0.115	2.271	**0.026**	2.835	**0.392**	6.254	-0.285	1.591
1/20/2019	1.218	-0.665	0	-0.324	1.099	-0.112	2.159	**0.029**	2.864	**0.395**	6.649	-0.282	1.309
1/21/2019	1.188	-0.695	0	-0.354	0.745	-0.142	2.017	-0.001	2.863	**0.365**	7.014	-0.312	0.997
1/22/2019	0.978	-0.905	0	-0.564	0.181	-0.352	1.665	-0.211	2.652	**0.155**	7.169	-0.522	0.475
1/23/2019	0.875	-1.008	0	-0.667	0	-0.455	1.21	-0.314	2.338	**0.052**	7.221	-0.625	0
1/24/2019	0.863	-1.02	0	-0.679	0	-0.467	0.743	-0.326	2.012	**0.04**	7.261	-0.637	0
1/25/2019	0.823	-1.06	0	-0.719	0	-0.507	0.236	-0.366	1.646	**0**	7.261	-0.677	0
1/26/2019	0.666	-1.217	0	-0.876	0	-0.664	0	-0.523	1.123	-0.157	7.104	-0.834	0
1/27/2019	0.617	-1.266	0	-0.925	0	-0.713	0	-0.572	0.551	-0.206	6.898	-0.883	0
1/28/2019	0.627	-1.256	0	-0.915	0	-0.703	0	-0.562	0	-0.196	6.702	-0.873	0
1/29/2019	0.589	-1.294	0	-0.953	0	-0.741	0	-0.6	0	-0.234	6.468	-0.911	0
1/30/2019	0.566	-1.317	0	-0.976	0	-0.764	0	-0.623	0	-0.257	6.211	-0.934	0
1/31/2019	0.549	-1.334	0	-0.993	0	-0.781	0	-0.64	0	-0.274	5.937	-0.951	0

Raw Influent BOD Data
St. Helena WWTRP Phase 1 Improvements

RAW DATA				2-year BOD Loading Distribution		
Date	Flow Rate (MGD)	BOD (mg/L)	BOD (lb/day)	BOD (lb/Day) Distribution	Rank	Percentile
1/5/2016	0.615	331	1698	49	1	0.023
1/12/2016	0.554	421	1945	106	2	0.045
1/20/2016	1.189	108	1071	717	3	0.068
1/26/2016	0.784	214	1399	882	4	0.091
2/3/2016	0.552	253	1165	918	5	0.114
2/9/2016	0.460	419	1607	957	6	0.136
2/17/2016	0.473	379	1495	1011	7	0.159
2/23/2016	0.430	431	1546	1014	8	0.182
3/2/2016	0.381	412	1309	1050	9	0.205
3/7/2016	1.503	193	2419	1052	10	0.227
3/8/2016	1.130	135	1272	1068	11	0.250
3/9/2016	1.023	155	1322	1071	12	0.273
3/14/2016	1.837	92	1409	1154	13	0.295
3/15/2016	1.426	139	1653	1154	14	0.318
3/16/2016	1.201	105	1052	1162	15	0.341
10/25/2016	0.382	406	1293	1165	16	0.364
12/15/2016	2.268	267	5050	1205	17	0.386
12/16/2016	1.438	116	1391	1272	18	0.409
12/17/2016	1.090	97	882	1282	19	0.432
2/4/2017	1.596	69	918	1292	20	0.455
2/7/2017	3.625	120	3628	1293	21	0.477
2/8/2017	3.438	25	717	1304	22	0.500
2/9/2017	3.777	41	1292	1309	23	0.523
2/16/2017	1.591	151	2004	1317	24	0.545
2/17/2017	2.753	119	2732	1322	25	0.568
2/18/2017	2.349	72	1411	1371	26	0.591
2/22/2017	2.289	55	1050	1391	27	0.614
2/23/2017	1.883	68	1068	1397	28	0.636
2/24/2017	1.595	76	1011	1399	29	0.659
2/28/2017	1.071	146	1304	1409	30	0.682
3/1/2017	1.003	144	1205	1411	31	0.705
3/2/2017	0.948	147	1162	1495	32	0.727
4/19/2017	0.604	190	957	1546	33	0.750
4/20/2017	0.642	246	1317	1607	34	0.773
4/21/2017	0.642	261	1397	1653	35	0.795
7/25/2017	0.386	426	1371	1659	36	0.818
10/11/2017	0.365	545	1659	1698	37	0.841
1/3/2018	0.375	410	1282	1945	38	0.864
3/1/2018	0.97	6	49	2004	39	0.886
3/15/2018	0.75	17	106	2286	40	0.909
5/11/2018	0.375	369	1154	2419	41	0.932
7/25/2018	0.335	413	1154	2732	42	0.955
10/17/2018	0.304	400	1014	2955	43	0.977
11/1/2018	0.356	770	2286	3628	44	1.000
1/4/2019	0.412	860	2955	5050	45	1.023

Raw Influent Flow Data
St. Helena WWTRP Phase 1 Improvements

Raw Data						2-year Flow Data Distribution		
Location	Parameter	Qual	Result	Units	Sampling Date	Flow (MGD)	Rank	Percentile
INF-001	Flow	=	0.947	MGD	2/1/2017	0.197	1	0.001
INF-001	Flow	=	1.261	MGD	2/2/2017	0.209	2	0.003
INF-001	Flow	=	1.721	MGD	2/3/2017	0.215	3	0.004
INF-001	Flow	=	1.596	MGD	2/4/2017	0.229	4	0.005
INF-001	Flow	=	1.727	MGD	2/5/2017	0.243	5	0.007
INF-001	Flow	=	2.144	MGD	2/6/2017	0.244	6	0.008
INF-001	Flow	=	3.625	MGD	2/7/2017	0.251	7	0.010
INF-001	Flow	=	3.438	MGD	2/8/2017	0.263	8	0.011
INF-001	Flow	=	3.777	MGD	2/9/2017	0.293	9	0.012
INF-001	Flow	=	2.783	MGD	2/10/2017	0.3	10	0.014
INF-001	Flow	=	2.125	MGD	2/11/2017	0.304	11	0.015
INF-001	Flow	=	1.778	MGD	2/12/2017	0.304	12	0.016
INF-001	Flow	=	1.542	MGD	2/13/2017	0.306	13	0.018
INF-001	Flow	=	1.37	MGD	2/14/2017	0.306	14	0.019
INF-001	Flow	=	1.338	MGD	2/15/2017	0.308	15	0.021
INF-001	Flow	=	1.591	MGD	2/16/2017	0.31	16	0.022
INF-001	Flow	=	2.753	MGD	2/17/2017	0.313	17	0.023
INF-001	Flow	=	2.349	MGD	2/18/2017	0.314	18	0.025
INF-001	Flow	=	2.125	MGD	2/19/2017	0.315	19	0.026
INF-001	Flow	=	3.693	MGD	2/20/2017	0.315	20	0.027
INF-001	Flow	=	3.027	MGD	2/21/2017	0.316	21	0.029
INF-001	Flow	=	2.289	MGD	2/22/2017	0.316	22	0.030
INF-001	Flow	=	1.883	MGD	2/23/2017	0.317	23	0.032
INF-001	Flow	=	1.595	MGD	2/24/2017	0.317	24	0.033
INF-001	Flow	=	1.437	MGD	2/25/2017	0.318	25	0.034
INF-001	Flow	=	1.292	MGD	2/26/2017	0.318	26	0.036
INF-001	Flow	=	1.189	MGD	2/27/2017	0.319	27	0.037
INF-001	Flow	=	1.071	MGD	2/28/2017	0.319	28	0.038
INF-001	Flow	=	1.003	MGD	3/1/2017	0.319	29	0.040
INF-001	Flow	=	0.948	MGD	3/2/2017	0.32	30	0.041
INF-001	Flow	=	0.893	MGD	3/3/2017	0.32	31	0.042
INF-001	Flow	=	0.922	MGD	3/4/2017	0.32	32	0.044
INF-001	Flow	=	0.922	MGD	3/5/2017	0.32	33	0.045
INF-001	Flow	=	0.891	MGD	3/6/2017	0.321	34	0.047
INF-001	Flow	=	0.82	MGD	3/7/2017	0.321	35	0.048
INF-001	Flow	=	0.758	MGD	3/8/2017	0.322	36	0.049
INF-001	Flow	=	0.716	MGD	3/9/2017	0.322	37	0.051
INF-001	Flow	=	0.675	MGD	3/10/2017	0.323	38	0.052
INF-001	Flow	=	0.656	MGD	3/11/2017	0.323	39	0.053
INF-001	Flow	=	0.608	MGD	3/12/2017	0.323	40	0.055
INF-001	Flow	=	0.594	MGD	3/13/2017	0.323	41	0.056
INF-001	Flow	=	0.565	MGD	3/14/2017	0.323	42	0.058
INF-001	Flow	=	0.555	MGD	3/15/2017	0.324	43	0.059
INF-001	Flow	=	0.546	MGD	3/16/2017	0.325	44	0.060
INF-001	Flow	=	0.537	MGD	3/17/2017	0.325	45	0.062
INF-001	Flow	=	0.525	MGD	3/18/2017	0.325	46	0.063
INF-001	Flow	=	0.517	MGD	3/19/2017	0.325	47	0.064
INF-001	Flow	=	0.569	MGD	3/20/2017	0.325	48	0.066
INF-001	Flow	=	0.665	MGD	3/21/2017	0.326	49	0.067
INF-001	Flow	=	0.674	MGD	3/22/2017	0.326	50	0.068
INF-001	Flow	=	0.618	MGD	3/23/2017	0.326	51	0.070
INF-001	Flow	=	1.058	MGD	3/24/2017	0.326	52	0.071
INF-001	Flow	=	0.924	MGD	3/25/2017	0.326	53	0.073
INF-001	Flow	=	0.833	MGD	3/26/2017	0.327	54	0.074

INF-001	Flow	=	0.824	MGD	3/27/2017	0.327	55	0.075
INF-001	Flow	=	0.717	MGD	3/28/2017	0.327	56	0.077
INF-001	Flow	=	0.686	MGD	3/29/2017	0.328	57	0.078
INF-001	Flow	=	0.651	MGD	3/30/2017	0.328	58	0.079
INF-001	Flow	=	0.627	MGD	3/31/2017	0.328	59	0.081
INF-001	Flow	=	0.595	MGD	4/1/2017	0.329	60	0.082
INF-001	Flow	=	0.561	MGD	4/2/2017	0.329	61	0.084
INF-001	Flow	=	0.541	MGD	4/3/2017	0.329	62	0.085
INF-001	Flow	=	0.524	MGD	4/4/2017	0.33	63	0.086
INF-001	Flow	=	0.517	MGD	4/5/2017	0.33	64	0.088
INF-001	Flow	=	0.646	MGD	4/6/2017	0.33	65	0.089
INF-001	Flow	=	0.962	MGD	4/7/2017	0.33	66	0.090
INF-001	Flow	=	1.017	MGD	4/8/2017	0.33	67	0.092
INF-001	Flow	=	0.867	MGD	4/9/2017	0.33	68	0.093
INF-001	Flow	=	0.792	MGD	4/10/2017	0.33	69	0.095
INF-001	Flow	=	0.733	MGD	4/11/2017	0.331	70	0.096
INF-001	Flow	=	0.734	MGD	4/12/2017	0.331	71	0.097
INF-001	Flow	=	0.731	MGD	4/13/2017	0.332	72	0.099
INF-001	Flow	=	0.672	MGD	4/14/2017	0.332	73	0.100
INF-001	Flow	=	0.638	MGD	4/15/2017	0.332	74	0.101
INF-001	Flow	=	0.651	MGD	4/16/2017	0.333	75	0.103
INF-001	Flow	=	0.637	MGD	4/17/2017	0.333	76	0.104
INF-001	Flow	=	0.616	MGD	4/18/2017	0.333	77	0.105
INF-001	Flow	=	0.604	MGD	4/19/2017	0.333	78	0.107
INF-001	Flow	=	0.642	MGD	4/20/2017	0.334	79	0.108
INF-001	Flow	=	0.583	MGD	4/21/2017	0.334	80	0.110
INF-001	Flow	=	0.563	MGD	4/22/2017	0.335	81	0.111
INF-001	Flow	=	0.544	MGD	4/23/2017	0.335	82	0.112
INF-001	Flow	=	0.54	MGD	4/24/2017	0.335	83	0.114
INF-001	Flow	=	0.524	MGD	4/25/2017	0.335	84	0.115
INF-001	Flow	=	0.517	MGD	4/26/2017	0.336	85	0.116
INF-001	Flow	=	0.509	MGD	4/27/2017	0.336	86	0.118
INF-001	Flow	=	0.505	MGD	4/28/2017	0.336	87	0.119
INF-001	Flow	=	0.493	MGD	4/29/2017	0.337	88	0.121
INF-001	Flow	=	0.483	MGD	4/30/2017	0.337	89	0.122
INF-001	Flow	=	0.468	MGD	5/1/2017	0.337	90	0.123
INF-001	Flow	=	0.486	MGD	5/2/2017	0.337	91	0.125
INF-001	Flow	=	0.458	MGD	5/3/2017	0.337	92	0.126
INF-001	Flow	=	0.456	MGD	5/4/2017	0.337	93	0.127
INF-001	Flow	=	0.453	MGD	5/5/2017	0.337	94	0.129
INF-001	Flow	=	0.463	MGD	5/6/2017	0.337	95	0.130
INF-001	Flow	=	0.46	MGD	5/7/2017	0.338	96	0.132
INF-001	Flow	=	0.44	MGD	5/8/2017	0.338	97	0.133
INF-001	Flow	=	0.459	MGD	5/9/2017	0.338	98	0.134
INF-001	Flow	=	0.423	MGD	5/10/2017	0.338	99	0.136
INF-001	Flow	=	0.423	MGD	5/11/2017	0.338	100	0.137
INF-001	Flow	=	0.45	MGD	5/12/2017	0.338	101	0.138
INF-001	Flow	=	0.433	MGD	5/13/2017	0.339	102	0.140
INF-001	Flow	=	0.43	MGD	5/14/2017	0.339	103	0.141
INF-001	Flow	=	0.429	MGD	5/15/2017	0.339	104	0.142
INF-001	Flow	=	0.416	MGD	5/16/2017	0.339	105	0.144
INF-001	Flow	=	0.422	MGD	5/17/2017	0.34	106	0.145
INF-001	Flow	=	0.43	MGD	5/18/2017	0.34	107	0.147
INF-001	Flow	=	0.491	MGD	5/19/2017	0.341	108	0.148
INF-001	Flow	=	0.436	MGD	5/20/2017	0.341	109	0.149
INF-001	Flow	=	0.431	MGD	5/21/2017	0.341	110	0.151

INF-001	Flow	=	0.428	MGD	5/22/2017	0.341	111	0.152
INF-001	Flow	=	0.422	MGD	5/23/2017	0.342	112	0.153
INF-001	Flow	=	0.423	MGD	5/24/2017	0.342	113	0.155
INF-001	Flow	=	0.425	MGD	5/25/2017	0.342	114	0.156
INF-001	Flow	=	0.458	MGD	5/26/2017	0.342	115	0.158
INF-001	Flow	=	0.445	MGD	5/27/2017	0.343	116	0.159
INF-001	Flow	=	0.429	MGD	5/28/2017	0.343	117	0.160
INF-001	Flow	=	0.44	MGD	5/29/2017	0.343	118	0.162
INF-001	Flow	=	0.414	MGD	5/30/2017	0.343	119	0.163
INF-001	Flow	=	0.437	MGD	5/31/2017	0.343	120	0.164
INF-001	Flow	=	0.458	MGD	6/1/2017	0.344	121	0.166
INF-001	Flow	=	0.411	MGD	6/2/2017	0.344	122	0.167
INF-001	Flow	=	0.409	MGD	6/3/2017	0.344	123	0.168
INF-001	Flow	=	0.414	MGD	6/4/2017	0.344	124	0.170
INF-001	Flow	=	0.415	MGD	6/5/2017	0.344	125	0.171
INF-001	Flow	=	0.408	MGD	6/6/2017	0.345	126	0.173
INF-001	Flow	=	0.41	MGD	6/7/2017	0.345	127	0.174
INF-001	Flow	=	0.469	MGD	6/8/2017	0.345	128	0.175
INF-001	Flow	=	0.439	MGD	6/9/2017	0.345	129	0.177
INF-001	Flow	=	0.433	MGD	6/10/2017	0.346	130	0.178
INF-001	Flow	=	0.422	MGD	6/11/2017	0.346	131	0.179
INF-001	Flow	=	0.419	MGD	6/12/2017	0.346	132	0.181
INF-001	Flow	=	0.4	MGD	6/13/2017	0.346	133	0.182
INF-001	Flow	=	0.406	MGD	6/14/2017	0.346	134	0.184
INF-001	Flow	=	0.453	MGD	6/15/2017	0.347	135	0.185
INF-001	Flow	=	0.413	MGD	6/16/2017	0.347	136	0.186
INF-001	Flow	=	0.406	MGD	6/17/2017	0.347	137	0.188
INF-001	Flow	=	0.394	MGD	6/18/2017	0.347	138	0.189
INF-001	Flow	=	0.407	MGD	6/19/2017	0.348	139	0.190
INF-001	Flow	=	0.393	MGD	6/20/2017	0.35	140	0.192
INF-001	Flow	=	0.399	MGD	6/21/2017	0.35	141	0.193
INF-001	Flow	=	0.452	MGD	6/22/2017	0.351	142	0.195
INF-001	Flow	=	0.41	MGD	6/23/2017	0.351	143	0.196
INF-001	Flow	=	0.407	MGD	6/24/2017	0.352	144	0.197
INF-001	Flow	=	0.4	MGD	6/25/2017	0.352	145	0.199
INF-001	Flow	=	0.402	MGD	6/26/2017	0.353	146	0.200
INF-001	Flow	=	0.385	MGD	6/27/2017	0.353	147	0.201
INF-001	Flow	=	0.395	MGD	6/28/2017	0.353	148	0.203
INF-001	Flow	=	0.434	MGD	6/29/2017	0.354	149	0.204
INF-001	Flow	=	0.411	MGD	6/30/2017	0.354	150	0.205
INF-001	Flow	=	0.428	MGD	7/1/2017	0.354	151	0.207
INF-001	Flow	=	0.43	MGD	7/2/2017	0.354	152	0.208
INF-001	Flow	=	0.441	MGD	7/3/2017	0.354	153	0.210
INF-001	Flow	=	0.397	MGD	7/4/2017	0.355	154	0.211
INF-001	Flow	=	0.414	MGD	7/5/2017	0.355	155	0.212
INF-001	Flow	=	0.447	MGD	7/6/2017	0.355	156	0.214
INF-001	Flow	=	0.393	MGD	7/7/2017	0.355	157	0.215
INF-001	Flow	=	0.397	MGD	7/8/2017	0.355	158	0.216
INF-001	Flow	=	0.382	MGD	7/9/2017	0.355	159	0.218
INF-001	Flow	=	0.384	MGD	7/10/2017	0.356	160	0.219
INF-001	Flow	=	0.386	MGD	7/11/2017	0.356	161	0.221
INF-001	Flow	=	0.393	MGD	7/12/2017	0.356	162	0.222
INF-001	Flow	=	0.445	MGD	7/13/2017	0.356	163	0.223
INF-001	Flow	=	0.392	MGD	7/14/2017	0.356	164	0.225
INF-001	Flow	=	0.404	MGD	7/15/2017	0.356	165	0.226
INF-001	Flow	=	0.391	MGD	7/16/2017	0.356	166	0.227

INF-001	Flow	=	0.394	MGD	7/17/2017	0.357	167	0.229
INF-001	Flow	=	0.391	MGD	7/18/2017	0.357	168	0.230
INF-001	Flow	=	0.395	MGD	7/19/2017	0.357	169	0.232
INF-001	Flow	=	0.433	MGD	7/20/2017	0.357	170	0.233
INF-001	Flow	=	0.398	MGD	7/21/2017	0.358	171	0.234
INF-001	Flow	=	0.391	MGD	7/22/2017	0.358	172	0.236
INF-001	Flow	=	0.391	MGD	7/23/2017	0.358	173	0.237
INF-001	Flow	=	0.398	MGD	7/24/2017	0.359	174	0.238
INF-001	Flow	=	0.386	MGD	7/25/2017	0.36	175	0.240
INF-001	Flow	=	0.426	MGD	7/26/2017	0.36	176	0.241
INF-001	Flow	=	0.393	MGD	7/27/2017	0.361	177	0.242
INF-001	Flow	=	0.389	MGD	7/28/2017	0.361	178	0.244
INF-001	Flow	=	0.403	MGD	7/29/2017	0.361	179	0.245
INF-001	Flow	=	0.394	MGD	7/30/2017	0.362	180	0.247
INF-001	Flow	=	0.393	MGD	7/31/2017	0.363	181	0.248
INF-001	Flow	=	0.384	MGD	8/1/2017	0.363	182	0.249
INF-001	Flow	=	0.37	MGD	8/2/2017	0.363	183	0.251
INF-001	Flow	=	0.431	MGD	8/3/2017	0.363	184	0.252
INF-001	Flow	=	0.368	MGD	8/4/2017	0.363	185	0.253
INF-001	Flow	=	0.401	MGD	8/5/2017	0.364	186	0.255
INF-001	Flow	=	0.369	MGD	8/6/2017	0.365	187	0.256
INF-001	Flow	=	0.386	MGD	8/7/2017	0.365	188	0.258
INF-001	Flow	=	0.8	MGD	8/8/2017	0.365	189	0.259
INF-001	Flow	=	0.378	MGD	8/9/2017	0.365	190	0.260
INF-001	Flow	=	0.433	MGD	8/10/2017	0.366	191	0.262
INF-001	Flow	=	0.369	MGD	8/11/2017	0.366	192	0.263
INF-001	Flow	=	0.39	MGD	8/12/2017	0.367	193	0.264
INF-001	Flow	=	0.377	MGD	8/13/2017	0.367	194	0.266
INF-001	Flow	=	0.383	MGD	8/14/2017	0.368	195	0.267
INF-001	Flow	=	0.386	MGD	8/15/2017	0.368	196	0.268
INF-001	Flow	=	0.318	MGD	8/16/2017	0.369	197	0.270
INF-001	Flow	=	0.244	MGD	8/17/2017	0.369	198	0.271
INF-001	Flow	=	0.243	MGD	8/18/2017	0.369	199	0.273
INF-001	Flow	=	0.393	MGD	8/19/2017	0.369	200	0.274
INF-001	Flow	=	0.389	MGD	8/20/2017	0.369	201	0.275
INF-001	Flow	=	0.388	MGD	8/21/2017	0.369	202	0.277
INF-001	Flow	=	0.353	MGD	8/22/2017	0.37	203	0.278
INF-001	Flow	=	0.392	MGD	8/23/2017	0.37	204	0.279
INF-001	Flow	=	0.438	MGD	8/24/2017	0.37	205	0.281
INF-001	Flow	=	0.395	MGD	8/25/2017	0.371	206	0.282
INF-001	Flow	=	0.401	MGD	8/26/2017	0.371	207	0.284
INF-001	Flow	=	0.382	MGD	8/27/2017	0.372	208	0.285
INF-001	Flow	=	0.395	MGD	8/28/2017	0.372	209	0.286
INF-001	Flow	=	0.384	MGD	8/29/2017	0.372	210	0.288
INF-001	Flow	=	0.388	MGD	8/30/2017	0.372	211	0.289
INF-001	Flow	=	0.424	MGD	8/31/2017	0.373	212	0.290
INF-001	Flow	=	0.385	MGD	9/1/2017	0.373	213	0.292
INF-001	Flow	=	0.403	MGD	9/2/2017	0.373	214	0.293
INF-001	Flow	=	0.392	MGD	9/3/2017	0.373	215	0.295
INF-001	Flow	=	0.396	MGD	9/4/2017	0.373	216	0.296
INF-001	Flow	=	0.391	MGD	9/5/2017	0.373	217	0.297
INF-001	Flow	=	0.379	MGD	9/6/2017	0.374	218	0.299
INF-001	Flow	=	0.448	MGD	9/7/2017	0.374	219	0.300
INF-001	Flow	=	0.418	MGD	9/8/2017	0.374	220	0.301
INF-001	Flow	=	0.384	MGD	9/9/2017	0.374	221	0.303
INF-001	Flow	=	0.348	MGD	9/10/2017	0.374	222	0.304

INF-001	Flow	=	0.389	MGD	9/11/2017	0.375	223	0.305
INF-001	Flow	=	0.383	MGD	9/12/2017	0.375	224	0.307
INF-001	Flow	=	0.4	MGD	9/13/2017	0.375	225	0.308
INF-001	Flow	=	0.443	MGD	9/14/2017	0.375	226	0.310
INF-001	Flow	=	0.407	MGD	9/15/2017	0.375	227	0.311
INF-001	Flow	=	0.401	MGD	9/16/2017	0.375	228	0.312
INF-001	Flow	=	0.41	MGD	9/17/2017	0.376	229	0.314
INF-001	Flow	=	0.431	MGD	9/18/2017	0.376	230	0.315
INF-001	Flow	=	0.347	MGD	9/19/2017	0.376	231	0.316
INF-001	Flow	=	0.385	MGD	9/20/2017	0.376	232	0.318
INF-001	Flow	=	0.425	MGD	9/21/2017	0.376	233	0.319
INF-001	Flow	=	0.417	MGD	9/22/2017	0.376	234	0.321
INF-001	Flow	=	0.392	MGD	9/23/2017	0.377	235	0.322
INF-001	Flow	=	0.374	MGD	9/24/2017	0.377	236	0.323
INF-001	Flow	=	0.384	MGD	9/25/2017	0.377	237	0.325
INF-001	Flow	=	0.372	MGD	9/26/2017	0.377	238	0.326
INF-001	Flow	=	0.375	MGD	9/27/2017	0.378	239	0.327
INF-001	Flow	=	0.432	MGD	9/28/2017	0.378	240	0.329
INF-001	Flow	=	0.409	MGD	9/29/2017	0.379	241	0.330
INF-001	Flow	=	0.379	MGD	9/30/2017	0.379	242	0.332
INF-001	Flow	=	0.355	MGD	10/1/2017	0.379	243	0.333
INF-001	Flow	=	0.376	MGD	10/2/2017	0.379	244	0.334
INF-001	Flow	=	0.379	MGD	10/3/2017	0.379	245	0.336
INF-001	Flow	=	0.372	MGD	10/4/2017	0.379	246	0.337
INF-001	Flow	=	0.434	MGD	10/5/2017	0.379	247	0.338
INF-001	Flow	=	0.414	MGD	10/6/2017	0.38	248	0.340
INF-001	Flow	=	0.321	MGD	10/7/2017	0.381	249	0.341
INF-001	Flow	=	0.469	MGD	10/8/2017	0.381	250	0.342
INF-001	Flow	=	0.209	MGD	10/9/2017	0.382	251	0.344
INF-001	Flow	=	0.197	MGD	10/10/2017	0.382	252	0.345
INF-001	Flow	=	0.365	MGD	10/11/2017	0.382	253	0.347
INF-001	Flow	=	0.215	MGD	10/12/2017	0.382	254	0.348
INF-001	Flow	=	0.251	MGD	10/13/2017	0.383	255	0.349
INF-001	Flow	=	0.229	MGD	10/14/2017	0.383	256	0.351
INF-001	Flow	=	0.263	MGD	10/15/2017	0.383	257	0.352
INF-001	Flow	=	0.32	MGD	10/16/2017	0.383	258	0.353
INF-001	Flow	=	0.325	MGD	10/17/2017	0.383	259	0.355
INF-001	Flow	=	0.347	MGD	10/18/2017	0.384	260	0.356
INF-001	Flow	=	0.399	MGD	10/19/2017	0.384	261	0.358
INF-001	Flow	=	0.402	MGD	10/20/2017	0.384	262	0.359
INF-001	Flow	=	0.34	MGD	10/21/2017	0.384	263	0.360
INF-001	Flow	=	0.318	MGD	10/22/2017	0.384	264	0.362
INF-001	Flow	=	0.373	MGD	10/23/2017	0.385	265	0.363
INF-001	Flow	=	0.357	MGD	10/24/2017	0.385	266	0.364
INF-001	Flow	=	0.365	MGD	10/25/2017	0.385	267	0.366
INF-001	Flow	=	0.402	MGD	10/26/2017	0.385	268	0.367
INF-001	Flow	=	0.385	MGD	10/27/2017	0.385	269	0.368
INF-001	Flow	=	0.365	MGD	10/28/2017	0.385	270	0.370
INF-001	Flow	=	0.407	MGD	10/29/2017	0.386	271	0.371
INF-001	Flow	=	0.379	MGD	10/30/2017	0.386	272	0.373
INF-001	Flow	=	0.357	MGD	10/31/2017	0.386	273	0.374
INF-001	Flow	=	0.365	MGD	11/1/2017	0.386	274	0.375
INF-001	Flow	=	0.456	MGD	11/2/2017	0.386	275	0.377
INF-001	Flow	=	0.433	MGD	11/3/2017	0.387	276	0.378
INF-001	Flow	=	0.367	MGD	11/4/2017	0.387	277	0.379
INF-001	Flow	=	0.371	MGD	11/5/2017	0.387	278	0.381

INF-001	Flow	=	0.386	MGD	11/6/2017	0.388	279	0.382
INF-001	Flow	=	0.379	MGD	11/7/2017	0.388	280	0.384
INF-001	Flow	=	0.434	MGD	11/8/2017	0.388	281	0.385
INF-001	Flow	=	0.471	MGD	11/9/2017	0.388	282	0.386
INF-001	Flow	=	0.435	MGD	11/10/2017	0.389	283	0.388
INF-001	Flow	=	0.436	MGD	11/11/2017	0.389	284	0.389
INF-001	Flow	=	0.402	MGD	11/12/2017	0.389	285	0.390
INF-001	Flow	=	0.403	MGD	11/13/2017	0.389	286	0.392
INF-001	Flow	=	0.396	MGD	11/14/2017	0.389	287	0.393
INF-001	Flow	=	0.533	MGD	11/15/2017	0.389	288	0.395
INF-001	Flow	=	0.532	MGD	11/16/2017	0.39	289	0.396
INF-001	Flow	=	0.421	MGD	11/17/2017	0.39	290	0.397
INF-001	Flow	=	0.43	MGD	11/18/2017	0.39	291	0.399
INF-001	Flow	=	0.451	MGD	11/19/2017	0.391	292	0.400
INF-001	Flow	=	0.418	MGD	11/20/2017	0.391	293	0.401
INF-001	Flow	=	0.408	MGD	11/21/2017	0.391	294	0.403
INF-001	Flow	=	0.393	MGD	11/22/2017	0.391	295	0.404
INF-001	Flow	=	0.468	MGD	11/23/2017	0.391	296	0.405
INF-001	Flow	=	0.408	MGD	11/24/2017	0.391	297	0.407
INF-001	Flow	=	0.408	MGD	11/25/2017	0.391	298	0.408
INF-001	Flow	=	0.501	MGD	11/26/2017	0.391	299	0.410
INF-001	Flow	=	0.484	MGD	11/27/2017	0.392	300	0.411
INF-001	Flow	=	0.431	MGD	11/28/2017	0.392	301	0.412
INF-001	Flow	=	0.434	MGD	11/29/2017	0.392	302	0.414
INF-001	Flow	=	0.415	MGD	11/30/2017	0.392	303	0.415
INF-001	Flow	=	0.47	MGD	12/1/2017	0.392	304	0.416
INF-001	Flow	=	0.417	MGD	12/2/2017	0.392	305	0.418
INF-001	Flow	=	0.416	MGD	12/3/2017	0.392	306	0.419
INF-001	Flow	=	0.413	MGD	12/4/2017	0.392	307	0.421
INF-001	Flow	=	0.398	MGD	12/5/2017	0.393	308	0.422
INF-001	Flow	=	0.398	MGD	12/6/2017	0.393	309	0.423
INF-001	Flow	=	0.392	MGD	12/7/2017	0.393	310	0.425
INF-001	Flow	=	0.404	MGD	12/8/2017	0.393	311	0.426
INF-001	Flow	=	0.404	MGD	12/9/2017	0.393	312	0.427
INF-001	Flow	=	0.404	MGD	12/10/2017	0.393	313	0.429
INF-001	Flow	=	0.403	MGD	12/11/2017	0.393	314	0.430
INF-001	Flow	=	0.376	MGD	12/12/2017	0.393	315	0.432
INF-001	Flow	=	0.393	MGD	12/13/2017	0.393	316	0.433
INF-001	Flow	=	0.448	MGD	12/14/2017	0.393	317	0.434
INF-001	Flow	=	0.387	MGD	12/15/2017	0.394	318	0.436
INF-001	Flow	=	0.394	MGD	12/16/2017	0.394	319	0.437
INF-001	Flow	=	0.389	MGD	12/17/2017	0.394	320	0.438
INF-001	Flow	=	0.393	MGD	12/18/2017	0.394	321	0.440
INF-001	Flow	=	0.402	MGD	12/19/2017	0.394	322	0.441
INF-001	Flow	=	0.397	MGD	12/20/2017	0.395	323	0.442
INF-001	Flow	=	0.441	MGD	12/21/2017	0.395	324	0.444
INF-001	Flow	=	0.387	MGD	12/22/2017	0.395	325	0.445
INF-001	Flow	=	0.38	MGD	12/23/2017	0.395	326	0.447
INF-001	Flow	=	0.377	MGD	12/24/2017	0.395	327	0.448
INF-001	Flow	=	0.335	MGD	12/25/2017	0.395	328	0.449
INF-001	Flow	=	0.399	MGD	12/26/2017	0.395	329	0.451
INF-001	Flow	=	0.402	MGD	12/27/2017	0.39599	330	0.452
INF-001	Flow	=	0.449	MGD	12/28/2017	0.396	331	0.453
INF-001	Flow	=	0.395	MGD	12/29/2017	0.396	332	0.455
INF-001	Flow	=	0.395	MGD	12/30/2017	0.396	333	0.456
INF-001	Flow	=	0.395	MGD	12/31/2017	0.396	334	0.458

INF-001	Flow	=	0.337	MGD	1/1/2018	0.397	335	0.459
INF-001	Flow	=	0.374	MGD	1/2/2018	0.397	336	0.460
INF-001	Flow	=	0.375	MGD	1/3/2018	0.397	337	0.462
INF-001	Flow	=	0.449	MGD	1/4/2018	0.397	338	0.463
INF-001	Flow	=	0.441	MGD	1/5/2018	0.397	339	0.464
INF-001	Flow	=	0.406	MGD	1/6/2018	0.397	340	0.466
INF-001	Flow	=	0.407	MGD	1/7/2018	0.398	341	0.467
INF-001	Flow	=	1.002	MGD	1/8/2018	0.398	342	0.468
INF-001	Flow	=	0.845	MGD	1/9/2018	0.398	343	0.470
INF-001	Flow	=	0.652	MGD	1/10/2018	0.398	344	0.471
INF-001	Flow	=	0.579	MGD	1/11/2018	0.398	345	0.473
INF-001	Flow	=	0.578	MGD	1/12/2018	0.399	346	0.474
INF-001	Flow	=	0.52	MGD	1/13/2018	0.399	347	0.475
INF-001	Flow	=	0.491	MGD	1/14/2018	0.399	348	0.477
INF-001	Flow	=	0.489	MGD	1/15/2018	0.399	349	0.478
INF-001	Flow	=	0.471	MGD	1/16/2018	0.4	350	0.479
INF-001	Flow	=	0.447	MGD	1/17/2018	0.4	351	0.481
INF-001	Flow	=	0.428	MGD	1/18/2018	0.4	352	0.482
INF-001	Flow	=	0.58	MGD	1/19/2018	0.4	353	0.484
INF-001	Flow	=	0.48	MGD	1/20/2018	0.4	354	0.485
INF-001	Flow	=	0.293	MGD	1/21/2018	0.4	355	0.486
INF-001	Flow	=	0.639	MGD	1/22/2018	0.4	356	0.488
INF-001	Flow	=	0.563	MGD	1/23/2018	0.4	357	0.489
INF-001	Flow	=	0.653	MGD	1/24/2018	0.4	358	0.490
INF-001	Flow	=	0.687	MGD	1/25/2018	0.401	359	0.492
INF-001	Flow	=	0.595	MGD	1/26/2018	0.401	360	0.493
INF-001	Flow	=	0.533	MGD	1/27/2018	0.401	361	0.495
INF-001	Flow	=	0.494	MGD	1/28/2018	0.401	362	0.496
INF-001	Flow	=	0.472	MGD	1/29/2018	0.401	363	0.497
INF-001	Flow	=	0.459	MGD	1/30/2018	0.402	364	0.499
INF-001	Flow	=	0.423	MGD	1/31/2018	0.402	365	0.500
INF-001	Flow	=	0.42199	MGD	2/1/2018	0.402	366	0.501
INF-001	Flow	=	0.4	MGD	2/2/2018	0.402	367	0.503
INF-001	Flow	=	0.385	MGD	2/3/2018	0.402	368	0.504
INF-001	Flow	=	0.402	MGD	2/4/2018	0.402	369	0.505
INF-001	Flow	=	0.39599	MGD	2/5/2018	0.402	370	0.507
INF-001	Flow	=	0.397	MGD	2/6/2018	0.402	371	0.508
INF-001	Flow	=	0.373	MGD	2/7/2018	0.402	372	0.510
INF-001	Flow	=	0.42899	MGD	2/8/2018	0.402	373	0.511
INF-001	Flow	=	0.405	MGD	2/9/2018	0.403	374	0.512
INF-001	Flow	=	0.4	MGD	2/10/2018	0.403	375	0.514
INF-001	Flow	=	0.369	MGD	2/11/2018	0.403	376	0.515
INF-001	Flow	=	0.401	MGD	2/12/2018	0.403	377	0.516
INF-001	Flow	=	0.4	MGD	2/13/2018	0.404	378	0.518
INF-001	Flow	=	0.373	MGD	2/14/2018	0.404	379	0.519
INF-001	Flow	=	0.363	MGD	2/15/2018	0.404	380	0.521
INF-001	Flow	=	0.363	MGD	2/16/2018	0.404	381	0.522
INF-001	Flow	=	0.374	MGD	2/17/2018	0.405	382	0.523
INF-001	Flow	=	0.371	MGD	2/18/2018	0.406	383	0.525
INF-001	Flow	=	0.375	MGD	2/19/2018	0.406	384	0.526
INF-001	Flow	=	0.359	MGD	2/20/2018	0.406	385	0.527
INF-001	Flow	=	0.355	MGD	2/21/2018	0.406	386	0.529
INF-001	Flow	=	0.406	MGD	2/22/2018	0.406	387	0.530
INF-001	Flow	=	0.352	MGD	2/23/2018	0.406	388	0.532
INF-001	Flow	=	0.364	MGD	2/24/2018	0.406	389	0.533
INF-001	Flow	=	0.363	MGD	2/25/2018	0.407	390	0.534

INF-001	Flow	=	0.358	MGD	2/26/2018	0.407	391	0.536
INF-001	Flow	=	0.342	MGD	2/27/2018	0.407	392	0.537
INF-001	Flow	=	0.44	MGD	2/28/2018	0.407	393	0.538
INF-001	Flow	=	0.97	MGD	3/1/2018	0.407	394	0.540
INF-001	Flow	=	0.84	MGD	3/2/2018	0.408	395	0.541
INF-001	Flow	=	0.84	MGD	3/3/2018	0.408	396	0.542
INF-001	Flow	=	0.84	MGD	3/4/2018	0.408	397	0.544
INF-001	Flow	=	0.631	MGD	3/5/2018	0.408	398	0.545
INF-001	Flow	=	0.58	MGD	3/6/2018	0.408	399	0.547
INF-001	Flow	=	0.554	MGD	3/7/2018	0.409	400	0.548
INF-001	Flow	=	0.559	MGD	3/8/2018	0.409	401	0.549
INF-001	Flow	=	0.53	MGD	3/9/2018	0.41	402	0.551
INF-001	Flow	=	0.495	MGD	3/10/2018	0.41	403	0.552
INF-001	Flow	=	0.47	MGD	3/11/2018	0.41	404	0.553
INF-001	Flow	=	0.465	MGD	3/12/2018	0.41	405	0.555
INF-001	Flow	=	0.6	MGD	3/13/2018	0.411	406	0.556
INF-001	Flow	=	0.584	MGD	3/14/2018	0.411	407	0.558
INF-001	Flow	=	0.75	MGD	3/15/2018	0.412	408	0.559
INF-001	Flow	=	0.784	MGD	3/16/2018	0.413	409	0.560
INF-001	Flow	=	0.713	MGD	3/17/2018	0.413	410	0.562
INF-001	Flow	=	0.651	MGD	3/18/2018	0.414	411	0.563
INF-001	Flow	=	0.593	MGD	3/19/2018	0.414	412	0.564
INF-001	Flow	=	0.71	MGD	3/20/2018	0.414	413	0.566
INF-001	Flow	=	1.483	MGD	3/21/2018	0.414	414	0.567
INF-001	Flow	=	1.16	MGD	3/22/2018	0.415	415	0.568
INF-001	Flow	=	1.33	MGD	3/23/2018	0.415	416	0.570
INF-001	Flow	=	1.106	MGD	3/24/2018	0.415	417	0.571
INF-001	Flow	=	0.951	MGD	3/25/2018	0.416	418	0.573
INF-001	Flow	=	0.842	MGD	3/26/2018	0.416	419	0.574
INF-001	Flow	=	0.76	MGD	3/27/2018	0.416	420	0.575
INF-001	Flow	=	0.718	MGD	3/28/2018	0.416	421	0.577
INF-001	Flow	=	0.674	MGD	3/29/2018	0.416	422	0.578
INF-001	Flow	=	0.639	MGD	3/30/2018	0.417	423	0.579
INF-001	Flow	=	0.608	MGD	3/31/2018	0.417	424	0.581
INF-001	Flow	=	0.589	MGD	4/1/2018	0.417	425	0.582
INF-001	Flow	=	0.529	MGD	4/2/2018	0.417	426	0.584
INF-001	Flow	=	0.504	MGD	4/3/2018	0.418	427	0.585
INF-001	Flow	=	0.485	MGD	4/4/2018	0.418	428	0.586
INF-001	Flow	=	0.562	MGD	4/5/2018	0.419	429	0.588
INF-001	Flow	=	1.255	MGD	4/6/2018	0.419	430	0.589
INF-001	Flow	=	1.239	MGD	4/7/2018	0.421	431	0.590
INF-001	Flow	=	0.971	MGD	4/8/2018	0.421	432	0.592
INF-001	Flow	=	0.836	MGD	4/9/2018	0.42199	433	0.593
INF-001	Flow	=	0.742	MGD	4/10/2018	0.422	434	0.595
INF-001	Flow	=	0.725	MGD	4/11/2018	0.422	435	0.596
INF-001	Flow	=	0.668	MGD	4/12/2018	0.422	436	0.597
INF-001	Flow	=	0.63	MGD	4/13/2018	0.422	437	0.599
INF-001	Flow	=	0.613	MGD	4/14/2018	0.422	438	0.600
INF-001	Flow	=	0.604	MGD	4/15/2018	0.423	439	0.601
INF-001	Flow	=	0.584	MGD	4/16/2018	0.423	440	0.603
INF-001	Flow	=	0.548	MGD	4/17/2018	0.423	441	0.604
INF-001	Flow	=	0.535	MGD	4/18/2018	0.423	442	0.605
INF-001	Flow	=	0.56	MGD	4/19/2018	0.423	443	0.607
INF-001	Flow	=	0.499	MGD	4/20/2018	0.424	444	0.608
INF-001	Flow	=	0.488	MGD	4/21/2018	0.424	445	0.610
INF-001	Flow	=	0.479	MGD	4/22/2018	0.425	446	0.611

INF-001	Flow	=	0.465	MGD	4/23/2018	0.425	447	0.612
INF-001	Flow	=	0.443	MGD	4/24/2018	0.425	448	0.614
INF-001	Flow	=	0.425	MGD	4/25/2018	0.426	449	0.615
INF-001	Flow	=	0.447	MGD	4/26/2018	0.426	450	0.616
INF-001	Flow	=	0.443	MGD	4/27/2018	0.427	451	0.618
INF-001	Flow	=	0.427	MGD	4/28/2018	0.427	452	0.619
INF-001	Flow	=	0.426	MGD	4/29/2018	0.428	453	0.621
INF-001	Flow	=	0.408	MGD	4/30/2018	0.428	454	0.622
INF-001	Flow	=	0.416	MGD	5/1/2018	0.428	455	0.623
INF-001	Flow	=	0.397	MGD	5/2/2018	0.42899	456	0.625
INF-001	Flow	=	0.406	MGD	5/3/2018	0.429	457	0.626
INF-001	Flow	=	0.406	MGD	5/4/2018	0.429	458	0.627
INF-001	Flow	=	0.402	MGD	5/5/2018	0.43	459	0.629
INF-001	Flow	=	0.4	MGD	5/6/2018	0.43	460	0.630
INF-001	Flow	=	0.436	MGD	5/7/2018	0.43	461	0.632
INF-001	Flow	=	0.374	MGD	5/8/2018	0.43	462	0.633
INF-001	Flow	=	0.377	MGD	5/9/2018	0.431	463	0.634
INF-001	Flow	=	0.392	MGD	5/10/2018	0.431	464	0.636
INF-001	Flow	=	0.375	MGD	5/11/2018	0.431	465	0.637
INF-001	Flow	=	0.401	MGD	5/12/2018	0.431	466	0.638
INF-001	Flow	=	0.394	MGD	5/13/2018	0.432	467	0.640
INF-001	Flow	=	0.392	MGD	5/14/2018	0.433	468	0.641
INF-001	Flow	=	0.396	MGD	5/15/2018	0.433	469	0.642
INF-001	Flow	=	0.383	MGD	5/16/2018	0.433	470	0.644
INF-001	Flow	=	0.441	MGD	5/17/2018	0.433	471	0.645
INF-001	Flow	=	0.389	MGD	5/18/2018	0.433	472	0.647
INF-001	Flow	=	0.391	MGD	5/19/2018	0.433	473	0.648
INF-001	Flow	=	0.4	MGD	5/20/2018	0.434	474	0.649
INF-001	Flow	=	0.369	MGD	5/21/2018	0.434	475	0.651
INF-001	Flow	=	0.375	MGD	5/22/2018	0.434	476	0.652
INF-001	Flow	=	0.383	MGD	5/23/2018	0.434	477	0.653
INF-001	Flow	=	0.427	MGD	5/24/2018	0.435	478	0.655
INF-001	Flow	=	0.39	MGD	5/25/2018	0.436	479	0.656
INF-001	Flow	=	0.402	MGD	5/26/2018	0.436	480	0.658
INF-001	Flow	=	0.388	MGD	5/27/2018	0.436	481	0.659
INF-001	Flow	=	0.385	MGD	5/28/2018	0.437	482	0.660
INF-001	Flow	=	0.382	MGD	5/29/2018	0.438	483	0.662
INF-001	Flow	=	0.37	MGD	5/30/2018	0.439	484	0.663
INF-001	Flow	=	0.419	MGD	5/31/2018	0.439	485	0.664
INF-001	Flow	=	0.39	MGD	6/1/2018	0.44	486	0.666
INF-001	Flow	=	0.382	MGD	6/2/2018	0.44	487	0.667
INF-001	Flow	=	0.354	MGD	6/3/2018	0.44	488	0.668
INF-001	Flow	=	0.379	MGD	6/4/2018	0.441	489	0.670
INF-001	Flow	=	0.356	MGD	6/5/2018	0.441	490	0.671
INF-001	Flow	=	0.368	MGD	6/6/2018	0.441	491	0.673
INF-001	Flow	=	0.315	MGD	6/7/2018	0.441	492	0.674
INF-001	Flow	=	0.363	MGD	6/8/2018	0.443	493	0.675
INF-001	Flow	=	0.378	MGD	6/9/2018	0.443	494	0.677
INF-001	Flow	=	0.369	MGD	6/10/2018	0.443	495	0.678
INF-001	Flow	=	0.352	MGD	6/11/2018	0.445	496	0.679
INF-001	Flow	=	0.344	MGD	6/12/2018	0.445	497	0.681
INF-001	Flow	=	0.339	MGD	6/13/2018	0.445	498	0.682
INF-001	Flow	=	0.389	MGD	6/14/2018	0.447	499	0.684
INF-001	Flow	=	0.358	MGD	6/15/2018	0.447	500	0.685
INF-001	Flow	=	0.36	MGD	6/16/2018	0.447	501	0.686
INF-001	Flow	=	0.337	MGD	6/17/2018	0.448	502	0.688

INF-001	Flow	=	0.356	MGD	6/18/2018	0.448	503	0.689
INF-001	Flow	=	0.356	MGD	6/19/2018	0.449	504	0.690
INF-001	Flow	=	0.347	MGD	6/20/2018	0.449	505	0.692
INF-001	Flow	=	0.398	MGD	6/21/2018	0.45	506	0.693
INF-001	Flow	=	0.355	MGD	6/22/2018	0.451	507	0.695
INF-001	Flow	=	0.341	MGD	6/23/2018	0.452	508	0.696
INF-001	Flow	=	0.35	MGD	6/24/2018	0.453	509	0.697
INF-001	Flow	=	0.346	MGD	6/25/2018	0.453	510	0.699
INF-001	Flow	=	0.338	MGD	6/26/2018	0.456	511	0.700
INF-001	Flow	=	0.344	MGD	6/27/2018	0.456	512	0.701
INF-001	Flow	=	0.391	MGD	6/28/2018	0.457	513	0.703
INF-001	Flow	=	0.353	MGD	6/29/2018	0.458	514	0.704
INF-001	Flow	=	0.366	MGD	6/30/2018	0.458	515	0.705
INF-001	Flow	=	0.345	MGD	7/1/2018	0.458	516	0.707
INF-001	Flow	=	0.36	MGD	7/2/2018	0.458	517	0.708
INF-001	Flow	=	0.351	MGD	7/3/2018	0.459	518	0.710
INF-001	Flow	=	0.334	MGD	7/4/2018	0.459	519	0.711
INF-001	Flow	=	0.416	MGD	7/5/2018	0.459	520	0.712
INF-001	Flow	=	0.376	MGD	7/6/2018	0.46	521	0.714
INF-001	Flow	=	0.357	MGD	7/7/2018	0.463	522	0.715
INF-001	Flow	=	0.346	MGD	7/8/2018	0.465	523	0.716
INF-001	Flow	=	0.332	MGD	7/9/2018	0.465	524	0.718
INF-001	Flow	=	0.336	MGD	7/10/2018	0.468	525	0.719
INF-001	Flow	=	0.344	MGD	7/11/2018	0.468	526	0.721
INF-001	Flow	=	0.4	MGD	7/12/2018	0.469	527	0.722
INF-001	Flow	=	0.342	MGD	7/13/2018	0.469	528	0.723
INF-001	Flow	=	0.358	MGD	7/14/2018	0.47	529	0.725
INF-001	Flow	=	0.354	MGD	7/15/2018	0.47	530	0.726
INF-001	Flow	=	0.338	MGD	7/16/2018	0.471	531	0.727
INF-001	Flow	=	0.343	MGD	7/17/2018	0.471	532	0.729
INF-001	Flow	=	0.345	MGD	7/18/2018	0.472	533	0.730
INF-001	Flow	=	0.379	MGD	7/19/2018	0.479	534	0.732
INF-001	Flow	=	0.353	MGD	7/20/2018	0.48	535	0.733
INF-001	Flow	=	0.338	MGD	7/21/2018	0.481	536	0.734
INF-001	Flow	=	0.343	MGD	7/22/2018	0.483	537	0.736
INF-001	Flow	=	0.33	MGD	7/23/2018	0.484	538	0.737
INF-001	Flow	=	0.341	MGD	7/24/2018	0.484	539	0.738
INF-001	Flow	=	0.335	MGD	7/25/2018	0.485	540	0.740
INF-001	Flow	=	0.381	MGD	7/26/2018	0.486	541	0.741
INF-001	Flow	=	0.354	MGD	7/27/2018	0.488	542	0.742
INF-001	Flow	=	0.355	MGD	7/28/2018	0.489	543	0.744
INF-001	Flow	=	0.345	MGD	7/29/2018	0.489	544	0.745
INF-001	Flow	=	0.344	MGD	7/30/2018	0.491	545	0.747
INF-001	Flow	=	0.332	MGD	7/31/2018	0.491	546	0.748
INF-001	Flow	=	0.346	MGD	8/1/2018	0.493	547	0.749
INF-001	Flow	=	0.388	MGD	8/2/2018	0.494	548	0.751
INF-001	Flow	=	0.342	MGD	8/3/2018	0.495	549	0.752
INF-001	Flow	=	0.338	MGD	8/4/2018	0.499	550	0.753
INF-001	Flow	=	0.346	MGD	8/5/2018	0.5	551	0.755
INF-001	Flow	=	0.329	MGD	8/6/2018	0.501	552	0.756
INF-001	Flow	=	0.339	MGD	8/7/2018	0.504	553	0.758
INF-001	Flow	=	0.326	MGD	8/8/2018	0.505	554	0.759
INF-001	Flow	=	0.376	MGD	8/9/2018	0.506	555	0.760
INF-001	Flow	=	0.339	MGD	8/10/2018	0.509	556	0.762
INF-001	Flow	=	0.342	MGD	8/11/2018	0.51	557	0.763
INF-001	Flow	=	0.326	MGD	8/12/2018	0.517	558	0.764

INF-001	Flow	=	0.325	MGD	8/13/2018	0.517	559	0.766
INF-001	Flow	=	0.341	MGD	8/14/2018	0.517	560	0.767
INF-001	Flow	=	0.329	MGD	8/15/2018	0.52	561	0.768
INF-001	Flow	=	0.373	MGD	8/16/2018	0.524	562	0.770
INF-001	Flow	=	0.337	MGD	8/17/2018	0.524	563	0.771
INF-001	Flow	=	0.331	MGD	8/18/2018	0.525	564	0.773
INF-001	Flow	=	0.331	MGD	8/19/2018	0.529	565	0.774
INF-001	Flow	=	0.328	MGD	8/20/2018	0.53	566	0.775
INF-001	Flow	=	0.333	MGD	8/21/2018	0.532	567	0.777
INF-001	Flow	=	0.32	MGD	8/22/2018	0.533	568	0.778
INF-001	Flow	=	0.37	MGD	8/23/2018	0.533	569	0.779
INF-001	Flow	=	0.341	MGD	8/24/2018	0.535	570	0.781
INF-001	Flow	=	0.327	MGD	8/25/2018	0.537	571	0.782
INF-001	Flow	=	0.33	MGD	8/26/2018	0.54	572	0.784
INF-001	Flow	=	0.33	MGD	8/27/2018	0.541	573	0.785
INF-001	Flow	=	0.314	MGD	8/28/2018	0.544	574	0.786
INF-001	Flow	=	0.334	MGD	8/29/2018	0.546	575	0.788
INF-001	Flow	=	0.356	MGD	8/30/2018	0.548	576	0.789
INF-001	Flow	=	0.327	MGD	8/31/2018	0.549	577	0.790
INF-001	Flow	=	0.333	MGD	9/1/2018	0.554	578	0.792
INF-001	Flow	=	0.325	MGD	9/2/2018	0.555	579	0.793
INF-001	Flow	=	0.335	MGD	9/3/2018	0.559	580	0.795
INF-001	Flow	=	0.325	MGD	9/4/2018	0.56	581	0.796
INF-001	Flow	=	0.306	MGD	9/5/2018	0.561	582	0.797
INF-001	Flow	=	0.367	MGD	9/6/2018	0.562	583	0.799
INF-001	Flow	=	0.323	MGD	9/7/2018	0.563	584	0.800
INF-001	Flow	=	0.325	MGD	9/8/2018	0.563	585	0.801
INF-001	Flow	=	0.327	MGD	9/9/2018	0.565	586	0.803
INF-001	Flow	=	0.319	MGD	9/10/2018	0.566	587	0.804
INF-001	Flow	=	0.336	MGD	9/11/2018	0.569	588	0.805
INF-001	Flow	=	0.324	MGD	9/12/2018	0.578	589	0.807
INF-001	Flow	=	0.373	MGD	9/13/2018	0.579	590	0.808
INF-001	Flow	=	0.345	MGD	9/14/2018	0.58	591	0.810
INF-001	Flow	=	0.323	MGD	9/15/2018	0.58	592	0.811
INF-001	Flow	=	0.323	MGD	9/16/2018	0.583	593	0.812
INF-001	Flow	=	0.317	MGD	9/17/2018	0.584	594	0.814
INF-001	Flow	=	0.32	MGD	9/18/2018	0.584	595	0.815
INF-001	Flow	=	0.323	MGD	9/19/2018	0.589	596	0.816
INF-001	Flow	=	0.375	MGD	9/20/2018	0.589	597	0.818
INF-001	Flow	=	0.343	MGD	9/21/2018	0.593	598	0.819
INF-001	Flow	=	0.34	MGD	9/22/2018	0.594	599	0.821
INF-001	Flow	=	0.316	MGD	9/23/2018	0.595	600	0.822
INF-001	Flow	=	0.326	MGD	9/24/2018	0.595	601	0.823
INF-001	Flow	=	0.317	MGD	9/25/2018	0.6	602	0.825
INF-001	Flow	=	0.319	MGD	9/26/2018	0.604	603	0.826
INF-001	Flow	=	0.366	MGD	9/27/2018	0.604	604	0.827
INF-001	Flow	=	0.338	MGD	9/28/2018	0.608	605	0.829
INF-001	Flow	=	0.333	MGD	9/29/2018	0.608	606	0.830
INF-001	Flow	=	0.363	MGD	9/30/2018	0.613	607	0.832
INF-001	Flow	=	0.321	MGD	10/1/2018	0.616	608	0.833
INF-001	Flow	=	0.406	MGD	10/2/2018	0.617	609	0.834
INF-001	Flow	=	0.369	MGD	10/3/2018	0.618	610	0.836
INF-001	Flow	=	0.381	MGD	10/4/2018	0.627	611	0.837
INF-001	Flow	=	0.372	MGD	10/5/2018	0.627	612	0.838
INF-001	Flow	=	0.346	MGD	10/6/2018	0.63	613	0.840
INF-001	Flow	=	0.332	MGD	10/7/2018	0.631	614	0.841

INF-001	Flow	=	0.323	MGD	10/8/2018	0.636	615	0.842
INF-001	Flow	=	0.32	MGD	10/9/2018	0.637	616	0.844
INF-001	Flow	=	0.33	MGD	10/10/2018	0.638	617	0.845
INF-001	Flow	=	0.374	MGD	10/11/2018	0.639	618	0.847
INF-001	Flow	=	0.343	MGD	10/12/2018	0.639	619	0.848
INF-001	Flow	=	0.354	MGD	10/13/2018	0.642	620	0.849
INF-001	Flow	=	0.337	MGD	10/14/2018	0.646	621	0.851
INF-001	Flow	=	0.344	MGD	10/15/2018	0.651	622	0.852
INF-001	Flow	=	0.313	MGD	10/16/2018	0.651	623	0.853
INF-001	Flow	=	0.304	MGD	10/17/2018	0.651	624	0.855
INF-001	Flow	=	0.373	MGD	10/18/2018	0.652	625	0.856
INF-001	Flow	=	0.355	MGD	10/19/2018	0.653	626	0.858
INF-001	Flow	=	0.337	MGD	10/20/2018	0.656	627	0.859
INF-001	Flow	=	0.343	MGD	10/21/2018	0.665	628	0.860
INF-001	Flow	=	0.337	MGD	10/22/2018	0.666	629	0.862
INF-001	Flow	=	0.326	MGD	10/23/2018	0.668	630	0.863
INF-001	Flow	=	0.336	MGD	10/24/2018	0.672	631	0.864
INF-001	Flow	=	0.376	MGD	10/25/2018	0.674	632	0.866
INF-001	Flow	=	0.339	MGD	10/26/2018	0.674	633	0.867
INF-001	Flow	=	0.337	MGD	10/27/2018	0.675	634	0.868
INF-001	Flow	=	0.329	MGD	10/28/2018	0.677	635	0.870
INF-001	Flow	=	0.33	MGD	10/29/2018	0.686	636	0.871
INF-001	Flow	=	0.31	MGD	10/30/2018	0.687	637	0.873
INF-001	Flow	=	0.308	MGD	10/31/2018	0.71	638	0.874
INF-001	Flow	=	0.356	MGD	11/1/2018	0.713	639	0.875
INF-001	Flow	=	0.316	MGD	11/2/2018	0.716	640	0.877
INF-001	Flow	=	0.33	MGD	11/3/2018	0.717	641	0.878
INF-001	Flow	=	0.335	MGD	11/4/2018	0.717	642	0.879
INF-001	Flow	=	0.322	MGD	11/5/2018	0.718	643	0.881
INF-001	Flow	=	0.328	MGD	11/6/2018	0.725	644	0.882
INF-001	Flow	=	0.315	MGD	11/7/2018	0.731	645	0.884
INF-001	Flow	=	0.361	MGD	11/8/2018	0.733	646	0.885
INF-001	Flow	=	0.333	MGD	11/9/2018	0.734	647	0.886
INF-001	Flow	=	0.337	MGD	11/10/2018	0.742	648	0.888
INF-001	Flow	=	0.322	MGD	11/11/2018	0.75	649	0.889
INF-001	Flow	=	0.306	MGD	11/12/2018	0.758	650	0.890
INF-001	Flow	=	0.328	MGD	11/13/2018	0.76	651	0.892
INF-001	Flow	=	0.304	MGD	11/14/2018	0.784	652	0.893
INF-001	Flow	=	0.362	MGD	11/15/2018	0.792	653	0.895
INF-001	Flow	=	0.347	MGD	11/16/2018	0.8	654	0.896
INF-001	Flow	=	0.319	MGD	11/17/2018	0.82	655	0.897
INF-001	Flow	=	0.3	MGD	11/18/2018	0.821	656	0.899
INF-001	Flow	=	0.326	MGD	11/19/2018	0.823	657	0.900
INF-001	Flow	=	0.33	MGD	11/20/2018	0.824	658	0.901
INF-001	Flow	=	0.41	MGD	11/21/2018	0.833	659	0.903
INF-001	Flow	=	0.417	MGD	11/22/2018	0.836	660	0.904
INF-001	Flow	=	0.459	MGD	11/23/2018	0.84	661	0.905
INF-001	Flow	=	0.393	MGD	11/24/2018	0.84	662	0.907
INF-001	Flow	=	0.356	MGD	11/25/2018	0.84	663	0.908
INF-001	Flow	=	0.351	MGD	11/26/2018	0.842	664	0.910
INF-001	Flow	=	0.356	MGD	11/27/2018	0.845	665	0.911
INF-001	Flow	=	0.484	MGD	11/28/2018	0.863	666	0.912
INF-001	Flow	=	0.636	MGD	11/29/2018	0.867	667	0.914
INF-001	Flow	=	0.506	MGD	11/30/2018	0.875	668	0.915
INF-001	Flow	=	0.51	MGD	12/1/2018	0.891	669	0.916
INF-001	Flow	=	0.421	MGD	12/2/2018	0.893	670	0.918

INF-001	Flow	=	0.424	MGD	12/3/2018	0.922	671	0.919
INF-001	Flow	=	0.396	MGD	12/4/2018	0.922	672	0.921
INF-001	Flow	=	0.422	MGD	12/5/2018	0.924	673	0.922
INF-001	Flow	=	0.422	MGD	12/6/2018	0.934	674	0.923
INF-001	Flow	=	0.387	MGD	12/7/2018	0.939	675	0.925
INF-001	Flow	=	0.377	MGD	12/8/2018	0.947	676	0.926
INF-001	Flow	=	0.354	MGD	12/9/2018	0.948	677	0.927
INF-001	Flow	=	0.355	MGD	12/10/2018	0.951	678	0.929
INF-001	Flow	=	0.357	MGD	12/11/2018	0.962	679	0.930
INF-001	Flow	=	0.361	MGD	12/12/2018	0.97	680	0.932
INF-001	Flow	=	0.397	MGD	12/13/2018	0.971	681	0.933
INF-001	Flow	=	0.372	MGD	12/14/2018	0.978	682	0.934
INF-001	Flow	=	0.361	MGD	12/15/2018	0.998	683	0.936
INF-001	Flow	=	0.5	MGD	12/16/2018	1.002	684	0.937
INF-001	Flow	=	0.489	MGD	12/17/2018	1.003	685	0.938
INF-001	Flow	=	0.433	MGD	12/18/2018	1.017	686	0.940
INF-001	Flow	=	0.416	MGD	12/19/2018	1.058	687	0.941
INF-001	Flow	=	0.415	MGD	12/20/2018	1.071	688	0.942
INF-001	Flow	=	0.457	MGD	12/21/2018	1.106	689	0.944
INF-001	Flow	=	0.383	MGD	12/22/2018	1.123	690	0.945
INF-001	Flow	=	0.391	MGD	12/23/2018	1.126	691	0.947
INF-001	Flow	=	0.481	MGD	12/24/2018	1.16	692	0.948
INF-001	Flow	=	0.439	MGD	12/25/2018	1.188	693	0.949
INF-001	Flow	=	0.458	MGD	12/26/2018	1.189	694	0.951
INF-001	Flow	=	0.445	MGD	12/27/2018	1.215	695	0.952
INF-001	Flow	=	0.417	MGD	12/28/2018	1.218	696	0.953
INF-001	Flow	=	0.402	MGD	12/29/2018	1.239	697	0.955
INF-001	Flow	=	0.392	MGD	12/30/2018	1.255	698	0.956
INF-001	Flow	=	0.399	MGD	12/31/2018	1.261	699	0.958
INF-001	Flow	=	0.338	MGD	1/1/2019	1.292	700	0.959
INF-001	Flow	=	0.35	MGD	1/2/2019	1.33	701	0.960
INF-001	Flow	=	0.376	MGD	1/3/2019	1.338	702	0.962
INF-001	Flow	=	0.412	MGD	1/4/2019	1.37	703	0.963
INF-001	Flow	=	0.423	MGD	1/5/2019	1.372	704	0.964
INF-001	Flow	=	1.478	MGD	1/6/2019	1.437	705	0.966
INF-001	Flow	=	1.126	MGD	1/7/2019	1.478	706	0.967
INF-001	Flow	=	0.939	MGD	1/8/2019	1.483	707	0.968
INF-001	Flow	=	1.372	MGD	1/9/2019	1.542	708	0.970
INF-001	Flow	=	1.123	MGD	1/10/2019	1.591	709	0.971
INF-001	Flow	=	0.998	MGD	1/11/2019	1.595	710	0.973
INF-001	Flow	=	0.821	MGD	1/12/2019	1.596	711	0.974
INF-001	Flow	=	0.677	MGD	1/13/2019	1.598	712	0.975
INF-001	Flow	=	0.717	MGD	1/14/2019	1.721	713	0.977
INF-001	Flow	=	0.934	MGD	1/15/2019	1.727	714	0.978
INF-001	Flow	=	2.714	MGD	1/16/2019	1.778	715	0.979
INF-001	Flow	=	2.064	MGD	1/17/2019	1.883	716	0.981
INF-001	Flow	=	1.598	MGD	1/18/2019	2.064	717	0.982
INF-001	Flow	=	1.215	MGD	1/19/2019	2.125	718	0.984
INF-001	Flow	=	1.218	MGD	1/20/2019	2.125	719	0.985
INF-001	Flow	=	1.188	MGD	1/21/2019	2.144	720	0.986
INF-001	Flow	=	0.978	MGD	1/22/2019	2.289	721	0.988
INF-001	Flow	=	0.875	MGD	1/23/2019	2.349	722	0.989
INF-001	Flow	=	0.863	MGD	1/24/2019	2.714	723	0.990
INF-001	Flow	=	0.823	MGD	1/25/2019	2.753	724	0.992
INF-001	Flow	=	0.666	MGD	1/26/2019	2.783	725	0.993
INF-001	Flow	=	0.617	MGD	1/27/2019	3.027	726	0.995

INF-001	Flow	=	0.627	MGD	1/28/2019	3.438	727	0.996
INF-001	Flow	=	0.589	MGD	1/29/2019	3.625	728	0.997
INF-001	Flow	=	0.566	MGD	1/30/2019	3.693	729	0.999
INF-001	Flow	=	0.549	MGD	1/31/2019	3.777	730	1.000

Raw Influent TSS Data
St. Helena WWTRP Phase 1 Improvements

RAW DATA				2-year TSS Loading Distribution		
Date	Flow Rate (MGD)	TSS (mg/L)	TSS (lb/day)	TSS (lb/day) Distribution	Rank	Percentile
1/5/2016	0.615	292	1498	406	1	0.026
1/20/2016	1.189	362	3590	426	2	0.053
1/26/2016	0.784	308	2014	469	3	0.079
2/3/2016	0.552	170	783	682	4	0.105
2/17/2016	0.473	312	1231	720	5	0.132
2/23/2016	0.430	796	2855	783	6	0.158
3/2/2016	0.381	1060	3368	791	7	0.184
3/7/2016	1.503	287	3598	801	8	0.211
3/8/2016	1.130	89	839	825	9	0.237
3/9/2016	1.023	142	1212	839	10	0.263
3/14/2016	1.837	235	3600	863	11	0.289
3/15/2016	1.426	286	3401	891	12	0.316
3/16/2016	1.201	80	801	900	13	0.342
10/25/2016	0.382	392	1249	916	14	0.368
12/15/2016	2.268	252	4767	949	15	0.395
12/16/2016	1.438	141	1691	963	16	0.421
12/17/2016	1.090	75	682	975	17	0.447
2/4/2017	1.596	32	426	1048	18	0.474
2/8/2017	3.438	34	975	1084	19	0.500
2/9/2017	3.777	39	1229	1171	20	0.526
2/16/2017	1.591	172	2282	1212	21	0.553
2/18/2017	2.349	67	1313	1229	22	0.579
2/22/2017	2.289	48	916	1231	23	0.605
2/23/2017	1.883	69	1084	1249	24	0.632
2/24/2017	1.595	67	891	1313	25	0.658
2/28/2017	1.071	152	1358	1358	26	0.684
3/1/2017	1.003	140	1171	1498	27	0.711
3/2/2017	0.948	120	949	1691	28	0.737
4/19/2017	0.604	208	1048	2014	29	0.763
4/20/2017	0.642	168	900	2049	30	0.789
4/21/2017	0.583	148	720	2282	31	0.816
7/25/2017	0.386	268	863	2855	32	0.842
10/11/2017	0.365	260	791	3368	33	0.868
1/3/2018	0.375	308	963	3401	34	0.895
7/25/2018	0.335	168	469	3590	35	0.921
10/17/2018	0.304	160	406	3598	36	0.947
11/1/2018	0.356	690	2049	3600	37	0.974
1/4/2019	0.412	240	825	4767	38	1.000

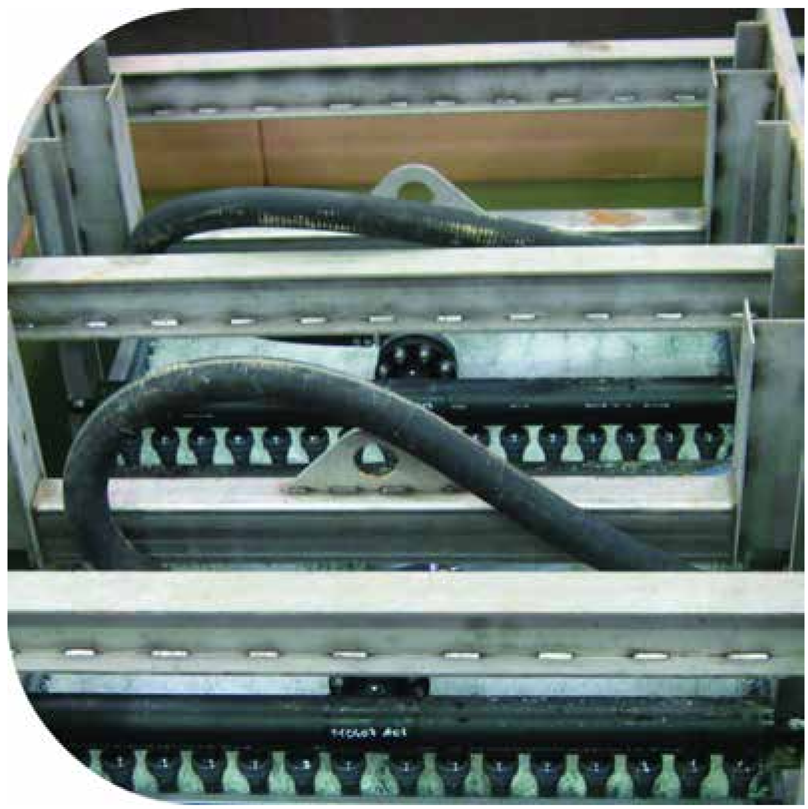
APPENDIX F

PRELIMINARY VENDOR INFORMATION FOR CONVENTIONAL MBR SYSTEMS

Process Design Report

ST HELENA WWTP CA

Design# 156741
Option: Revised Preliminary MBR Design (Phase II)



Aqua-Aerobic® MBR

Membrane Bioreactor System

June 05, 2019
Designed By: Jakob Nowicki

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(815) 654-2501 www.aqua-aerobic.com

Design Notes

Pre-MBR

- Fine screening (by others) is required ahead of the Aqua-Aerobic MBR system, with an opening of 1-2 mm depending upon the characteristics of the screen. Punched hole or wire mesh up to 2 mm is preferred. Wedge wire screens are not recommended, but may be acceptable provided a maximum 1 mm opening.

- Coarse solids screening and grit removal (by others) is recommended ahead of the fine screens.

- If fine screening bypass provisions are included, the bypass channel shall be designed with a manual (or automatic) screen with similar opening properties (i.e. 1-2 mm). In no event should unscreened wastewater enter the Aqua-Aerobic MBR system.

- Grease removal (by others) may be required if the wastewater contains significant amounts of fats, oils, and greases (FOG) due to a significant contribution from restaurant and/or industrial waste contributions.

- Neutralization is recommended/required ahead of the MBR if the pH is expected to fall outside of 6.5-8.5 for significant durations.

MBR

- The Aqua-Aerobic MBR system has been designed with a phased approach. The Phase I design consists of a dual basin Bioreactor, and three membrane tank(s). Phase II will require modification of the operating water levels in the Bioreactor(s). No additional tankage is required for Phase II.

- The maximum flow, as shown on the design, has been assumed as a hydraulic maximum and does not represent an additional organic load.

- The amount of citric acid used is based on quarterly membrane cleaning for inorganic fouling, which assumes that the wastewater treated by the membranes is similar to that of a typical municipality with relatively low inorganic content.

Aeration

- The aeration system has been designed to provide 1.25 lbs. O_2/lb. BOD_5 applied and 4.6 lbs. O_2/lb. TKN applied at the design average loading conditions.

- No oxygen supply credit has been taken with respect to the oxygen supplied via the membrane air scour process, carbon stabilized through denitrification, or nitrogen uptake as a nutrient in determining the average aeration requirement for the biological treatment system.

- Depending on the actual yard piping from the blowers to the diffuser system and the heat losses associated with the yard piping, additional provisions for cooling of the air (i.e. incorporating heat exchangers) and/or modification of in-basin piping and/or diffuser sleeve material may be required. Aqua-Aerobic Systems, Inc. may need to modify the following equipment offering to ensure compatibility of all in-basin components with actual air temperatures.

Process/Site

- The anticipated effluent NH_3-N requirement is predicated upon an influent waste temperature of 18° C or greater. While lower temperatures may be acceptable for a short-term duration, nitrification below 10° C can be unpredictable, requiring special operator attention.

- Sufficient alkalinity is required for nitrification, as approximately 7.1 mg alkalinity (as $CaCO_3$) is required for every mg of NH_3-N nitrified. If the raw water alkalinity cannot support this consumption, while maintaining a residual concentration of 50 mg/l, supplemental alkalinity shall be provided (by others).

Membrane

- The system is designed to treat the average daily flow with one membrane train offline.

- Chemicals required for process and/or cleaning and their containers are not included.

- Spare parts are not included.

- Interconnecting wiring and piping are not included unless specifically called out within this design.

- The Aqua-Aerobic MBR system is designed to process the maximum design flow with all membrane trains online. It is assumed that recovery cleaning operations (typically 1 – 4 times annually) can be selectively conducted during non-peak flow periods.

- Sodium hypochlorite and citric acid feed systems for the membrane Maintenance Clean (MC) processes are included for the Aqua-Aerobic MBR system. Containers and chemicals will be supplied by others.

- A neutralization system (if required) is not included. Depending on the particular characteristics of the wastewater (hardness, etc.) a caustic feed system may be required to facilitate necessary membrane cleaning operations.

- Feed and permeate pump quantities and horsepower could vary slightly depending on final design.

- Membrane train feed and permeate pump(s) will be VFD controlled.

- Influent to the membrane system must contain no substance that is incompatible with the membrane, epoxy potting, SS/PVC piping, or EPDM gaskets/seals, including silicones, solvents, or free oil.

- Influent to the membranes must contain no more than 3 mg/l of fats, oils, or grease (FOG).

- The membrane tanks (provided by others) must be made of, or coated with, a material capable of handling a pH as low as 2 and as high as 10.5 for up to 24 hours quarterly.

Equipment

- The control panel for Phase I has been sized to incorporate Phase II equipment and will require no additional hardware to upgrade to Phase II flows.

- The basin dimensions reported on the design have been assumed based upon the required volumes and assumed basin geometry. Actual basin geometry may be circular, square or rectangular with construction materials including concrete or steel.

- Rectangular or sloped basin construction with length to width ratios greater than 1.5:1 may require alterations in the equipment recommendation.

- Influent is assumed to enter the Bioreactor above the waterline, located appropriately to avoid excessive splashing or direct discharge in the immediate vicinity of other equipment. If the influent is to be located submerged below the waterline, adequate hydraulic capacity should be made in the headworks to prevent backflow from one bioreactor to the other during transition of influent.

- A minimum freeboard of 3 feet is required for the bioreactors.

- A dual-compressor air supply system has been included for all equipment requiring process air (e.g. pneumatic valves).

- The control panel does not include motor starters or VFDs, which should be provided in a separate MCC (by others).

- Pre-eq pumps, membrane tank feed pumps, permeate pumps, WAS pump, chemical feed systems, membrane air scour system and all MBR system valves and lines are sized to meet Phase II requirements.

- Equipment selection is based upon Aqua Aerobic Systems' standard materials of construction and electrical components.

- Aqua-Aerobic Systems, Inc. is familiar with various “Buy American” Acts (i.e. AIS, ARRA, Federal FAR 52.225, EXIM Bank, USAid, PA Steel Products Act, etc.). As the project develops Aqua-Aerobic Systems can work with you to ensure full compliance of our goods with various Buy American provisions if they are applicable/required for the project. When applicable, please provide us with the specifics of the project’s “Buy American” provisions.

- This product is being sold as a domestic project. However, if circumstances arise where this item would be exported, this product is classified as ECCN 2B352 under US export compliance laws/regulations. This product would require an export license from the Department of Commerce Bureau of Industry and Security (BIS) to all countries listed in CB Column 2 on the BIS country chart, if the goods are exported from the United States. See http://www.bis.doc.gov website for details and additional information for compliance with the laws/regulations.

Aqua-Aerobic MBR - Membrane Bioreactor - Design Summary

DESIGN INFLUENT CONDITIONS

Avg. Design Flow	= 1.77 MG/day	=	6,701	m^3/day
Max. Design Flow	= 2 MG/day	=	7,571	m^3/day

INFLUENT PARAMETERS

	Influent	mg/l	Effluent Required	≤ mg/l	Effluent Anticipated	≤ mg/l
Bio/Chem Oxygen Demand:	BOD5	250	BOD5	15	BOD5	2
Suspended Solids:	TSS	200	TSS	15	TSS	2
Nitrogen:	NH3-N	34	Total-N	10	Total-N	10
Phosphorus:	Total-P	8	Total-P	--	Total-P	--

SITE CONDITIONS

	Maximum		Minimum		Design		Elevation (MSL)
Ambient Air Temperature:	85 F	29.4 C	55 F	12.8 C	85 F	29.4 C	253 ft
Influent Waste Temperature:	77 F	25 C	64.4 F	18 C	77 F	25 C	77 m

BIOREACTOR BASIN DESIGN

			Water Depth			Volume/Basin		
No./Basin Geometry:	= 2 Rectangular Basin(s)		Min. =	14.7 ft	= 4.5 m	Min. =	0.2322 MG	= 879.2 m3
Freeboard:	= 2.5 ft	= 0.76 m	Avg. =	20.3 ft	= 6.2 m	Avg. =	0.3207 MG	= 1214.2 m3
Length of Basin:	= 47 ft	= 14.3 m	Max. =	21 ft	= 6.4 m	Max. =	0.3322 MG	= 1257.7 m3
Width of Basin:	= 45 ft	= 13.7 m						
Reactor Operating Mode:	= Batch							
Reactor Discharge Mode:	= Continuous Discharge							

BIOREACTOR PROCESS VARIABLES:

Hydraulic Retention Time:	=	8.7	hours (at average water level, average flow)
MLSS Concentration:	=	5,000	mg/l (at low water level)
Food/Mass (F/M) Ratio:	=	0.191	lbs BOD5 /lb MLSS-day
Solids Retention Time:	=	7.2	days
Est. Net Sludge Yield	=	0.681	lbs WAS/lb. BOD5 applied
Est. WAS Volume:	=	48,202	gallons/day
WAS Pumping Rate:	=	200	GPM
Actual Oxygen Required:	=	7,752	lbs O_2/day
Peak O2 Factor:	=	1.12	x average AOR of 6921.8 lbs O2/day
Bioreactor Airflow Required/Basin:	=	1,222	SCFM/basin
Total Bioreactor Airflow:	=	2,444	SCFM
Average Discharge Pressure:	=	10.4	psig (10.67 psig max discharge pressure)
Est. Bioprocess Average Power Consumption:	=	1496	kWh/day

Aqua-Aerobic MBR - Membrane Bioreactor - Design Summary

MEMBRANE BASIN DESIGN

Number of Parallel Tanks:	= 2 Membrane Tanks		
Freeboard:	= 2 ft	=	0.61 m
Length of Basin:	= 23.2 ft	=	7.1 m
Width of Basin:	= 9.4 ft	=	2.9 m
Water Depth:	= 9.6 ft	=	2.9 m
Membrane Tank Volume:	= 15661 gal	=	59.3 m3

MEMBRANE PROCESS VARIABLES:

No. Membrane Modules per Tank:	=	3	Membrane Modules/Tank		
Active Membrane Area per Module:	=	16,858	ft2 per module (1566 m2)		
Total Membrane Area Provided:	=	101,148	ft2 total (9396 m2)		
Average Membrane Flux Rate (F_{opt}):	=	17.5	Gallons/day/ft2 (29.7 liters/m2/hr)		
Maximum Membrane Flux Rate (F_{pk}):	=	19.8	Gallons/day/ft2 (33.6 liters/m2/hr)		
Est. Membrane Tank MLSS Concentration:	=	6,250	mg/l		
Design Peak Sludge Recycle Rate to Bioreactors:	=	4.0	x Average Design Flow	=	7.08 MGD
Avg. Membrane Tank Feed Rate (all trains on-line):	=	5978	GPM Total (2989 GPM per membrane tank)		
Peak Membrane Tank Feed Rate (all trains on-line):	=	6306	GPM Total (3153 GPM per membrane tank)		
Average Membrane Air Scour Requirement:	=	546	SCFM (varying distribution to all tanks)		
Peak Membrane Air Scour Requirement:	=	1093	SCFM (varying distribution to all tanks)		
Air Scour Blower Discharge Pressure:	=	5.2	psig		
Est. Membrane Average Power Consumption:	=	539	kWh/day		

Note: Membrane flux rates are based on continuous flow from the bioreactors. Only one bioreactor will feed the membrane tanks at a time.

Bioreactors

Influent Valves

2 Bio-Reactor Influent Valve(s) will be provided as follows:

- 10 inch pneumatically operated wafer style butterfly valve(s).

Mixers

2 AquaDDM Direct Drive Mixer(s) will be provided as follows:

- 10 HP Aqua-Aerobic Systems Endura Series Model FSS DDM Mixer(s).

Mixer Mooring

2 Mixer pivotal mooring assembly(ies) consisting of:

- 304 stainless steel pivotal mooring arm(s).
- #12 AWG-four conductor electrical service cable(s).
- Electrical cable strain relief grip(s), 2 eye, wire mesh.

2 Mixer De-Watering Support(s) will be provided as follows:

- Galvanized steel dewatering support posts.
- Galvanized steel support angle(s).
- Stainless steel anchors.

Transfer Pumps/Valves

6 RAS Flow Control Valve(s) consisting of the following:

- 20 inch pneumatically operated wafer style butterfly valve(s).

4 Bio-reactor Discharge / Membrane Feed Control Valve(s) consisting of the following:

- 20 inch pneumatically operated wafer style butterfly valve(s).

Retrievable Fine Bubble Diffusers

8 Retrievable Fine Bubble Diffuser Assembly(ies) consisting of:

- 25 diffuser tubes consisting of two flexible EPDM porous membrane sheaths mounted on a rigid support pipe with 304 stainless steel band clamps.
- 304 stainless steel manifold weldment.
- 304 stainless steel leveling angles.
- 304 stainless steel leveling studs.
- Galvanized vertical support beam.
- Galvanized vertical air column assembly.
- Galvanized upper vertical beam and pulley assembly.
- Galvanized top support bracket.
- 3" EPDM flexible air line with ny-glass quick disconnect end fittings.
- Galvanized threaded flange.
- 3" manual isolation butterfly valve with cast iron body, EPDM seat, aluminum bronze disk and one-piece steel shaft.
- Ny-glass quick disconnect cam lock adapter.
- 304 stainless steel adhesive anchors.
- Brace angles.

1 Diffuser Electric Winch(es) will be provided as follows:

- Portable electric winch.

Positive Displacement Blowers

3 Positive Displacement Blower Package(s), with each package consisting of:

- ROOTS 616 Positive Displacement Blower Package with common base, V-belt drive, enclosed drive guard, pressure gauge, pressure relief valve, and vibration pads.
- Stainless steel anchors.
- 100 HP motor with slide base.
- Blower startup by the blower packager is included.
- Inlet filter and inlet silencer.
- Discharge silencer, check valve, manual butterfly isolation valve, and flexible discharge connector.

Level Sensor Assemblies

2 Pressure Transducer Assembly(ies) each consisting of:

- Submersible pressure transducer(s).
- Mounting bracket weldment(s).
- Transducer mounting pipe weldment(s).

2 Level Sensor Assembly(ies) will be provided as follows:

- Float switch(es).
- Float switch mounting bracket(s).
- Stainless steel anchors.

Air Compressor

1 Valve Actuation Compressed Air System(s) will be provided as follows:

- (2) compressor pumps rated for 0.75 hp each pump with a 60-gallon receiver tank, air dryer, alternating control panel, and wide range pressure switches.
- (1) Coalescing, oil removing filter
- (1) Set of 4 machine vibration isolators
- (1) Adjustable pressure regulator

Controls

Controls wo/Starters

1 Controls Package(s) will be provided as follows:

- NEMA 12 panel enclosure suitable for indoor installation and constructed of painted steel.
- Fuse(s) and fuse block(s).
- Compactlogix Processor.
- Operator interface(s).
- Remote Access Ethernet Modem.

Membrane

Membranes

6 Membrane Module Assembly(ies) each consisting of:

- Puron / Pulsion LE36 membrane module(s)
- Membrane lifting weldment(s).
- Stainless steel support beam(s).
- Wall mounting bracket(s).
- Permeate and air scour flexible hose(s).
- Stainless steel anchors.

Membrane Accessories

2 Membrane Tank Feed Manifold(s) consisting of:

- Distribution Plate
- Stainless steel support(s).
- Stainless steel anchors and hardware.
- 304 stainless steel U-bolt(s) and hardware.

2 Pressure Transducer Assembly(ies) each consisting of:

- Submersible pressure transducer(s).

- Mounting bracket weldment(s).
- Transducer mounting pipe weldment(s).

2 Level Sensor Assembly(ies) will be provided as follows:

- Float switch(es).
- Float switch mounting bracket(s).
- Stainless steel anchors.

2 Set(s) of Membrane Air Scour Manifold Components consisting of:

- 6 inch pneumatically operated wafer style butterfly valve(s).
- Dip tube(s).
- Air scour manifold pressure transmitter(s).

Permeate Discharge Components

2 Set(s) of Membrane Tank Permeate Collection Piping and Accessories consisting of:

- PVC membrane permeate manifold(s).
- PVC permeate discharge pipe(s).
- Permeate pipe support bracket(s).
- 304 stainless steel U-bolt(s) and hardware.

2 Set(s) of Permeate Line Valves and Instrumentation consisting of:

- 10" magnetic flow-meter and converter(s).
- Rosemount pressure transmitter(s)
- Vent valve(s) assembly(ies).
- Stainless steel vent valve support bracket(s).
- Sampling port ball valve.

1 Permeate Holding Tank(s) consisting of:

- Polyethylene tank(s).
- Pressure transducer(s).
- 3" PVC flange with coupling.
- 1/2" PVC pipe.

Transfer Pumps/Valves (Membranes)

2 Permeate Suction and Effluent Discharge Pump Installation(s) consisting of:

- Positive displacement pump(s) with reducer, coupling, base, and 60HP, TEFC, 3ph. motor.
- 10" manual butterfly valve(s).
- 10 inch pneumatically operated wafer style butterfly valve(s).

1 WAS Valve Installation(s) consisting of:

- 3 inch pneumatically operated wafer style butterfly valve(s)

4 Membrane Feed Pump Installation(s) consisting of:

- Centrifugal pump with 30 HP, 3 ph. motor.
- 10" manual butterfly valve(s).

Positive Displacement Blowers

2 Positive Displacement Blower Package(s), with each package consisting of:

- ROOTS 711R Positive Displacement Blower Package with common base, V-belt drive, enclosed drive guard, pressure gauge, pressure relief valve, and vibration pads.
- Stainless steel anchors.
- 40 HP motor with slide base.
- Inlet filter and inlet silencer.
- Discharge silencer, check valve, manual butterfly isolation valve, and flexible discharge connector.

Chemical Feed Systems

1 Chemical Feed System for acid and chlorine, each system consisting of the following:

- PVC backing panel(s).
- Calibration columns.
- Chemical feed pumps.
- Pressure relief valves.
- GFI outlet(s).
- Ball valves.
- 316 stainless steel shelf weldments.
- Polypropylene utility trays.

2 Chemical Flow Control Valve(s) consisting of:

- 1/2" Electric PVC ball valve(s).

Water Technologies & Solutions

budget proposal for the

St. Helena WWTP

ZeeWeed* membrane bioreactor system

submitted to:

HydroScience Engineers
Sacramento, CA

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proposal number: 362702-rev 3

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table of contents

1 Z-MOD introduction 4
2 Z-MOD - low lifecycle cost MBR 5
2.1 LEAPmbr… simple, reliable, efficient 5
2.2 membrane life, cleanability & replacement 6
3 Z-MOD - simple MBR operations 7
3.1 membrane aeration system design 7
3.2 membrane cleaning systems 7
4 Z-MOD robust design basis 8
4.1 positive displacement process pumps 8
4.2 permeate for membrane cleaning 8
4.3 mixed liquor concentration range 8
4.4 electrical design 9
5 basis of design 10
5.1 influent flow data 10
5.2 influent quality 10
5.3 effluent quality 11
5.4 influent variability 11
5.5 biological system design 11
5.6 ultrafiltration system design 12
5.7 annual power & chemical consumption estimates 12
6 Scope of Supply 14
6.1 Z-MOD-L equipment description 14
6.2 scope of supply by SUEZ 16
6.3 buyer scope of supply 18
7 commercial 20
7.1 pricing 20
7.2 equipment shipment and delivery 20
7.3 freight terms 20
7.4 terms and conditions of sale 20

SUEZ Water Technologies & Solutions confidential and proprietary information

1 Z-MOD introduction

SUEZ's packaged ZMOD pump skids are pre-engineered systems that helps simplify the installation of a ZeeWeed membrane filtration system used in municipal, industrial, or land development applications.

Each system has been engineered with a multitude of design options, features and benefits to enable engineers, clients and operators to design and configure the MBR system that best fits each individual application.

The Z-MOD range of systems is designed with 3 key attributes in mind:

- lowest lifecycle cost MBR – lowest cost of ownership for the Owner;
- simple operations – simple & automated operations coupled with SUEZ support for the operating team;
- robust design – prove design parameters with scope and configuration options for a wide variety of conditions.

Z-MOD systems are focused on the ultrafiltration system as the heart of the MBR process, with the ability to add biological or other additional components into the system as required.

ZeeWeed UF membranes operate under a low-pressure vacuum, drawing clean water to the inside of the fiber (outside-in flow path), while leaving impurities in the process tank.

2 Z-MOD - low lifecycle cost MBR

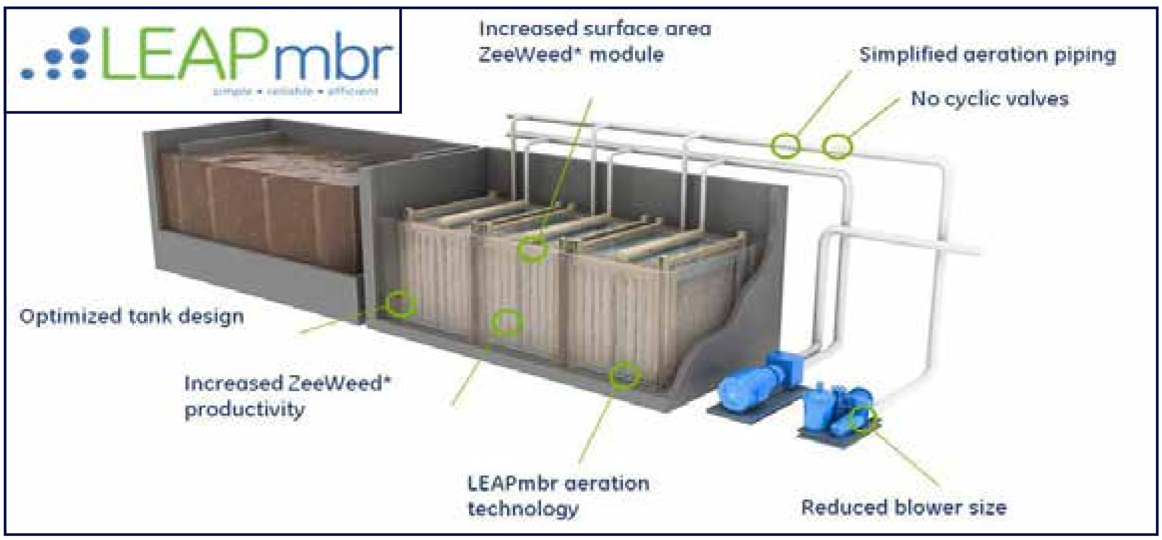
At the heart of a Z-MOD system are the two most important parameters in a low lifecycle cost MBR; efficient MBR design and operation, and SUEZ's ZeeWeed 500 membrane technology.

2.1 LEAPmbr… simple, reliable, efficient

Z-MOD is designed to incorporate the latest innovations of LEAPmbr technology making Z-MOD the most energy efficient and productive MBR that SUEZ is able to provide to owners.

LEAPmbr's combined initiatives will directly impact your plant design by:

- improving your productivity by 15%;
- decreasing your membrane system footprint by 20%;
- removing equipment needed to provide aeration to your membranes by 50%;
- saving you over 30% in membrane aeration power costs.



2.2 membrane life, cleanability & replacement

Z-MOD incorporates SUEZ's ZW500 membrane technology with the following key benefits to ensure an owner's peace of mind for the life of their MBR facility:

- ZeeWeed MBR membrane with a proven membrane life and high resistance to upset conditions;
- system designed with multiple cleaning options to ensure the highest chance of achieving maximum membrane life;
- SUEZ as a single point of responsibility provides an integrated supply chain between the system & membrane warranty provider and the membrane manufacturer;
- a straight forward membrane warranty with clear performance triggers.

3 Z-MOD - simple MBR operations

Z-MOD is designed to ensure the MBR system is simple to operate without compromising any operational robustness.

The operators have a range of flexible options to ensure the MBR system is able to meet varying operating conditions should they arise.

3.1 membrane aeration system design

Aeration is one of the most important operating parameters for successful long term MBR operations and is a significant component of operating cost.

Z-MOD utilizes a very simple aeration strategy which minimizes the amount of instrumentation and controls required to achieve energy efficient membrane aeration.

No complex control loops or complicated airflow measurement devices are required for LEAP MBR aeration technology to achieve energy efficiency.

3.2 membrane cleaning systems

SUEZ has developed MBR design principles based on best engineering practices that ensure the permeability of the membrane is maintained over the life of the membranes.

A fully automated suite of membrane maintenance procedures will ensure long-term, successful operation, including:

- in situ chemical membrane cleaning performed directly in the membrane process tanks so your operators don't waste time moving cassettes;
- the ability to increase or decrease the frequency of maintenance cleans to fit the operating conditions;
- the ability to backpulse when needed to greatly improve your operator's ability to recover from non-design conditions.

The above cleaning systems are automated resulting in operators having available a full suite of comprehensive cleaning systems which are simple to use and initiate.

4 Z-MOD robust design basis

Z-MOD systems are designed to ensure operators have a system with sufficient design robustness to accommodate a wide range of potential conditions.

4.1 positive displacement process pumps

Z-MOD uses positive displacement process pumps to draw effluent through the membranes.

- The positive displacement design of these pumps allows for variations within the hydraulic profile that will not adversely affect the pump performance;
- The pumps come complete with an ability to backpulse the membranes should sludge conditions deteriorate;
- A wide range of pump turndown provides the operator to wide window of flow adjustment for a variety of situations.

This pump selection provides a high level of security and flexibility for engineers and operators.

4.2 permeate for membrane cleaning

Z-MOD systems ensure a volume of clean permeate is always stored ready for use for membrane cleaning.

- Z-MOD takes permeate from its production cycle and stores this treated water in the backpulse tank (or pipe of a similar volume) ready for use. This ensures no reliance or costs from a potable water system to supply cleaning solution to the site for the membrane cleaning process;
- Z-MOD systems include a backpulse tank which provides the operations staff with a readily available source of water for cleaning whenever it is required.

This allows cleaning processes to occur automatically while allowing the operator flexibility to select different cleaning methods.

4.3 mixed liquor concentration range

SUEZ MBR/UF systems rely solely on the pore size of the membrane to effect filtration of the mixed liquor. This allows the MBR at a wide range of mixed liquor concentrations.

This reduces the need for mixed liquor concentrations to be within the intended range during start-up processes or low flow scenarios.

4.4 electrical design

Z-MOD systems are designed based on the following electrical architecture:

- central PLC and common equipment I/O panel;
- remote I/O panel mounted on the process pump skid

This design basis allows the system to readily accommodate additional trains and allows operators to isolate or troubleshoot individual trains without the loss of the central PLC.

5 basis of design

The proposed ZeeWeed membrane bioreactor system for the St. Helena WWTP is offered based on using the design parameters summarized in the following sections.

5.1 influent flow data

The influent design flows are summarized in the table below. This proposal is providing scope for the initial flow. As per flow information provided, anything above the maximum day flow value listed below will be equalized.

	near flow	**future flow**	
average day flow (ADF)	0.50	0.65	mgd
maximum month flow (MMF)	1.33	1.77	mgd
maximum day flow (MDF)	1.50	2.00	mgd
maximum flow with one train offline for maintenance or cleaning (for less than 24 hours)	1.00	1.30	mgd

Note: any flow conditions that exceed the above-noted flow limits must be equalized prior to treatment in the ZeeWeed membrane bioreactor system

- ADF – the average flow rate occurring over a 24-hour period based on annual flow rate data.
- MMF – the average flow rate occurring over a 24-hour period during the 30-day period with the highest flow based on annual flow rate data.
- MDF – the maximum flow rate sustained over a 24-hour period based on annual flow rate data.

5.2 influent quality

The design solution proposed is based on the wastewater characteristics detailed below. The concentrations listed below are specific to the flow used for the biological design as listed in section 6.1 below.

design influent temperature	12	ºC
BOD_5	425	mg/L
TSS	300	mg/L
NH_3-N	85	mg/L
TKN[1]	113	mg/L
TP[1]	8	mg/L
alkalinity [1,2]	250	mg/L

note 1: Parameter value assumed.

note 2: SUEZ is assuming that sufficient influent alkalinity is available for proper performance of the biological system. Should influent alkalinity not be sufficient, chemical addition by buyer will be required.

5.3 effluent quality

The following performance parameters are expected upon equipment startup and once the biological system has stabilized based on the data listed in sections 4.1 and 4.2.

BOD_5	≤ 5	mg/L
TSS	≤ 1	mg/L
NH_3	≤ 10	mg/L
turbidity	≤ 1	NTU

5.4 influent variability

Influent wastewater flows or loads in excess of the design criteria defined above must be equalized prior to entering the membrane tanks. In the event that the influent exceeds the specifications used in engineering this proposal, or the source of influent changes, the ability of the treatment system to produce the designed treated water quality and/or quantity may be impaired. Buyer may choose to continue to operate the system, but assumes the risk of damage to the system and/or additional costs due to increased membrane cleaning frequency, potential for biological upset and/or increased consumables usage.

5.5 biological system design

The biological system for this project consists of an aerobic zone. The design detail is listed in the table below. It is assumed that the aerobic tank will be built for the future flow volume while the mechanical equipment will be provided for the near flow design only. This proposal includes mechanical equipment for the near flow design.

	near flow	**future flow**	
flow basis for biological design	1.33	1.77	mgd
design wastewater temperature	12		°C
total aerobic volume (excluding membranes)	534,000	711,000	gal
total design HRT	10		hours
aerobic design SRT	12.9		days
design MLSS concentration in aerobic zone	8,000		mg/L
design MLSS concentration in membrane zone	10,000		mg/L
estimated sludge wasting rate (@ ADF)	9700	12,600	gal/day
design liquid depth in bioreactor	18		ft
AOR	10,000	13,600	lb 0_2/day

note 1: Tank volumes are preliminary only and may change once final detail design commences.
note 2: The biological system is designed for installation within concrete tanks supplied by buyer.

5.6 ultrafiltration system design

The table below summarizes the membrane design for the St. Helena WWTP. This proposal includes membranes and cassettes for the near flow design case. The mechanical equipment is sized per membrane cassette therefore the ZMODL pump and blower equipment provided will be able to treat the future flow.

	near flow	future flow
Membrane type	ZeeWeed 500D (370 ft^2)	
number of membrane trains	2	
number of Z-MOD L permeate pump skids	2	
number of cassette spaces per train	3	3
type of cassette	52 -module	
module design per train	1 x 52 + 2 x 34	2 x 52 + 1 x 50
total number of modules installed per train	120	154
total number of modules installed per plant	240	308
total number of cassettes installed per plant	6	6
Percentage spare space	23.1%	1.3%
membrane tank internal dimensions (L x W x H) (ft)	21.7 x 9 x 13	21.7 x 9 x 13

note 1: Tank dimensions and volumes are preliminary only and may change slightly once final detail design commences.

note 2: The ultrafiltration system is designed for installation within concrete tanks supplied by buyer.

5.7 annual power & chemical consumption estimates

The data presented below is for information purposes only and is based on the design information provided by the buyer and presuming that the equipment is operated according to the design basis and in accordance with seller's operations and maintenance manuals.

annual power consumption estimate [1]

equipment	Quantity	kWh/year
process blowers	1 duty + 1 standby	282,000
process pumps [2]	2 duty + 1 standby	49,000
membrane blowers	2 duty + 1 standby	120,000
recirculation pumps	2 duty	113,000
air compressors	1 duty + 1 standby	2,700
total		**566,700**

note 1: Annual power consumption estimate is calculated at ADF condition

note 2: Assumes membrane relaxation mode used

annual chemical consumption estimate

chemical	US gal/year
sodium hypochlorite (10.3% w/w, SG: 1.168)	781
citric acid (50.0% w/w, SG: 1.24)	154

note 1: Cleaning chemical consumption estimates are based on the frequencies and concentrations summarized in the table below. Frequencies are typical for ZW-MBR operation, actual frequency of maintenance and recovery cleans may change with final design or may change once system is in operation.

basis of chemical consumption estimates

chemical		maintenance clean	recovery clean
sodium hypochlorite solution (10.3% w/w, SG: 1.168)	frequency	1 time per week	2 times per year
	concentration	200 mg/L	1,000 mg/L
citric acid solution (50.0% w/w, SG: 1.24)	frequency	N/A	2 times per year
	concentration	N/A	2,000 mg/L

6 Scope of Supply

6.1 Z-MOD-L equipment description

The following is a description of the equipment included in SUEZ's scope of supply. Pre-assembled components include the process pump skids, membrane cassette assemblies, and chemical addition system skids. Critical items that will be shipped loose for installation by buyer include the master control panel, backpulse tank, blowers, RAS pumps and other equipment. Please refer to section 6.2 below for a complete list of SUEZ supplied equipment.

master PLC panel

An Allen-Bradley Compact Logix Programmable Logic Controller (PLC) and Panel View Plus 6 1250 Human Machine Interface (HMI), installed in the UL Type 4 main control panel, monitors and manages all critical process operations.

The master PLC panel communicates using Ethernet TCP/IP and includes I/O for common equipment items such as membrane blowers, air compressors, RAS pumps and other items (if included in SUEZ Scope).

Level controls monitor the level of mixed liquor in the process tanks and transmit this information to the SUEZ PLC. The PLC will automatically adjust the flow of the Z-MOD trains based on proportional control to the process or membrane tank levels.

process pump equipment

One reversible process pump per train is used to draw water through the membranes. The process pump, associated valves, and piping for the train are mounted on a factory assembled, epoxy-coated carbon steel skid.

Each process pump skid is designed to include a remote I/O panel UL type 4, which distributes control wiring to the pump, skid mounted instrumentation including magnetic flowmeter required to operate the pump system, all located on the process pump skid.

Optional turbidity meter is available for inclusion onto the process pump skid for train-dedicated permeate turbidity monitoring.

membrane scour aeration system

One duty membrane blower per train will be supplied with one common standby blower to be shared by all trains.

Blowers will typically come complete with required isolation valves, check valves, pressure relief valve, pressure indicators and flow indicators.

sludge wasting system

Sludge wasting is accomplished by periodically diverting mixed liquor from the recirculation return line, via manual control or by pulling directly from the bioreactor. The frequency of wasting is a function of influent characteristics, reactor design and operator preference. In certain operating circumstances, bioreactors can be designed to accommodate client preferences with regards to wasting frequencies; however, the preferred fashion of wasting would be a continuous 24-hour bleeding at fixed flow rate.

process aeration system

The process aeration blowers provide air for the biological tank and ensure that sufficient oxygen is available to maintain the biological processes in the tank. The process aeration blowers are shipped loose for installation on site.

fine bubble diffusers

A fine bubble diffused aeration system delivers air from the process aeration blowers to the aerobic zone of the process tank.

mixed liquor recirculation equipment

Mixed liquor flows by gravity from the bioreactor to the membrane tank at a rate of 5 × ADF. Recirculation pumps are used to transfer mixed liquor from the the membrane tanks to the bioreactor at a rate of 4 × ADF.

Recirculation pump will be supplied as well as check valves, isolation valves magmeter and pressure indicator.

sodium hypochlorite dosing system

The sodium hypochlorite dosing system is used for membrane cleaning to remove organic foulants from the membrane surface.

citric acid dosing system

The citric acid dosing system is used for membrane cleaning to remove inorganic scaling from the membrane surface.

effluent flow measurement

Each train will include a flow meter to provide daily discharge flow measurements.

effluent turbidity analyzer

Effluent turbidity analyzers monitor effluent water quality and alert operators if effluent turbidity rises beyond acceptable set point. For optimal performance monitoring, one turbidity analyzer per train has been included.

InSight Basic – digital asset monitoring

Water and process applications generate vast amounts of operating data. InSight, SUEZ's easy-to-use, cloud-based knowledge management platform, captures and transforms your plant data into meaningful and actionable information, ultimately providing the knowledge you need to maximize performance, avoid operational interruptions, optimize your processes, and reduce the total cost of operation.

InSight Basic – Digital Asset Monitoring has been provided with your MBR system for the first year of operation. With InSight Basic, you will gain visibility into your plant's current and future performance by having complete access to your plant data through InSight. InSight Basic allows you to perform your own process monitoring, trending and analysis suited to your individual plant operations and success criteria. You will have access to the tools in InSight to add your own annotations, load your own analytical data and configure your own reports and alerts.

InSight Basic is enhanced with weekly automated performance reports and daily alarm notification summaries, allowing you to identify emerging problems earlier so that action can be taken now, before a failure can occur. In addition, InSight Basic customers will have access to InSight's built in analytics workspace where you can go beyond standard time based data analytics to uncover more valuable information and understand the underlying causal factors of your plant.

InSight Basic customers have access to personnel from SUEZ's Service Reliability Center (SRC) who will provide training and support on the use and features of InSight.

6.2 scope of supply by SUEZ

quantity	description
The MBR system will consist of two (2) Z-MOD-L systems including the following equipment:	
ZeeWeed membranes & tankage	
Lot	membrane tank cassette mounting assemblies
6	ZeeWeed 500 membrane cassettes
240	membrane modules
2 sets	permeate collection & air distribution header piping
2	membrane tank level transmitter (one per train)
ejector & associated equipment	
2	air ejector assembly w/ air supply assembly
master control panel	
1	master control panel w/ Allen Bradley Compact Logix PLC, Panelview plus 6 1250 HMI, and Flexlogic I/O
process pump skid	
2	process pump equipment skid - epoxy coated carbon steel
2	positive displacement, reversible lobe process pump
2	required pump isolation valves and check valves
2	remote I/O panel - includes Allen Bradley Flexlogic I/O
lot	pressure gauge, flow meter
lot	chemical injection ports and valves
2	turbidimeter (one per train) - includes isolation valves, throttle valve and backplate.
lot	pressure transmitter – loose shipped
backpulse system	
incl	process pumps will also provide backpulse duty
1	flow through backpulse water storage tank, with tank level control and associated valves
membrane air scour blowers	
3	membrane air scour blowers (2 duty + 1 standby) - includes isolation valves, flow

quantity	description
	switches, pressure gauges
mixed liquor recirculation equipment	
2	mixed liquor recirculation pump (2 duty), used to transfer mixed liquor from the membrane tanks to the bioreactor
biological equipment (for one biological train)	
1	fine bubble diffuser system for process aeration - loose shipped (without tank downcomer piping)
2	process blowers (1 duty + 1 standby) - includes flow switches, isolation valves
1	pH sensor
1	aerobic dissolved oxygen sensor
membrane cleaning systems	
1	sodium hypochlorite chemical feed system - includes dosing pump and associated valving
1	citric acid chemical feed system - includes dosing pump and associated valving
Miscellaneous	
2	air compressor (1 duty + 1 standby) and air receiver tank (1 duty) for pneumatic valve operation with two refrigerated air driers.
1	digi modem for remote monitor system
General	
included	P&IDs and equipment general arrangement drawings for SUEZ supplied equipment
included	operating & maintenance manuals
included	field service and start-up assistance - 30 days support over 2 site visits from SUEZ field-service personnel for commissioning, plant start-up and operator training
included	Insight Basic – digital asset monitoring – 1 year
included	24/7 emergency phone support – 1 year
included	equipment mechanical warranty - 1 year or 18 months from shipment
included	membrane warranty– 5 year (2-year cliff and 3 year prorated)

note 1: additional man-hours will be billed separately from the proposed system capital cost at a rate of $1,300 per day plus living and traveling expenses. Detailed SUEZ service rates are available upon request.

note 2: all SUEZ supplied equipment is designed for installation in an unclassified area.

note 3: to receive complete 24/7 Emergency Telephone Technical Support Service and to allow for InSight Monitor Service, a suitable secure remote internet connection, by buyer, is required.

6.3 buyer scope of supply

The following items are for supply by buyer and will include but are not limited to:

- overall plant design responsibility
- review and approval of design parameters related to the biological process and membrane separation system
- review and approval of SUEZ-supplied tank and equipment drawings and specifications
- detail drawings of all termination points where SUEZ equipment or materials tie into equipment or materials supplied by buyer
- design, supply and installation of lifting devices including overhead traveling bridge crane and/or monorail able to lift 4,535 kg (10,000 lb) for membrane removal, lifting davits c/w a hoist, guide rails for submersible mixers and pumps etc.
- civil works, provision of main plant tank structure, buildings, equipment foundation pads etc. including but not limited to:
  - common channels, housekeeping pads, equipment access platforms, walkways, handrails, stairs etc.
  - equalization tank – as required
  - bioreactor tank
- equalization equipment as required
- membrane tanks c/w tank covers or grating, and their support over membrane tanks.
- treated water storage tank, as required
- HVAC equipment design, specifications and installation (where applicable)
- UPS, power conditioner, emergency power supply and specification (where applicable)
- 2-mm Pretreatment fine screens
- acoustical enclosures for membrane and process blowers
- VFDs and MCC for all SUEZ supplied equipment
- plant SCADA system
- process and utilities piping, pipe supports, hangers, valves, etc. including but not limited to:
  - piping, pipe supports and valves between SUEZ-supplied equipment and other plant process equipment
  - piping between any loose-supplied SUEZ equipment

  - process tank aeration system air piping, equalization tank system piping, etc.

- electrical wiring, conduit and other appurtenances required to provide power connections as required from the electrical power source to the SUEZ control panel and from the control panel to any electrical equipment, pump motors and instruments external to the SUEZ-supplied enclosure
- supply and installation of suitable, secure remote internet connection for 24/7 emergency telephone technical support service and InSight remote monitoring & diagnostics service
- design, supply and installation of equipment anchor bolts and fasteners for SUEZ supplied equipment. All seismic structural analysis and anchor bolt sizing.
- receiving (confirmation versus packing list), unloading and safe storage of SUEZ-supplied equipment at site until ready for installation
- installation on site of all SUEZ supplied loose-shipped equipment
- alignment of rotating equipment
- raw materials, chemicals, and utilities during equipment start-up and operation
- disposal of initial start-up wastewater and associated chemicals
- supply of seed sludge for biological process start-up purposes
- laboratory services, operating and maintenance personnel during equipment checkout, start-up and operation
- touch up primer and finish paint surfaces on equipment as required at the completion of the project
- weather protection as required for all SUEZ-supplied equipment. Skids and electrical panels are designed for indoor operation and will need shelter from the elements.
- all permits

7 commercial

7.1 pricing

Pricing for the proposed equipment and services, as outlined in section 6, is summarized in the table below. All pricing is based on the design operating conditions and influent characteristics detailed in herein. The pricing herein is for budgetary purposes only and does not constitute an offer of sale. No sales, consumer use or other similar taxes or duties are included in the pricing below.

price: all equipment & service	
ZeeWeed membrane bioreactor system, as per Section 6.	$ 1,205,000 USD

7.2 equipment shipment and delivery

Equipment shipment is estimated at 20 to 26 weeks after order acceptance. The buyer and seller will arrange a kick-off meeting after contract acceptance to develop a firm shipment schedule.

typical drawing submission and equipment shipment schedule

		4-6 weeks	2-3 weeks	14-20 weeks		2 weeks
acceptance of PO						
submission of drawings						
drawings approval						
equipment manufacturing						
equipment shipment						
plant operations manuals						

The delivery schedule is presented based on current workload backlogs and production capacity. This estimated delivery schedule assumes no more than 2 weeks for buyer review of submittal drawings. Any delays in buyer approvals or requested changes may result in additional charges and/or a delay to the schedule.

7.3 freight terms

The following freight terms used are as defined by INCOTERMS 2010.

All pricing is FCA Guelph, Ontario.

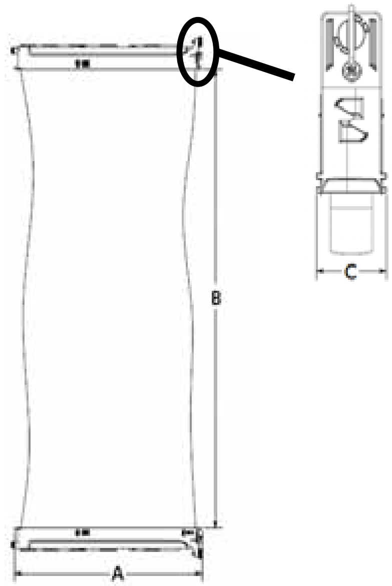
7.4 terms and conditions of sale

This proposal has been prepared and is submitted based on seller's standard terms and conditions of sale.

Water Technologies & Solutions

fact sheet

ZeeWeed* 500D module



Module Dimensions			
Product	**Width (A) mm (in)**	**Height (B) mm (in)**	**Depth (C) mm (in)**
370, 340	844 (33.2)	2,198 (86.5)	49 (1.9)
440			52 (2.05)
300s		1,835 (72.25)	49 (1.9)
350s			52 (2.05)

Module Properties									
Application	**Product**	**Nominal Membrane Surface Area m^2 (ft^2)**	**Max. Shipping Weight [1] kg (lb)**	**Lifting Weight [2] kg (lb)**	**Material**	**Nominal Pore Size (μm)**	**Surface Properties**	**Fiber Diameter (mm)**	**Flow Path**
MBR	370	34.4 (370)	28 (61)	28 – 75 (61 – 164)	PVDF	0.04	Non-ionic & Hydrophilic	OD: 1.9 ID: 0.8	Outside-In
	300s	27.9 (300)	24 (53)	24 - 58 (53 - 128)					
Non-MBR	440	40.9 (440)	32 (70)	30 – 74 (66 – 163)					
	350s	32.5 (350)	26 (57)	26 - 72 (57 – 159)					
All	340	31.6 (340)	26 (61)	26 - 60 (57 - 132)					

[1] Packaged
[2] Varies with solids accumulation

Operating & Cleaning Specifications							
Application	**Product**	**TMP Range kPa (psig)**	**Max. Operating Temp. °C (°F)**	**Operating pH Range**	**Max. Cleaning Temp. °C (°F)**	**Cleaning pH Range**	**Max. Cl_2 Conc'n (ppm)**
MBR	370, 300s	-55 to 55 (-8 to 8)	40 (104)	5.0-9.5	40 (104)	2.0 – 10.5 (<30°C) 2.0 -10.0 (30-40°C)	1,000
Non-MBR	440, 340, 350s	-90 to 90 (-13 to 13)					

Find a contact near you by visiting www.suezwatertechnologies.com and clicking on "Contact Us."

*Trademark of SUEZ; may be registered in one or more countries.

GRAVITY FLOW SYSTEMS SOUTHWEST, INC.

Represented by:

JBI Water & Wastewater
Jim Zaiser

To:

Jason Crowley, PE
HydroScience Engineers

Project:

City of St. Helena, CA WWTRP
Phase 1 Improvements

Wedgewater™ Sludge Filter Bed Equipment

PROPOSAL DATE: July 3, 2019

P.O. Box 1541 Leadville, Colorado 80461 Tel: (830) 379-5730
www.gravityflow.com

PROPOSAL

NOTICE – PLEASE READ THIS PROPOSAL *ALL THE WAY THROUGH*, ANY PURCHASE ORDER ISSUED MUST CONFORM TO ALL ITEMS IN THIS PROPOSAL FOR ORDER ENTRY.

We propose to furnish the following items of equipment and associated services at the prices indicated and in accordance with the terms and conditions set forth herein:

ITEM 1. DRYING BED MEDIA AND INSTALLATION APPURTENANCES FOR FOUR (4) 1,040 SQUARE FEET INSIDE DIMENSION BED(S).

4,180 - Polyurethane Wedgewater™ filter modules, each 12 inches by 12 inches by 2 inches high, having male and female dovetail interlocking design, to fit four (4) sludge drying filter beds. Includes 20 spare filter modules.

4 - Lot(s) of peripheral seal angles, each lot to fit one (1) sludge drying filter bed. The peripheral seal angles shall be constructed from 4” x 4” x 11 gauge Type 304 stainless steel, and shall be supplied with attached rubber seal strips and stainless steel concrete anchors for installation to the concrete bed walls by others.

4 - Lot(s) of entrance ramp seal plates, 8” wide 11 gauge Type 304 stainless steel, each lot to fit one (1) sludge drying filter bed. Plates are provided with attached rubber seal strips and stainless steel concrete anchors for installation to the concrete bed floor slab by others.

8 - Splash plate(s), measuring 24” square, constructed from 11 gauge Type 304 stainless steel, each plate for placement beneath one sludge feed point.

1 - 5’-0” long Stainless Steel reinforced Polyurethane bucket tip.

BUDGET PRICE ***The total price for Item 1 above is $_______________***

ITEM 2. GFSS/BIOTRIAD WALL MOUNT POLYMER FEED SYSTEM

1 - GFSS/BioTriad wall mount sludge conditioning polymer feed system, complete with 1” Inlet and outlet black polypro & sch 80 gray piping and fittings, (1) Solenoid valve, (2) Flow meters (0-10 gpm capacity) with union connections, (2) True union check valves, (3) PSI gauges (0-100psi), (1) Static mixer, (1) BA acoustic reed mixer: 50B (3 to 7 GPM cap) (1) On-Off Electrical Panel, NEMA 4X enclosure, 25’ inlet power cord, 20 amp fuse, On-Off switch, Green light and GFCI outlet for pump (1) “C” shaped frame constructed of 3/16” mill finish aluminum; (1) peristaltic metering pump.

1 - Lot of sludge conditioning accessories: rigid suction pipe to reach to near bottom of 55-gallon bucket (bucket-stick), drum mixer, and drum dolly.

1 - Freight to jobsite

BUDGET PRICE ***The total price for Item 2 above is $_______________***

□□**M**□. FIBERGLASS SHELTER #7272 TO HOUSE POLYMER SYSTEM

1 - Fiberglass Shelter Model #7272 - 72” L x 72” W x 84” sidewall height with 3” wide external mounting flange, 12” sq. aluminum exhaust louvre, 8” 98 CFM fiberglass intake fan, 40” x 80” door w/ SS door closer, SS piano hinge, standard lockset, door gasket & chain stop, two (2) weatherproof switches (light & fan), 60w vapor tight incandescent lamp, pre-wired electrical panel, fiberglass awning, with 120 VAC portable heater unit.

1 - Freight to jobsite

BUDGET PRICE ***The total price for Item 3 above is $_______________***

FIELD SERVICE

One (1) trip, one (1) day of installation inspection, O&M training and startup assistance is provided in this scope of supply.

PRICING TERMS AND CONDITIONS

Pricing is based on the following terms of payment:

Conditions	Amount of Invoice
Approval of Submittals	30% upon Invoice
Materials ready for Shipment	70% upon Invoice

_______ **Initial**

All invoices are due and payable within twenty (20) days from the invoice date. ***Purchaser shall be obligated to pay said invoices even if Purchaser is not paid by owner***, provided the reason for such non-payment is unrelated to the performance of Gravity Flow Systems Southwest, Inc.

Pricing is valid through □□□□□ □□**r**□□□**0**□□. After this date pricing and availability are subject to change.

TAXES

Federal, State or local sales, use or other taxes applicable to this transaction shall be added to the sales price for Purchaser’s account.

FREIGHT

All prices are quoted FOB FACTORY, with freight allowed to a readily accessible location at jobsite.

DELIVERY

Submittals: 3 to 4 weeks after receipt of a purchase order.

Equipment Shipment: 8 to 13 weeks after receipt of approved submittals, or written waiver thereof.

Re-submittals, should they be required, will take an additional 3 to 4 weeks.

WARRANTY

Gravity Flow Systems Southwest will warranty the equipment supplied in conformance with paragraph 6. of our "Standard Conditions of Sale", Sheet 7 of 7 of this proposal.

NOT INCLUDED

Unless specifically mentioned in this proposal for inclusion with the proposed equipment, the above price DOES NOT INCLUDE:

- Spare parts;
- Unloading, hauling, or storage;
- Equipment erection or field welding;
- Concrete, concrete work, grout or sealants;
- Field cleaning or field painting;
- Protection against corrosion or deterioration due to unprotected or improper storage;
- Piping, valves, or fittings;
- Pipe hangers or supports;
- Lubricating oils or greases;
- Wire, wiring, or conduit;
- Motor starters or controls;
- Any electrical devices not described above;
- Polymer, polymer systems, or polymer injection/mixing equipment.

PAST DUE ACCOUNTS

Payment of invoices shall be in compliance with the "General Terms" of this proposal.

______ [illegible]
Initial

SPECIAL CONDITIONS

This proposal shall be made a part of any Purchase Order resulting from this offering.

Pricing and delivery quoted herein is based on those terms and conditions found exclusively in this document. No other terms or conditions shall be made part of the sales contract, unless specifically accepted in writing by Gravity Flow Systems Southwest, Inc. Such other terms and conditions, if accepted, may affect stated prices and/or deliveries.

[illegible]

Gravity Flow Systems Southwest, Inc. is an equipment manufacturer and supplier only. We will not accept any purchase orders requiring us to take on additional liabilities by containing the following:

- Those requiring our company to accept any penalties or liquidated damages whatsoever.
- Those requiring delivery schedules other than those specified in our proposal.
- Those indicating payment to us conditional upon payment of our customer by others, and/or containing payment terms contrary to those set forth in our proposal.
- Those indicating that items additional to those specifically delineated in our proposal may or will be required to be provided, such as unloading, storage, tools, fuel, supplies, etc.
- Those requiring our company to provide any licensing or bonding.
- Those referring to us as a subcontractor.
- Those with any conditions of sale contrary to those set forth in this proposal.
- Those that do not reference this proposal number or cite this proposal as reference only.

In such cases, an order will not be entered until a satisfactory order is issued. Additionally we require a copy of this proposal signed by the buyer for order entry to occur.

M

Terms of payments are as follows: **0** % at submittal approval and **70** % when materials are ready for shipment; for payment within 20 days of invoice date

This quotation is subject to change or withdrawal without notice, and subject to acceptance within **0** days by Buyer. If accepted by the Buyer, this proposal shall become a binding contract only when approved and signed by an authorized representative of the Seller at its offices in Leadville, Lake County, Colorado, and may then be modified by written agreement only. No statement or understandings relating to the subject matter, other than those set forth herein, shall be binding on **r**

All orders, contracts and quotations are submitted contingent upon occurrence of strikes, accidents, fire, riots, war, and Acts of God, and any other causes beyond our control. In the event of strikes in our plants or in the plants of our suppliers, we may withdraw this proposal if, in our opinion, such strikes may result in the following:

1. Delay in the delivery of materials and supplies.
2. Cancellation by suppliers of materials and supplies.
3. Increased prices for material, supplies and labor.

Quoted shipment or delivery dates are based upon current production schedules of the specified equipment, after receipt of all approved drawings, together with complete technical data necessary for proper application and "state of the art" engineering as required by the project. **r** will deliver drawings for approval in a timely manner commensurate with the original concept of completion as conceived by the owners and/or engineers. **r** will not be liable for liquidated damages or other penalties, either direct or indirect, for failure to perform within these estimated dates.

The standard conditions of sale printed on the attached sheet, unless expressly excepted herein, are made part of this quotation. Any provisions in the purchase order which are in conflict with or any addition to the provisions provided herein shall become a part of the contract only if affirmatively accepted in writing by Buyer and Seller.

[illegible]

[illegible]

This contract is subject to credit approval by the Seller prior to acceptance. In the event of insolvency or other financial difficulty on the part of the Buyer, the Seller may withhold delivery or require payment in advance or seek such other security as it deems necessary.

[illegible]

Buyer agrees to pay Seller interest at the highest legal rate on any amount unpaid from maturity and Buyer further agrees to pay Seller all collection or attorneys' fees and court costs incurred; under no conditions will credit be extended beyond ninety (90) days without the applicable statutory and common law liens being filed.

[illegible]

In the event Buyer cancels the contract or any part thereof, Buyer agrees to reimburse Seller for any costs incurred, including engineering time expended on pre-approval and approval drawings as well as shop drawings and direct labor with overhead burden, materials and other costs incurred through the date of cancellation, plus a margin of 25% of the contract amount.

[illegible]

Buyer will pay Seller, in addition to the price stated, the amount of any applicable sales, and gross receipts or other tax which may be imposed on this transaction by the Federal, State, county or municipal government and any subdivision thereof.

5. [illegible]

Full risk of loss (including transportation, delays, damages and/or losses) shall pass to the Buyer upon delivery of products to the F.O.B. point or at the time of installation, if provided for in the contract. Seller retains title, for security purposes only, to all products whether attached to realty or other property, until fully paid for in cash; and the Buyer agrees to perform all acts which may be necessary to perfect and assure retention of title in the Seller. In the case of failure by the Buyer to make any payment when due, it is expressly understood that it shall be optional with the Seller to take exclusive possession of the products supplied wherever found and remove same without legal process, and that any payments which may have been made on account of same shall be retained by the company as liquidated damages, without prejudice to its right of recovery for further damage it may suffer from any cause.

[illegible]

A. Seller warrants only that the products and parts manufactured by Seller, when shipped, and the work performed by Seller (including installation, construction and start-up) when performed, will meet all applicable specifications and other specific product and work requirements (including those of performance), if any, of this agreement, and will be free from defects in material and workmanship. All claims for defective or non-conforming (both hereinafter called defective) products or parts under this warranty shall be made in writing Immediately upon discovery, and in any event, within one (1) year from shipment of the applicable item unless Seller specifically assumes installation, construction or start-up responsibility, in all claims for defective or non-conforming work shall be made in writing immediately upon discovery, and in any event, within one (1) year from completion of the applicable work by Seller, such date to be determined exclusive of instruction, start-up and inspection work done pursuant to the contract; provided, however, all claims for defective products and parts shall be made in writing no later than eighteen (18) months after shipment. Defective and non-conforming items must be held for Seller's inspection and returned to the original F.O.B. point upon request. THE FOREGOING IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES WHATSOEVER, EXPRESS, IMPLIED AND STATUTORY, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS.

B. Any act of the Buyer to alter, modify, or install equipment in a manner contrary to the instructions furnished by the Seller shall serve to void the Seller's warranty on those items altered, modified or improperly installed. Failure of the Buyer to maintain equipment contrary to the instructions furnished by the Seller shall serve to void the warranty on all equipment affected by such improper maintenance.

C. Upon Buyer's submission of a claim as provided herein and its substantiation, Seller shall at its option either repair or replace its product, part or work at the original F.O.B. point of delivery or to refund an equitable portion of the purchase price.

D. Notwithstanding the foregoing provisions of this WARRANTY AND LIABILITY Clause, it is specifically understood that products and parts not manufactured and work not performed by Seller are warranted to the extent and in the manner that the same are warranted to Seller by Seller's vendors, and then only to the extent that Seller is reasonably able to enforce such warranty. In enforcing such warranty, it is understood Seller shall have no obligation to initiate litigation unless Buyer undertakes to pay all costs and expenses therefor, including, but not limited to attorneys' fees, and indemnifies Seller against any liability to Seller's vendors arising out of such litigation.

E. THE FOREGOING IS SELLER'S ONLY OBLIGATION AND BUYER'S EXCLUSIVE REMEDY FOR BREACH OF WARRANTY AND, EXCEPT FOR GROSS NEGLIGENCE AND WILLFUL MISCONDUCT, THE FOREGOING IS BUYER'S EXCLUSIVE REMEDY AGAINST SELLER FOR ALL CLAIMS ARISING HEREUNDER OR RELATING HERETO WHETHER SUCH CLAIMS ARE BASED ON BREACH OF CONTRACT, TORT (INCLUDING NEGLIGENCE AND STRICT LIABILITY) OR OTHER THEORIES. BUYER'S FAILURE TO SUBMIT A CLAIM AS PROVIDED ABOVE SHALL SPECIFICALLY WAIVE ALL CLAIMS FOR DAMAGES OR OTHER RELIEF, INCLUDING BUT NOT LIMITED TO, CLAIMS BASED ON LATENT DEFECTS. IN NO EVENT SHALL BUYER BE ENTITLED TO INCIDENTAL OR CONSEQUENTIAL DAMAGES. ANY ACTION BY BUYER ARISING HEREUNDER OR RELATING HERETO, WHETHER BASED ON BREACH OF CONTRACT, TORT (INCLUDING NEGLIGENCE AND STRICT LIABILITY) OR OTHER THEORIES, MUST BE COMMENCED WITHIN ONE (1) YEAR AFTER THE CAUSE OF ACTION ACCRUES OR IT SHALL BE BARRED.

7. [illegible]

Should the equipment proposed herein incorporate a patent or a concept that results In a patent or a patent application, title to such patent or concept resulting therefrom shall be retained in full ownership of [illegible], and shall be the sole property of [illegible]

8. [illegible]

Seller will not accept any charge for modification, servicing, adjustment or for any other item without authority in the form of a written order issued from the office of [illegible], in Leadville, Colorado, in advance of doing the work.

[illegible]

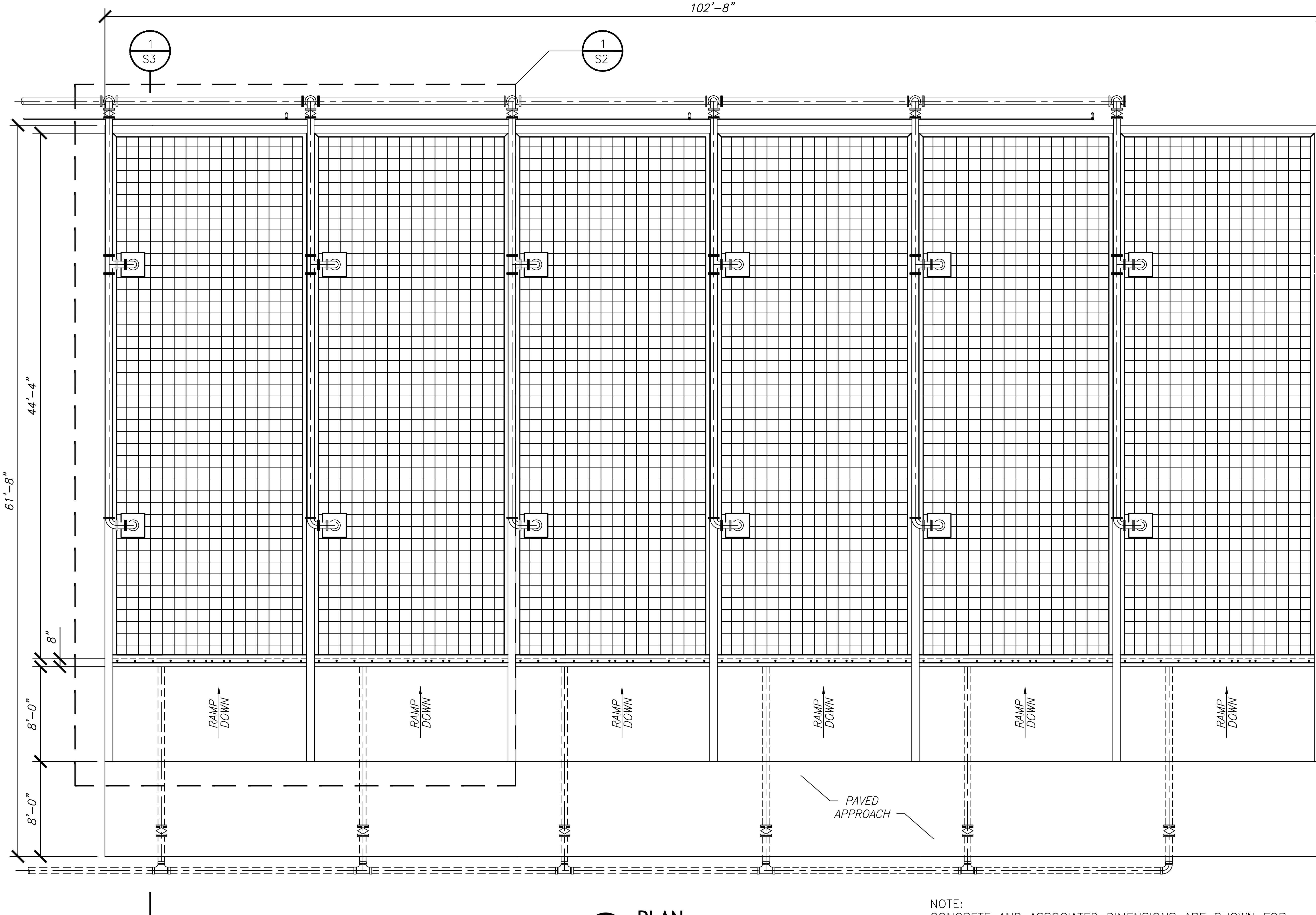
The acceptance of this order shall be upon the terms and conditions specified herein which shall take precedence and represent the final agreement between the Buyer and Seller notwithstanding any inconsistent, contradictory or other and further terms and conditions contained in Buyer's purchase order or other document furnished by Buyer in connection with this order, whether such document or documents are exchanged simultaneously with this order, prior to, or subsequent thereto.

10. ENFORCEMENT

Buyer and Seller expressly agree that the laws of the State of Colorado shall govern the validity, construction, interpretation and effect of this contract. The courts of Colorado, County of Lake, shall have jurisdiction over the parties in any action at law relating to the subject matter or the interpretation of this contract.

[illegible]

Signature of Purchaser's Authorized Agent Date	Signature of Gravity Flow Systems Southwest Authorized Agent
For Purchaser (print name of purchasing entity below):	Rhonda Shaw
	For [illegible]



1 PLAN
SCALE: 1/8" = 1'-0"

NOTE:
CONCRETE AND ASSOCIATED DIMENSIONS ARE SHOWN FOR EQUIPMENT FIT AND FUNCTION ONLY. GFS SOUTHWEST, INC. DOES NOT PROVIDE STRUCTURAL CONCRETE DESIGN.

SCALE:	AS SHOWN
DRAWN:	JDS
CHECKED:	ALH
DATE:	9/10/13

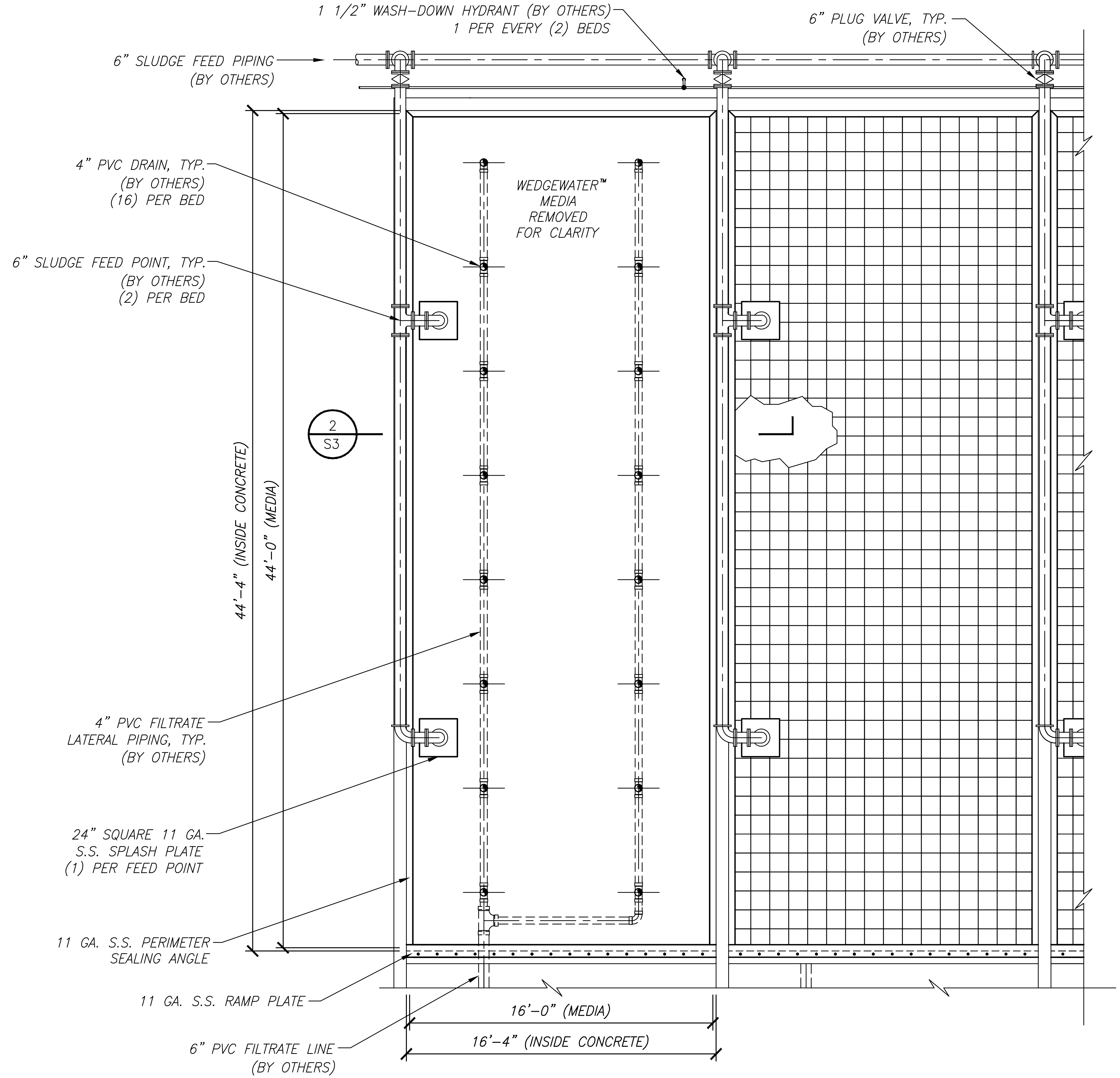
1.44 MGD WWTP Sludge Drying Beds
Anywhere, U.S.A.

Drying Bed Layout & Details
Preliminary

GRAVITY FLOW SYSTEMS SOUTHWEST, INC.
P.O. BOX 1200
DRIPPING SPRINGS, TEXAS 78620
PHONE (830) 379-5730
Specializing in Gravity Dewatering Equipment

JOB NO.	XX
FILE NAME	XX
SHEET	S1

PLOT DATE: 9/12/13
PLOT SCALE: AS SHOWN



1 **DETAIL**

SCALE: 1/4" = 1'-6"

SCALE:	AS SHOWN
DRAWN:	JDS
CHECKED:	ALH
DATE:	9/10/13

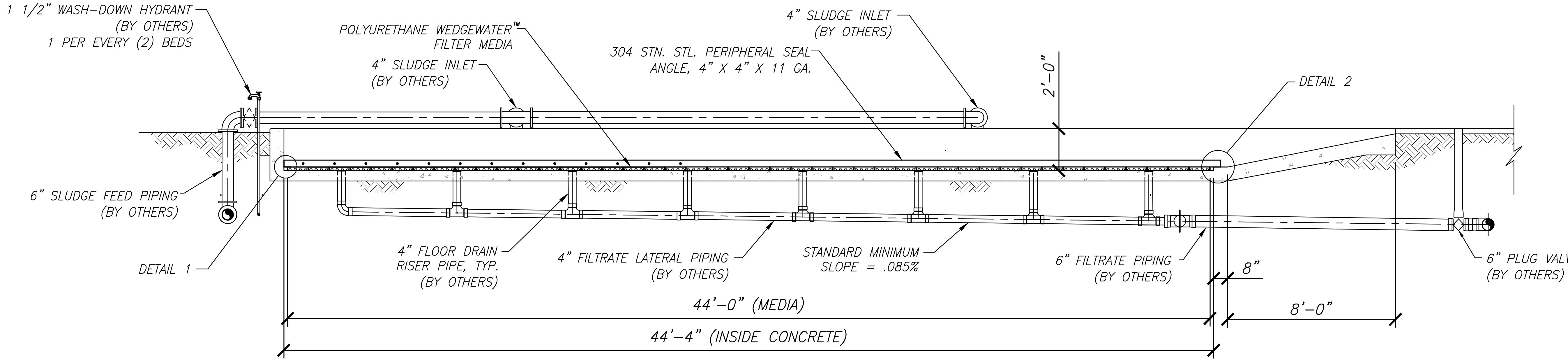
1.44 MGD WWTP Sludge Drying Beds
Anywhere, U.S.A.

Drying Bed Layout & Details
Preliminary

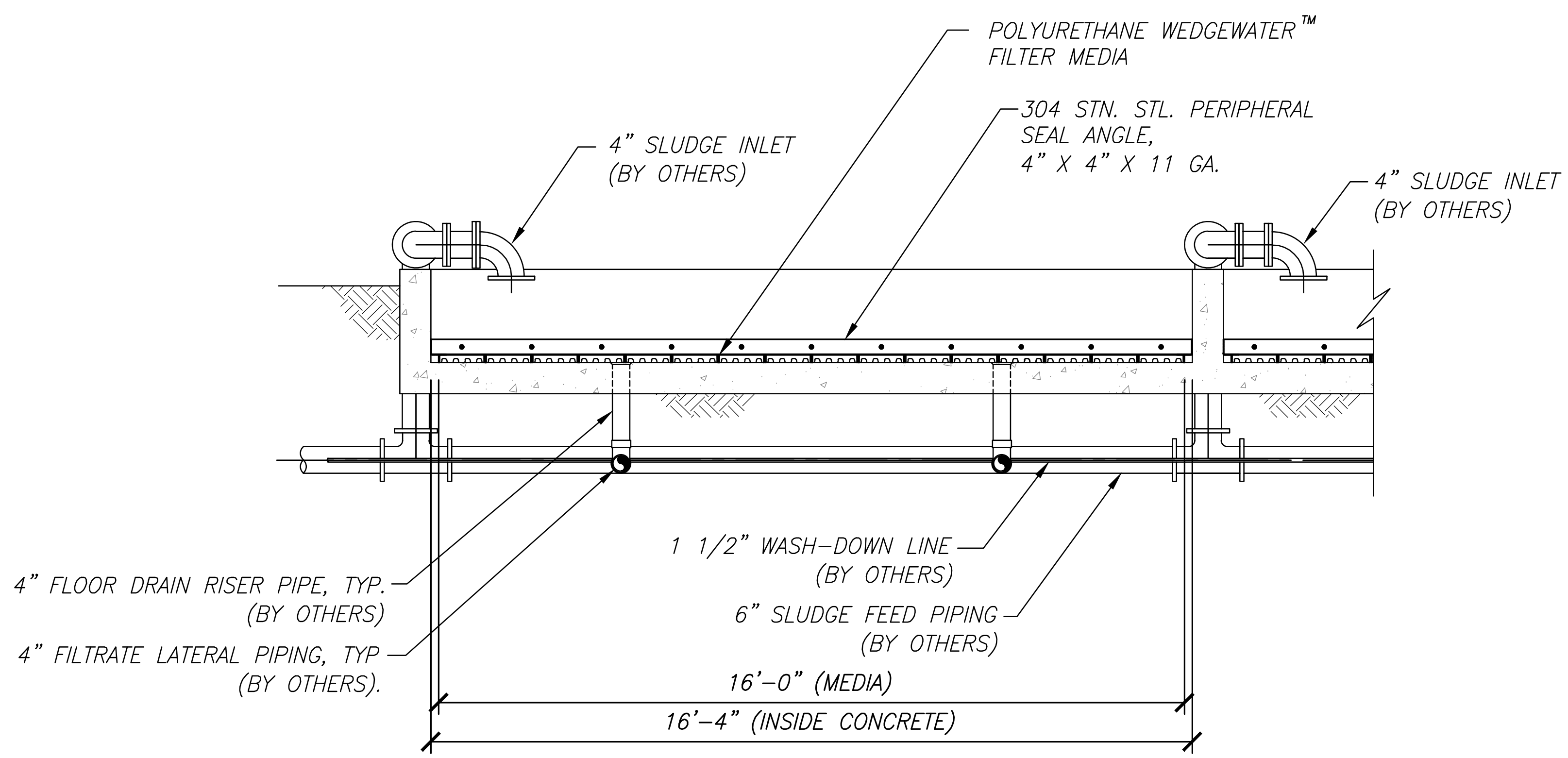
GRAVITY FLOW SYSTEMS SOUTHWEST, INC.
P.O. BOX 1200
DRIPPING SPRINGS, TEXAS 78620
PHONE (830) 379-5730
Specializing in Gravity Dewatering Equipment

JOB NO.	XX
FILE NAME	XX
SHEET	S2

PLOT DATE: 9/12/13
PLOT SCALE: AS SHOWN



1 SECTION
SCALE: 3/16" = 1'-0"



2 SECTION
SCALE: 1/4" = 1'-0"

PLOT DATE: 9/12/13
PLOT SCALE: AS SHOWN

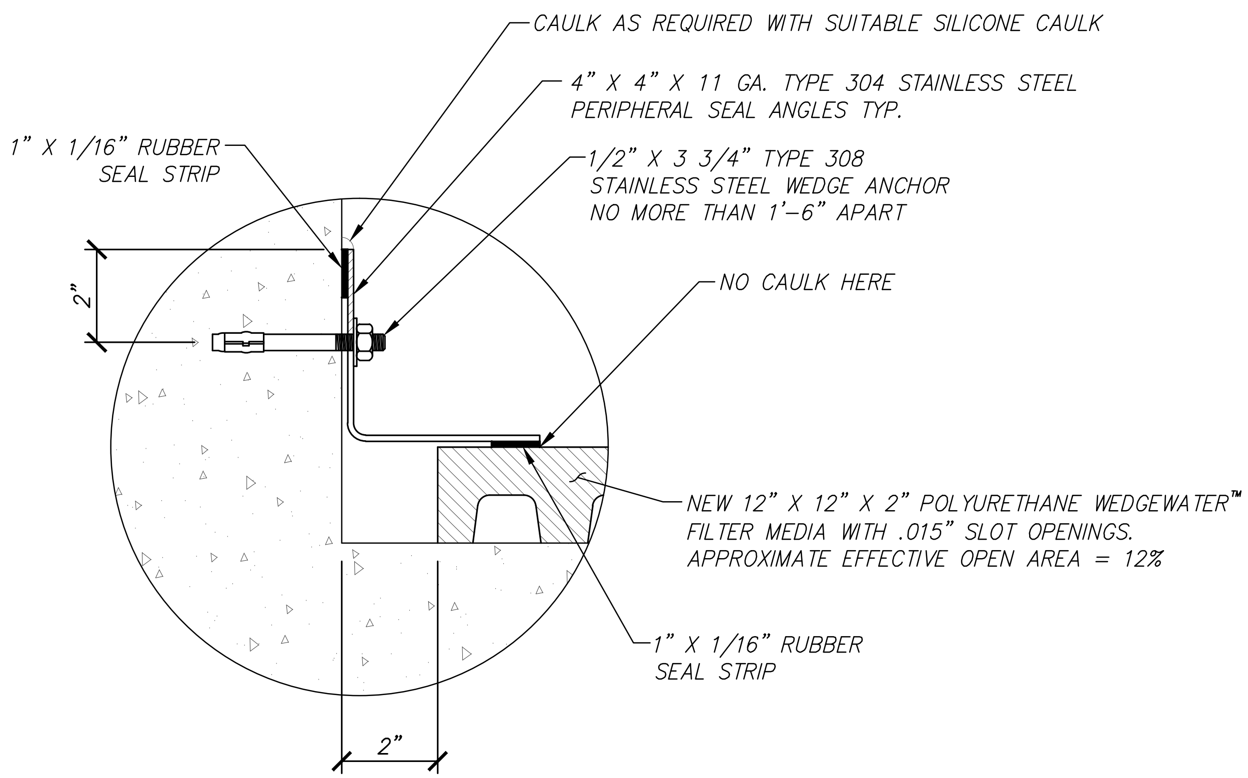
SCALE: AS SHOWN
DRAWN: JDS
CHECKED: ALH
DATE: 9/10/13

1.44 MGD WWTP Sludge Drying Beds
Anywhere, U.S.A.

Drying Bed Layout & Details
Preliminary

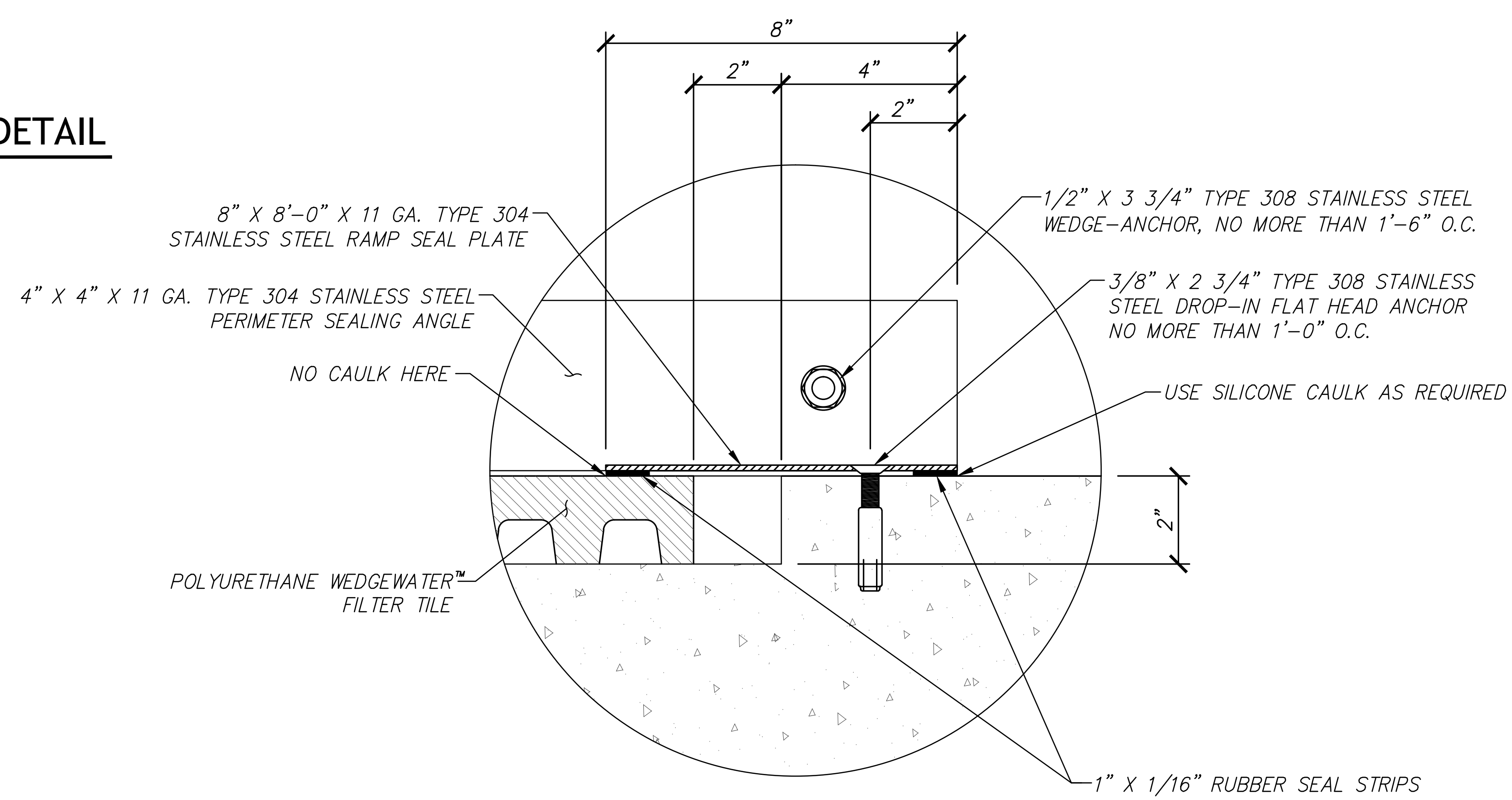
GRAVITY FLOW SYSTEMS SOUTHWEST, INC.
P.O. BOX 1200
DRIPPING SPRINGS, TEXAS 78620
PHONE (830) 379-5730
Specializing in Gravity Dewatering Equipment

JOB NO. XX
FILE NAME XX
SHEET S3



1 PERIPHERAL SEAL ANGLE DETAIL

SCALE: 1/4" = 1"



2 RAMP PLATE DETAIL

SCALE: 1/4" = 1"

PLOT DATE: 9/12/13
PLOT SCALE: AS SHOWN

SCALE: AS SHOWN
DRAWN: JDS
CHECKED: ALH
DATE: 9/10/13

1.44 MGD WWTP Sludge Drying Beds
Anywhere, U.S.A.

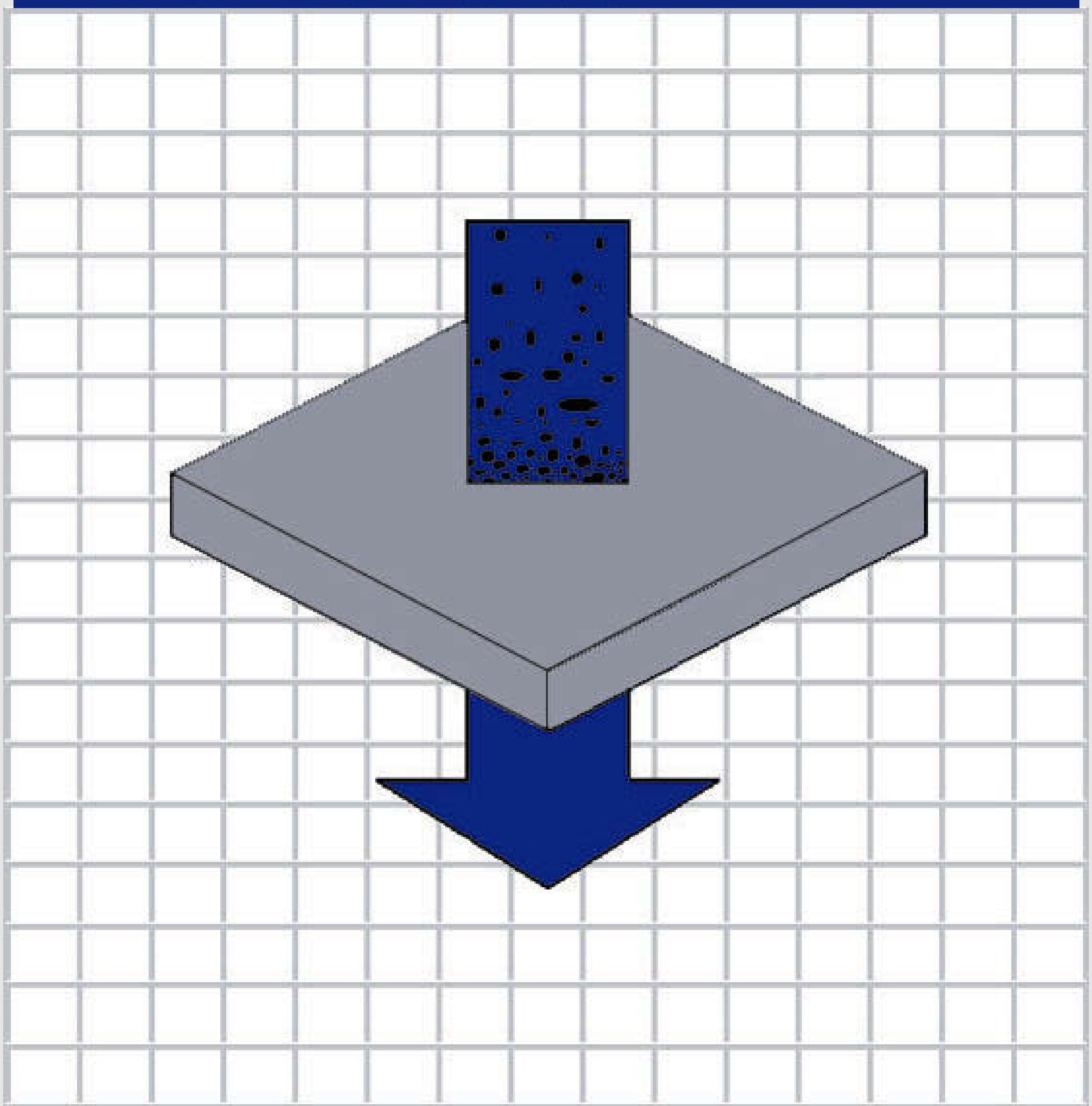
Drying Bed Layout & Details
Preliminary

GRAVITY FLOW SYSTEMS SOUTHWEST, INC.
P.O. BOX 1200
DRIPPING SPRINGS, TEXAS 78620
PHONE (830) 379-5730
Specializing in Gravity Dewatering Equipment

JOB NO. XX
FILE NAME XX
SHEET S4

Gravity Flow Systems Southwest, Inc.

GFS HAS THE ANSWER

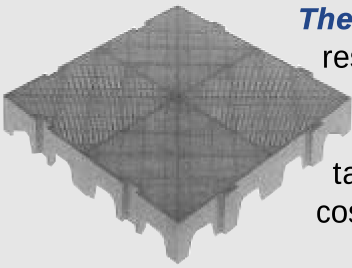


GFS Wedgewater™ Filter Bed

Waste Treatment that Doesn't Waste Time or Money

The Wedgewater™ Filter Bed System

The Advanced Filter Media That Saves You Time and Money in Your Sludge Dewatering Operation



The Wedgewater™ Filter Bed System is the result of intensive research, rigorous field testing, and years of experience in screen and filter design and manufacture. It offers highly cost-effective sludge dewatering, with significant advantages over both slow, space-consuming sand drying beds and costly, energy-intensive mechanical dewatering units.

This unique system is composed of interlocking 12” x 12” high-density polyurethane filter modules. Practically indestructible, these panels shrug off the effects of sun and environment, are corrosion and abrasion resistant, nonconductive and virtually maintenance free.

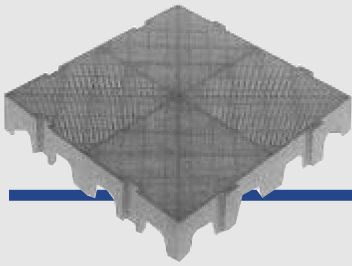
Each module features a special non-clogging orifice design, 12% open area, and built-in underdrain which insures continuous dewatering. Integral, molded-in structural elements allow the panels to easily support small front-end loaders for sludge cake removal. The interlocking panel modules make setup and panel replacement a snap ... without tools!

All Types of sanitary sewage and water treatment sludges are efficiently dewatered by Wedgewater™ Filter Beds. The system also effectively dewaters most biological and chemical industrial sludges. It is suited to both indoor and outdoor applications. Unaffected by wide variations in concentration, the system can dewater a 1% aerobically digested sludge one day, followed by a 5% primary sludge the next. Even the most dilute sludges can be economically concentrated.

The filtrate extracted by the process is of a high quality, usually less than 50 ppm suspended solids, with low BOD and COD levels. The filter panel design maintains sludge porosity, prevents media blinding and maintains filtrate drainage at the optimal rate. The high capture rate and unusually clear filtrate allow many plants to discharge the effluent directly into tertiary processes.

After dewatering, the sludge is left suspended on a dry media. The circulation of air both above and below the layer of sludge speeds drying. The sludge cake can then be easily removed with mechanical loaders.

Save time and money in your dewatering operations — contact your Gravity Flow Systems Southwest, Inc. representative for a complete proposal on implementing the cost-effective Wedgewater™ Filter Bed System.



Near Perfect Reliability

The Wedgewater™ Filter Bed System is so simple, practically nothing can go wrong. Since there are no moving parts, there is no possibility of mechanical failure. The system is virtually maintenance free, requiring only a quick wash down at the end of each cycle and a semi-annual check of the tank and media perimeter seal. Should an individual panel ever be damaged, it can easily replaced on-the-spot by your own personnel — without special tools or skills.

Saves Space

Wedgewater™ Filter Beds require a mere 1/6 to 1/10 the space of outmoded sand drying beds. Use the space saved for other plant needs, or expand the area devoted to Wedgewater™ Filter Beds - and exponentially increase your dewatering capacity.

Improved Operating Environment

Because it uses gravity to do the work, Wedgewater™ Filter Beds consume no power, and produce no by-products or emissions. Operation is noiseless, so there is no on-site hearing loss or off-site complaints. The efficiency of the system and high quality filtrate produced, dramatically improve overall plant performance.

Lebanon, Ohio This 3.5 MGD low-load counter current aeration system plant desired a non-mechanical dewatering system. GFS had the answer: install 10,000 square feet of Wedgewater™ Filter Beds enclosed in a translucent building. Dewatering takes place year round utilizing gravity alone with no mechanized equipment used for the dewatering cycle. Original design called for 70,000 square feet of conventional sand beds. Wedgewater™ beds were able to reduce that area by one-seventh.

Quick, Effortless Dewatering

The Wedgewater™ system dewaters in 2 to 3 days, rather than the weeks required by conventional sand beds. Mechanical sludge cake removal is almost effortless. The entire process is as easy as 1-2-3 . . .
Just flood the filter bed . . . Wait . . . remove the sludge cake. Then, cycle again.

George's Creek, Maryland
Extended Operating Season

This 1.0 MGD oxidation ditch plant needed to extend the operating season of their dewatering cycle to at least eight months of the year. GFS had the answer: dewatering indoors. GFS recommended Wedgewater™ Filter Beds enclosed in a translucent structure, sheltering the sludge from seasonal rains and taking advantage of passive solar heating to extend the months of operation.

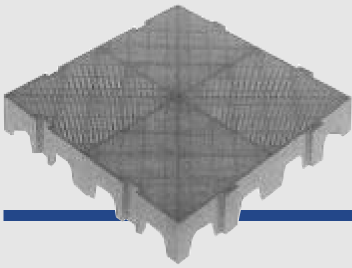
Clermont County
Middle East Fork Wastewater Treatment Plant
Batavia, OH — Design Flow: 7.2 MGD
Waste Activated Sludge

La Place, Louisiana Wastewater Treatment Plant — Four 1800 square foot Wedgewater™ Filter Beds

Bay Minette, Alabama

This 2.0 MGD low-load counter current extended aeration system plant desired a dewatering system that was non-mechanical, required minimal maintenance and operator attention. GFS had the answer: install three 1250 square foot beds enabling them to dewater 3 tons of dry solids per week.

Jacksonville, Florida Naval Air Station
Four 750 square foot Wedgewater™ Filter Beds
Aerobically Digested Sludge



Low Initial Cost

Since it is modular in design, the Wedgewater™ Filter Bed System can be sized to your exact needs now, yet it can be easily expanded later, eliminating costly over-capacity. Wedgewater ™ Filter Beds offer dramatic cost savings over mechanical dewatering equipment. The entire system consists of a bed of Wedgewater™ Filter Panels, tankage, and minor auxiliary pumps, equipment and appurtenances.

Low Operating Cost

The system functions continuously by force of gravity without any supervision. The dewatering process therefore costs practically *nothing* to operate ...

... the only energy costs are the minor requirements of the auxiliary equipment. This unique means of low pressure dewatering requires less polyelectrolyte than other advanced systems. The use of front-end loaders speeds sludge cake removal, minimizing labor costs, and with Wedgewater™ Filter Beds, there is absolutely no media loss.

Cypress Walk, Florida

This 1.0 MGD waste activated treatment facility serves the famed Grand Cypress Planned Unit Development in Orlando, Florida. The engineer in charge specified that the dewatering system be noiseless, require minimal maintenance, and be aesthetically pleasing. GFS had the answer: the contemporary design-appeal of a mosaic of Wedgewater™ Filter Media. The installation is attractive, requires no power to operate and requires very little maintenance.

Experience

GFS sets the standard, with over 350 installations of Wedgewater™ Filter Beds spanning 20 years. We are the oldest in the business, and have the experience to make sure your installation works the way it is supposed to ... First time, every time.

Saint Bernard Parish, Louisiana
Dravo Sewage Treatment Plant

This 3.5 MGD contact stabilization activated sludge plant required a dewatering system with minimal space requirements and minimal manpower requirements. GFS had the answer: install 7200 square feet of Wedgewater™ Filter Beds covered with a translucent roof. Mechanical dewatering methods were rejected due to increased maintenance and operational costs. Outdated sand beds were rejected due to space limitations and increased manpower requirements. The Wedgewater™ Filter Beds utilized one-tenth of the area with virtually no maintenance, significantly reduced manpower requirements, and greatly reduced operational costs. Dewatering efficiency was increased while overall operating expenses were decreased, freeing up man-hours to be utilized for normal everyday operation and maintenance of the treatment plant.

Hohenwald, Tennessee
Wastewater Treatment Plant -
Two 1000 square foot Wedgewater™ Filter Beds

Kingston, Tennessee

This 1.0 MGD low-load oxidation ditch plant needed a dewatering system that would require little maintenance and be space efficient. Original design called for 20,000 square feet of sand drying beds. GFS had the answer: Utilize one-tenth of that space. By installing two 20’ x 50’ Wedgewater™ Filter Beds, dewatering capacity is not diminished while total area was significantly decreased.

SLUDGE TYPE	% DRY SOLIDS		CAPACITY
Sanitary	Initial Solids	Final Solids after 24 hours	Pounds Dry Solids/ ft²/load
Raw Primary	2-6%	18-24%	1-4.25
Waste Activated	1-3%	8-14%	0.75-2
Aerobic Digested	1-3%	8-14%	0.75-2
Anaerobic Digested	2-8%	14-18%	1-5.75
Chlorine Stabilized	0.75-1.5%	10-14%	0.5-1
Aerobic Digested with Aluminum	1-3%	10-16%	0.75-2
Water and Industrial			
Aluminum Clarification	1-4%	8-13%	0.75-2.5
Lime Clarification	8-12%	25-35%	4-8
Aluminum Hydroxide	0.5-1.5%	8-12%	0.5-1
Iron Hydroxide	1-4%	11-15%	0.75-2.5
Zinc Hydroxide	0.5-1.5%	8-12%	0.5-1
Lead Hydroxide	0.75-2%	8-12%	0.5-1.25
Copper/Nickel Hydroxide	1-3%	10-14%	0.5-2
Iron Clarification	2-6%	14-20%	1-4
Paper Mill Waste	1-3%	7-12%	0.75-2
Tanning Waste	1-3%	12-15%	0.75-2

*This chart illustrates operating results and capabilities from typical municipal and industrial installations employing Wedgewater™ Filter Beds, or from pilot plant demonstrations. The concentrations and capabilities listed from each type of sludge are for *general information purposes only*. Because variation in concentration and capacities may be experienced due to the individual nature of a particular sludge, contact Gravity Flow Systems Southwest for specific design data. Gravity Flow Systems Southwest, Inc. accepts no responsibility for any operational or design data not submitted in writing directly from Gravity Flow Systems Southwest, Inc.

GFS SOUTHWEST
GFS HAS THE ANSWER

Gravity Flow Systems Southwest, Inc.

Seguin, Texas
Tel: (830) 379-5730 • Fax (830) 379-5781
www.gravityflow.com

Locally represented by:

TROJANUVFIT™

WASTEWATER DISINFECTION FILTERED IN-PIPE TREATMENT

TROJANUVFIT™

Proven TrojanUV Closed-Vessel Chambers for Reuse Disinfection.

Validated, chemical-free disinfection from the industry leader

Around the globe, wastewater treatment plants of all sizes are responding to the water quality and quantity demands of the communities they serve. As more municipalities adopt wastewater reuse policies and practices, wastewater treatment plants are required to treat effluent to higher levels–essentially eliminating all pathogens prior to reuse or discharge.

Depending on site and design conditions, wastewater treatment plants producing filtered effluent sometimes prefer a disinfection solution using closed-vessel or pressurized UV chambers. The TrojanUVFit™ offers an effective and energy-efficient closed-vessel UV solution. This compact chamber is available in multiple configurations to treat a wide range of flow rates. The streamlined hydraulic profile of closed-vessel systems disinfect filtered effluent without breaking head in the treatment process. These benefits, along with UV's ability to provide environmentally friendly, chemical-free treatment for chlorine resistant microorganisms (such as *Cryptosporidium* and *Giardia*) make the TrojanUVFit closed-vessel solution an attractive option for wastewater disinfection.

Key Benefits
TrojanUVFit

Fully validated performance. System sizing is based on actual dose delivery verified through bioassay validation. Real-world, field performance data eliminates sizing assumptions and risks associated with theoretical dose calculations.

Compact design. The small chamber footprint simplifies indoor retrofit installations and reduces construction costs.

Reliable, proven components. UV lamps, quartz sleeves, electronic lamp drivers, sensors and sleeve wiping system have been tested, proven reliable and are operating in hundreds of installations.

Design flexibility. Chambers can be installed in parallel or in series, making it simple to incorporate redundancy or future expansion needs.

Wide range of flow rates. Peak flow rates per chamber are suitable for either individual post-filter or manifold installation. Flows up to 7 MGD per chamber – the largest validated low-pressure lamp in-pipe wastewater system in the industry.

Validated lamp performance. Lamp output and aging characteristics validated through industry protocols and proven through years of operating experience.

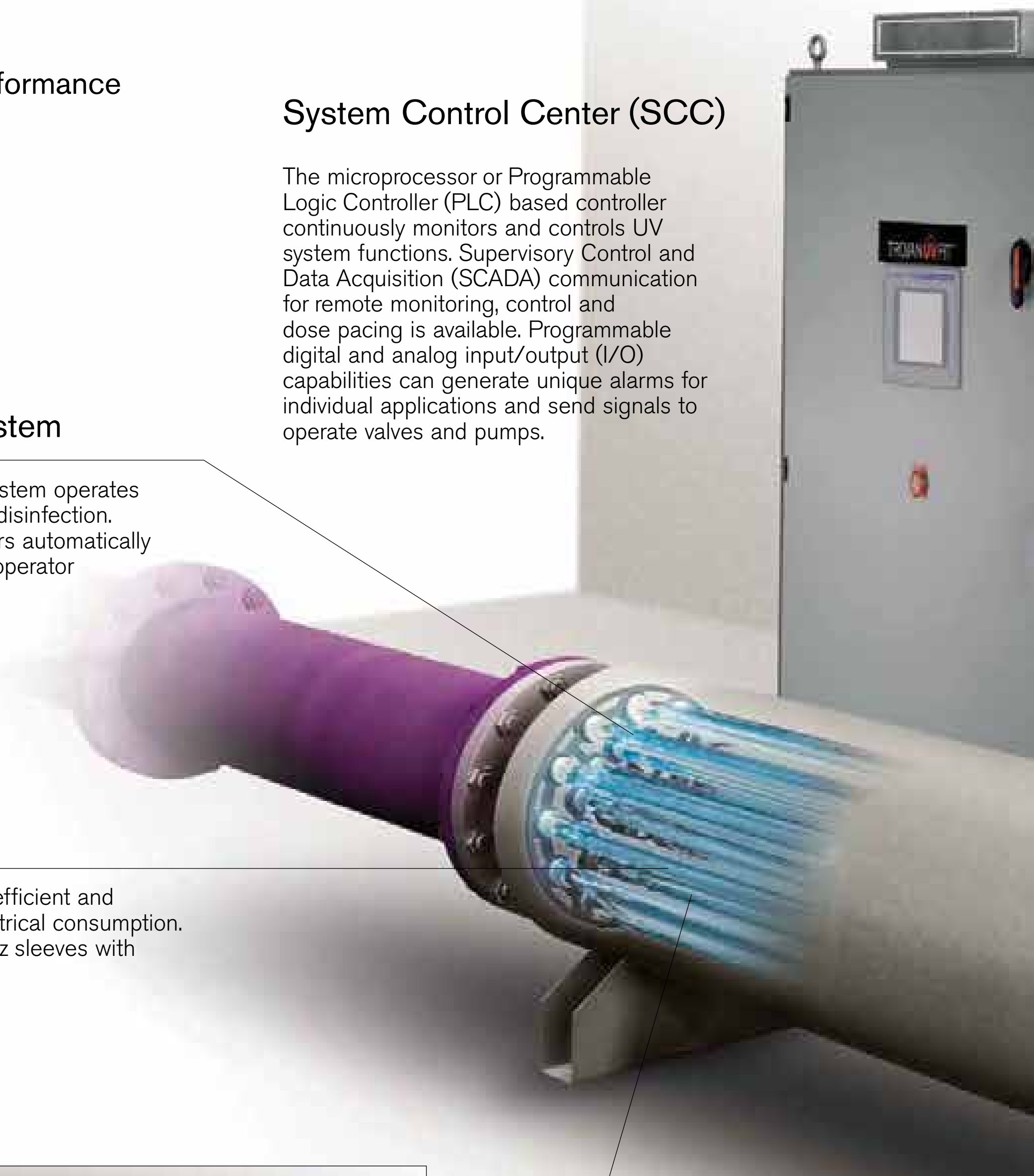
Automatic wiping. Automatic sleeve wiping saves operator's time and money. Ensures the maximum UV output is available for disinfection and minimizes energy consumption.

Global support. Local service. Our comprehensive network of certified service providers offers fast response for service and spare parts.

Guaranteed performance and comprehensive warranty. Our systems include a Lifetime Disinfection Performance Guarantee.

TROJANUVFIT™

Designed for efficient, reliable performance



System Control Center (SCC)

The microprocessor or Programmable Logic Controller (PLC) based controller continuously monitors and controls UV system functions. Supervisory Control and Data Acquisition (SCADA) communication for remote monitoring, control and dose pacing is available. Programmable digital and analog input/output (I/O) capabilities can generate unique alarms for individual applications and send signals to operate valves and pumps.

Sleeve Wiping System

Automatic sleeve wiping system operates online without interrupting disinfection. The wiping sequence occurs automatically at preset intervals without operator involvement.

Amalgam Lamps

High-output amalgam lamps are energy-efficient and save operating costs due to reduced electrical consumption. Lamps are located within protective quartz sleeves with easy access from the service entrance.

UV Intensity Sensor

Highly accurate, photodiode sensor monitors UV output within the chamber. The sensor ensures UV light is fully penetrating the water for complete disinfection.

This chamber contains lamps in both ends of the chamber. Multiple inlet and outlet flange orientations are available.

Power Distribution Center (PDC)

The PDC panel distributes power to the chamber, UV intensity sensor and sleeve wiping system. The panel also houses high-efficiency, variable-output lamp driver (60 – 100% power) with proven performance in hundreds of installations around the world.

End Cap

The end cap protects and isolates connections for components such as lamps, sleeves and wiping system. Power is automatically disconnected if end cap is removed thereby ensuring a safe working environment for operators.

UV Chamber

Electropolished 316L stainless steel chamber available in multiple configurations for a wide range of flow rates. Optional flange orientations allow chambers to fit into existing piping galleries or tight spaces.

Regulatory-Endorsed Bioassay Validation

Field testing ensures accurate dose delivery

Benefits:

- Validated in accordance with industry protocols established by National Water Research Institute (NWRI)
- Performance data is generated from actual field testing over a wide range of flow rates and water quality (UV transmission)
- Bioassay testing offers peace of mind and improved public and environmental safety due to verified dose delivery – not theoretical calculations

Compact Chamber for Installation Flexibility

Efficient, cost-saving design enables retrofit or new construction

Benefits:

- Compact footprint simplifies installation and minimizes related capital costs – ideal for retrofit and new construction applications
- Lamps and sleeves are fully serviceable from the chamber end – allowing the system to be installed against walls, other equipment or piping
- Low head loss design simplifies integration into existing process, and avoids additional pumping and associated capital and operational costs
- Multiple flange orientations available – increasing design flexibility

Chambers can be installed in parallel or in series for increased design and installation flexibility.

Amalgam Lamps Require Less Energy

Maintain maximum output and reduce O&M costs

Benefits:

- Each lamp draws 250 Watts
- Our amalgam lamps maintain 98% output during entire lamp life – 20% less decline than competitive UV lamps
- Validated performance provides assurance of reliable dose delivery and prolonged lamp life
- Deliver consistent and stable UV output over a wide range of water temperatures

Built for Reliable Performance and Easy Maintenance

Designed for trouble-free operation and minimal service

Benefits:

- Routine procedures, including lamp change-outs are simple and require minimal time – reducing maintenance costs
- Access to internal components (lamps, sleeves, cleaning system) through service entrance at one end
- Service entrance and connections protected by end cap
- Intensity sensor continuously monitors UV output to ensure dose delivery

The TrojanUVFit lamps are easily replaced in minutes without the need for tools.

Robust Sleeve Wiping System

Automatic wiping system maintains consistent dose delivery

Benefits:

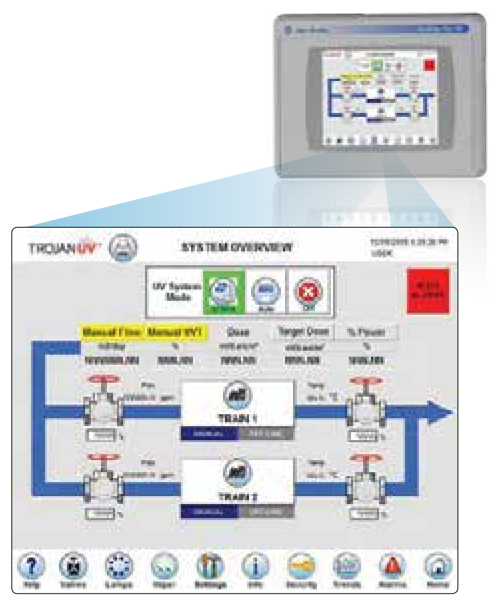
- Wiping system minimizes fouling of quartz sleeves
- Ensures consistent UV dose delivery and optimum performance
- Automatic wiping occurs while the lamps are disinfecting, reducing downtime
- Optional off-line chemical cleaning to reduce maintenance associated with manual cleaning

User-Friendly Operator Interface

Touchscreen display allows easy operation and monitoring

Benefits:

- Microprocessor or PLC-based system controls all functions and dose pacing to minimize energy use while maintaining required UV dose
- Controller features intuitive, graphical display for at-a-glance system status
- Controller communicates with plant SCADA systems for centralized monitoring of performance, lamp status, power levels, hours of operation and alarm status



The PLC-based controller combines sophisticated system operation and reporting with an operator-friendly, touchscreen display.

TROJANUVFIT™

System Specifications

Model			04AL20	08AL20	18AL40	32AL50	72AL75	D72AL75
Number of Lamps			4	8	18	32	72	144
Lamp Type			High-efficiency, High-output, Low-pressure Amalgam					
Sleeve Wiping			Automatic wiping system					
Lamp Driver			Electronic, constant output (100% power) or electronic, variable output (60 to 100% power)					
Chamber								
Materials of Construction			316L Stainless Steel					
Flange Size (ANSI/DIN), inches (mm)			6 (150)		10 (250)	12 (300)	20 (500)	20 (500)
Outlet Flange Orientation			Multiple orientations available 3, 6, 9 or 12 o'clock position					
Approx. Chamber Length, inches (mm)			80 (2032)	80 (2032)	82 (2083)	90 (2286)	90 (2286)	152 (3860)
Max. Operating Pressure, PSI (bar)			150 (10)	150 (10)	150 (10)	100 (6.8)	65 (4.5)	65 (4.5)
Dry Chamber Weight, lbs (kg)			107 (49)	115 (52)	400 (181)	1600 (726)	2100 (953)	3700 (1678)
Wet Chamber Weight, lbs (kg)			230 (105)		877 (398)	2200 (998)	3700 (1678)	7200 (3265)
Power Distribution Center (PDC)								
Electrical Supply	Standard: Single phase, 2 wire + gnd, 50/60 Hz L-L	120V	N/A	N/A	N/A	N/A	N/A	N/A
		208V	√	√	√	√	N/A	N/A
		240V	√	√	√	√	N/A	N/A
	3 Phase, 4 wire + gnd, 50/60 Hz	400/230V	N/A	N/A	√	√	√	√
Dimensions (H x W x D) inches (mm)		Type 12	30 x 16 x 10 (760 x 410 x 250)		36 x 30 x 10 (920 x 760 x 250)	60 x 36 x 10 (1520 x 920 x 250)	86 x 48 x 24 (2184 x 1219 x 610)	86 x 96 x 24 (2184 x 2438 x 610)
		Type 3R						
		Type 4X	30 x 24 x 10 (760 x 610 x 250)			60 x 36 x 12 (1520 x 920 x 305)		
Material		Type 12	Painted Mild Steel					
		Type 3R	Painted Mild Steel					
		Type 4X	304 Stainless (1.4301 in Europe)					
Panel Rating			NEMA 12, 3R or 4X			NEMA 12 or 4X		
Network Interface			Modbus RTU RS485, Modbus TCP/IP, AB Ethernet I/P, ProfiNet				N/A	
System Control Center (SCC)								
Panel is Required/Optional			N/A (requires only PDC)			Optional	Required	
Electrical			N/A (see PDC)			Two (2) Supplies of 120 V single phase, 2 wire plus ground, 60 Hz, 1.2 kVA (one (1) for the PLC, one (1) for lights & heater)		
Material		Type 12	Painted Mild Steel					
		Type 4X	Stainless(1.4301 in Europe)					
Panel Rating			N/A (see PDC)			NEMA 12 or 4X		
Typical Outputs Provided			Chamber status, common alarms and SCADA communication					
Network Interface			Modbus RTU RS485, Modbus TCP/IP, AB Ethernet I/P, ProfiNet					

TrojanUV is part of the Trojan Technologies group of businesses.

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TROJANUV™
WATER CONFIDENCE™

APPENDIX G

PRELIMINARY VENDOR INFORMATION FOR PACKAGED MBR SYSTEMS

CLOACINA
PACKAGE TREATMENT SOLUTIONS

MEMPAC-M500, MEMBRANE PACKAGE
STANDARD ESTIMATE

PROJECT NAME	St. Helena WWTP	ESTIMATE DATE	3/21/2019
CONTACT NAME	Jason Crowley, PE	PROJECT NUMBER	CL19-029
CONTACT EMAIL	jcrowley@hydroscience.com	REVISION NUMBER	5
CONTACT NUMBER	619-392-1906	REVISION DATE	9/20/2019

MEMPAC Installation

1 DESIGN PARAMETERS

The following parameters are used for the standard product design.

1.1 Influent Flow

RANGE	Peaking Factor	VOLUME (GPD)	SOURCE
Average Annual Flow (AAF)		500,000	M500 Standard
Maximum Daily Flow (MDF)	1.50	750,000	M500 Standard
Peak Daily Flow (PDF)	2.66	1,330,000	Project Engineer
Peak Hour Flow (PHF)	4.00	1,389 gpm	M500 Standard

1.1.1 Flow Definitions

Wastewater flow can be described in a multitude of ways, related to varied time periods, wet and dry weather, seasonal populations and permit definitions. To ensure that the estimated package meets the project needs, the following terms shall be used to define the hydraulic capacity of the proposed system:

TERM	DEFINITION
Average Annual Flow (AAF)	The average flow of a one-day period which is the influent volume in one year divided by the number of days in that year. AAF is typically the nominal capacity of a plant.
Maximum Daily Flow (MDF)	The maximum daily flow occurring over a 24-hour period. Cloacina utilizes MDF for maximum biological design and the maximum sizing of the treatment equipment.
Peak Daily Flow (PDF)	The single greatest flow of a one-day (24hr) period in a year. PDF serves for design of plant hydraulic capacity. Flow rates greater than PDF, including Peak Hour Flow (defined below), are to be equalized to PDF by influent storage (by others) that augments the treatment plant.
Peak Hour Flow (PHF)	The flow over a 60-minute period which is the influent flow of the highest flow hour in the Peak Day. For applications in which influent is screened prior to equalization, screens shall be sized for PHF. In the absence of a PHF specified by the Client, PHF will be calculated as a function of the plant's service population per "Metcalf & Eddy".

1.2 Flow Equalization

The proposed system is designed to ensure Max Month Daily Flow rate can discharge from the package with a minimum of 50% of equipment online. Cloacina recommends the client provide the necessary volume to store peak weekday diurnal flow.

1.3 Influent Loading

The following table outlines the organic loading standards used to develop this Cloacina product.

CONSTITUENT	INFLUENT CONCENTRATION (mg/L)	ORGANIC LOADING* (lbs/day at AAF)	ORGANIC LOADING* (lbs/day at MDF) 75% of AVG mg/L	SOURCE
BOD	425	1,701	1,994	Engineer
TSS	300	1,138	1,407	Engineer
TKN	60	245	281	Engineer
NH_3	85	355	399	Engineer
Phosphorus	9	36.8	42	Engineer
Grease and Oil	<50			Standard

***Reflects 2mm screen efficiency**

1.4 Effluent Limitations

The following performance parameters are expected upon equipment start-up and biological stabilization:

CONSTITUENT	CONCENTRATION (mg/L)	UNIT	SOURCE
BOD	10	mg/L	Standard
TSS	10	mg/L	Standard
TKN	10	mg/L	Standard
NH_3	5	mg/L	Standard
Phosphorus	3	mg/L	Standard

Additional equipment can be supplied to meet more stringent requirements.

2 PACKAGE PARAMETERS

2.1 Package Dimensions

The following are the anticipated dimensions of the base package treatment train. The dimensions are for the package only and do not include attached equipment, exterior walkways or unattached equipmen t such as dumpsters or chemical storage.

DESCRIPTION	HEIGHT	WIDTH	LENGTH	ESTIMATED WEIGHT (LBS at operating depth)
Outside Dimensions of Package Tanks	10'	80'	102'9"	2,800,000
Required area with attached equipment and access	18'	110'	133'	

2.2 Power Requirements

The package outlined is designed for 3 phase 480 volt, 4 wire power supply.

Installed Panel

3 SCOPE OF SUPPLY

3.1 Headworks

To protect membrane equipment influent must be screened to a minimum of 2mm prior to entering the package system:

EQUIPMENT	DESCRIPTION	QUANTITY
Influent Screen Platform	Stainless Steel platform integrated above Anoxic Chamber A1	1
Influent Control Box	Stainless Steel Flow Control Box	1
Influent Screen	2mm auger screens with wash bar and compaction zone designed for Instantaneous Peak Flowrate of 695 gpm	2

Example Screen Installation

3.2 Anoxic Process

To meet effluent nitrogen requirements, it is necessary to incorporate an anoxic stage into the treatment train.

3.2.1 Anoxic Operating Parameters

The following parameters were used to design the Anoxic Process:

PARAMETER	RANGE	UNIT
Average BOD Loading (After Screen)	1,701	lbs/day
Average Nitrogen Loading (After Screen)	246	lbs/day
Required Hydraulic Residence Time (Per Train)	4	Hrs

3.2.2 Anoxic Equipment

The following equipment will be supplied as part of the Anoxic process:

EQUIPMENT	DESCRIPTION	EACH CHAMBER	TOTAL
Mixer	Propeller Mixer on Slide Rail	2	8
Monitoring	ORP Sensor	1	4
Monitoring	pH Sensor		2

Example Submerged Mixer

3.3 Aerobic Process

3.3.1 Aerobic Operating Parameters

The following performance parameters are expected upon equipment start-up and stabilization:

PARAMETER	AAF	MDF	UNIT
F/M Ratio	.1	.12	
MCRT	26	15	Days
Hydraulic Residence Time (HRT)	17.1	11.4	HRS
MLSS Concentration	8,800	8,800	mg/L
Air Supply (Total, split between 6 chambers)	1,526	2,266	SCFM
Return Activated Sludge (RAS)	1,736	4,618	gpm

3.3.2 Aerobic Equipment

The following equipment will be supplied as part of the Aerobic process:

EQUIPMENT	DESCRIPTION	EACH CHAMBER	TOTAL
Aeration Blower	Regen Blower (400 cfm)	1	6
Aeration Blower	Blower VFD	1	6
Recirculation	Pumps transfer flow from aeration to membrane	2	4
Monitoring	RAS Flow Meter	1	2
Monitoring	Dissolved Oxygen Sensor	1	6
Monitoring	Level Sensor	1	6
Monitoring	Nitrate Sensor		2

Example Aeration Grid

3.4 Waste Activated Sludge (WAS)

All biological treatment processes reducing BOD and Suspended Solids (SS) produce bio solids or sludge as a by-product. This material must be removed from the treatment process and can either be stored or treated further prior to final disposal.

3.4.1 WAS Operating Parameters

The following are is the anticipated Waste Activated Sludge production at average loading:

PARAMETER	AAF	MDF	UNIT
lbs of WAS/lbs of influent BOD	.49	.73	Ratio
Daily Waste Activated Sludge Volume	9,145	15,906	gal
WAS Solids Concentration	11,000	11,000	mg/L

3.4.2 WAS Equipment

The following equipment will be supplied for solids disposal:

EQUIPMENT	DESCRIPTION	TOTAL
Sludge pump (WAS)	Used to remove a metered amount of solids from the secondary treatment system depending on solids concentration	4
Monitoring	On-line MLSS meter in Aeration Process	2
Monitoring	Waste Sludge Flow Meter	1

Example Sensor Installation

3.5 Clarification Process

Prior to disposal, it is necessary to separate solids from the effluent to be discharged. This will be accomplished by membrane filtration.

3.5.1 Membrane Design Parameters

The following are the design and operating parameters of the membrane clarification equipment:

PARAMETER	EACH CASSETTE	50% OF CASSETTES	TOTAL	UNIT
FibrePlate™ FPM500-3X10	1	4	8	Cassettes
FibrePlate™ FPM500	30	120	240	Modules
ft^2 of Surface Area	15,000	60,000	120,000	ft^2
Average Annual Flow Flux	33.3	8.3	4.2	gpd/ft^2
Maximum Daily Flow Flux	50.2	12.5	6.3	gpd/ft^2
Peak Daily Flow	88.7	22.2	11.1	gpd/ft^2
Average Permeate Flow @ 1,091 minutes	458			gpm
Max Permeate Flow @ 1,091 minutes	690			gpm
Peak Permeate Flow @ 1,091 minutes	920			gpm
Air Supply (per cassette)	306			SCFM

3.5.2 Membrane Equipment

The following equipment will be supplied as part of the membrane clarification process:

EQUIPMENT	DESCRIPTION	EACH CHAMBER	TOTAL
Membrane Cassette	Fibracast FPM-500 3x10	1	8
Membrane Blower	600 cfm positive displacement blower in sound attenuated cabinet (supplies two cassettes)		4
Permeate Pump	Rotary Lobe Pump (supplies two cassettes)		4
Permeate Pump VFD	Dedicated VFD for control of membrane permeate rate		4
Monitoring	Permeate Flow Meter (1 per permeate pump)		4
Monitoring	Permeate Pressure Sensor		4
Monitoring	Pressure sensors supplied on suction and discharge of blower	2	8
Monitoring	Blower VFD		4
Monitoring	Permeate Pump VFD		4
Monitoring	Mass Air Flow Sensor		8
Monitoring	Clear Well Level Transducer	1	2

3.5.3 Membrane Cleaning Parameters

The following are the design parameters for the weekly Clean in Place (CIP) of each membrane cassette:

EQUIPMENT	EACH CASSETTE	TOTAL	UNIT
Treated Effluent for CIP	540	4,320	Gallons
CL2 per CIP	.45	3.6	Gallons
Citric Acid	1.17	9.36	Gallons
Time Required for CIP	1	4	Hours

3.5.4 Membrane Cleaning Equipment

A small volume of treated effluent will be stored in the Clear Well Chamber for use in cleaning the membrane system on a routine basis.
The Backflush system typically includes the following:

EQUIPMENT	DESCRIPTION	QUANTITY
Clear Well Chamber	2,840 Chamber	2
Level Transducer	Monitors level in Clear Well Chamber	2
Pressure Transducer	Monitors Pressure of Backflush on Membrane Cassettes	4
Chemical Pumps	Peristaltic Chemical Pumps	8

3.5.5 Membrane Cleaning Cycles

The supplied membrane modules are automatically cleaned on the following schedule:

Backpulse Cycle: is typically performed automatically for 30 seconds every five minutes of forward flow. The permeate pump will reverse direction, returning treated effluent from the Clear Well Chamber through the membrane modules. During the Backpulse cycle, flow and pressure are monitored continuously.

Maintenance Clean/Clean in Place (CIP): is typically performed once a week at a period of low influent flow. The CIP typically requires 60 minutes per cassette during which treated effluent is returned through the membrane modules. During CIP small volumes of sodium hypochlorite and citric acid are alternately injected into the permeate line prior to entering the membrane modules.

Recovery Clean: is a manual procedure that is performed as needed based on loss of membrane permeability. The Recovery Cleaning is typically performed no more than annually.

3.6 Disinfection

This proposal does not include disinfection equipment. Cloacina can provide disinfection equipment specific to the project, an estimate requires specific design parameters for effluent disposal.

3.7 Effluent Disposal

The Cloacina design assumes the final treated effluent will flow by gravity to downstream treatment or disposal.

3.7.1 Effluent Equipment

The following equipment will be provided for effluent monitoring:

EQUIPMENT	DESCRIPTION	TOTAL
Monitoring	Effluent Flow Meter	2
Monitoring	Effluent Turbidimeter	2

3.8 Documents, Materials and Services

The following will be supplied with the package treatment system:

DOCUMENT	DESCRIPTION
Project Drawings	Equipment drawings necessary for site plans and construction
Submittal Package	Detailed information for all supplied equipment
Pre-commissioning Letter	Letter covering all expectations and obligations with regards to installation
Pre-commissioning Checklist	Pre-commissioning checklist which covers all items that must be completed before commissioning is performed
Factory Inspection Form	Details all equipment tests prior to shipping
Operations Manual	Detailed Operations and Maintenance Manual

MATERIAL	DESCRIPTION
Operator Tablet	Tablet pre-loaded with all project documents and manuals

SERVICE	DESCRIPTION
On-Site Startup and Training	This estimate assumes a package of this size requires the Cloacina technician be on-site up to 80 hours. This estimate assumes a single visit is required.

4 Assumptions

4.1 Domestic Facility

The system will be designed to receive only domestic wastewater, as outlined in Section 2, above.

4.2 Unnecessary Waste

All unnecessary process waste will be diverted from entering the treatment system. Examples of unnecessary process waste are:

- Rainwater, excess flow during rain events should be prevented by identifying areas with potential for Infiltration and Intrusion (I & I).
- Industrial Dischargers, high strength dischargers should be identified and associated waste streams should be evaluated for impact on the treatment facility. Industrial waste can increase the loading on the treatment facility and result in poor performance or reduction in hydraulic capacity.
- Inorganic Solids, efforts should be made to keep excess dirt and grit from entering the tre atment facility.
- Food Oil and Grease (FOG), should be prevented from entering the facility by ensuring all restaurants have properly installed and maintained grease traps.

4.3 Effluent Disposal

Effluent will flow by gravity from Clear Well, the final disposal location is to be determined. Effluent pumps can be provided in addition to this package.

4.4 Installation Location

The package will be installed outdoors on an engineered concrete slab. The site will have sufficient access t o allow the delivery of the individual treatment tanks fully assembled.

5 Exclusions

5.1 Installation

Treatment package quoted does not include installation costs.

5.2 Civil Engineering

Site civil engineering is not provided as part of this budgetary estimate.

5.3 Slab

Equipment slab design and construction is not included as part of this budgetary estimate.

5.4 Permitting

Permit costs are not included as part of this budgetary estimate, however, construction permitting is often reduced due to the package design.

5.5 Seismic

Seismic Restraint design and supply are not included in this budgetary estimate. Cloacina can provide the necessary, engineered restraints, with supplied plans.

5.6 Secondary Containment

Secondary containment is not included in this budgetary estimate.

5.7 Thermal Protection

Thermal protection of hydraulic piping is not included in this budgetary estimate. Thermal protection can be provided in addition to this estimate.

5.8 Security

Safety and security items such as fencing, locking ladders, lighting etc. are not included in this budgetary estimate.

5.9 Shipping

Shipping and crane costs are not included in this budgetary estimate.

5.10 Dissolved Solids (TDS)

The unit will not address dissolved solids through biological treatment. Dissolved Solids should be managed through source control.

6 Pricing

6.1 Base Price

The Base price include all services and equipment outlined in Sections 1-5, above.

DESCRIPTION	ESTIMATE
Membrane Package Equipment as outlined above	**$4,252,026.74**

DESCRIPTION	ESTIMATE
Required design and engineering for project	**$212,601.34**

DESCRIPTION	ESTIMATE
Total Estimated Package Cost	**$4,464,628.08**

7 Options

The following equipment can be supplied in addition to the above package:

7.1 Effluent Storage

Cloacina will provide an external tank for temporary storage of treated effluent.

EQUIPMENT	DESCRIPTION
Effluent Storage Tank	(1) 10'x'10'x30' ~20,000 gallon welded stainless steel tank. (2) 8" flanged nozzles, (1) 2" FNPT nozzle. Includes structural anchor hold downs (anchors not included), and structural engineering.

DESCRIPTION	ESTIMATE
Effluent Storage Equipment	**$69,000.00**

7.2 Effluent Disinfection

Disinfection of treated effluent will be accomplished by an enclosed UV unit installed on the permeate lines prior to the effluent storage tank. Pre-validated California T-22 unit to be provided. This UV will be integrated, installed on the MEMPAC system. The SCADA system will provide graphing, trending, maintenance intervals and system alarming for site personnel.

UV Design Parameters (Each Unit):

PARAMETER	CONCENTRATION LIMIT	UNIT
Design Flow Rate	920 (peak)	GPM
%UVT	65	%
Dose	80	mj/cm2

UV Equipment (Each Unit)

EQUIPMENT	DESCRIPTION	Quantity
UV Unit	Evoqua Model: UVLW- 30800-24 (20" connection)	2
Lamps	800 W low pressure high output UV lamps parallel to flow	30
Panel	Control Panel	1 each

DESCRIPTION	ESTIMATE
UV Disinfection Equipment (Two Units Total)	**$476,000.00**

*Assumes cooling loop is not necessary.

7.3 Solids Dewatering

Cloacina can provide a DRYPAC dewatering train with the following features. The DRYPAC train includes a mounted volute dewatering press, feed pump and polymer system, aeration system and 21,000-gallon liquid storage tank. This will all be monitored and controlled by the MEMPAC SCADA system. Dewatered sludge will fall from the press by gravity into the customer supplied roll-off dumpster or equivalent container for disposal.

The following equipment will be supplied for solids disposal:

EQUIPMENT	DESCRIPTION
Liquid Storage	21,000 gallon welded stainless steel tank
Sludge Feed Pump	Progressive cavity feed pump
Equipment Skid	Elevated equipment skid
Volute Press	Volute dewatering press (~50 gpm NET) and Controls System
Polymer addition system	Polymer pump and mixer
Aeration Equipment	Regenerative blower and OTT diffusers pre-installed in Sludge Storage tank
Control Equipment	Level transducer

DESCRIPTION	ESTIMATE
Solids Dewatering Equipment	**$495,846.00**

7.4 Effluent Pump Station

Cloacina can provide integrated equipment necessary to pump treated effluent to downstream disposal.

Effluent Pump Design Parameters:

PARAMETER	CONCENTRATION LIMIT	UNIT
Design Flow Rate	300	GPM
Operating Pressure	40	PSI

Effluent Pump Equipment:

EQUIPMENT	DESCRIPTION	Quantity
Effluent Pumps	Isolation valves, check valves, gauges and pipe network	2
Equipment Skid	Stainless Steel Equipment Skid attached to Effluent tank	1
Control Equipment	(1) lot of Level Transducer for Effluent Storage Tank, programming, graphing, trending, flowmeter, testing	1

DESCRIPTION	ESTIMATE
Effluent Pumping Equipment	**$56,400.00**

*Assumes no interlock for downstream final disposal location.
*Assumes pumping uphill, so no automated valve on discharge is provided.

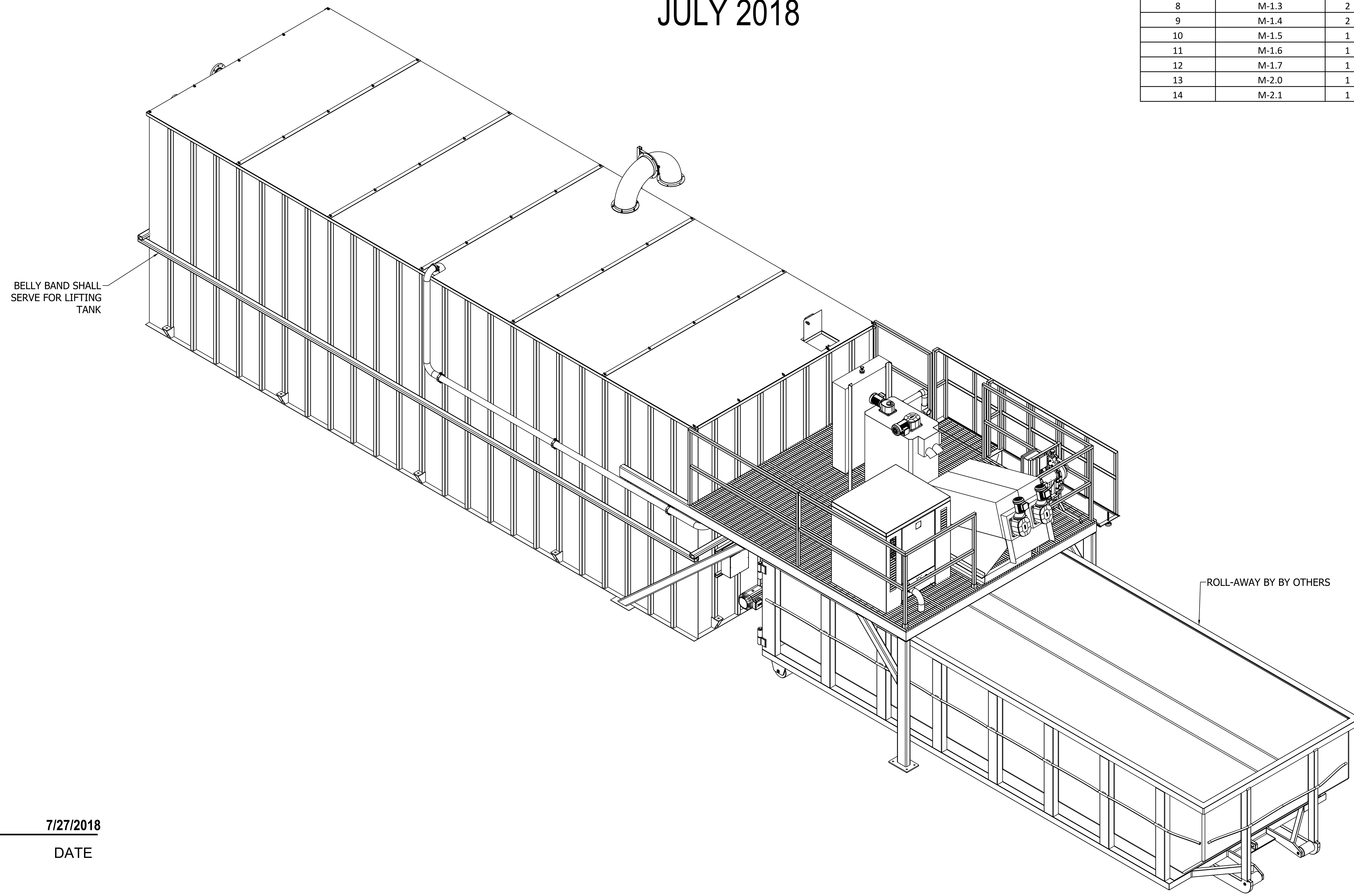
TESORO VIEJO

20,000 GPD - DRYPAC

JULY 2018

DRAWING INDEX

SHEET NUMBER	DRAWING NUMBER	REV	DRAWING TITLE
1	G-0.01	1	COVER SHEET - DRAWING INDEX
2	G-0.02	1	DESIGN DATA & GENERAL NOTES
3	G-0.03	1	SYMBOLS & LEGENDS
4	P-0.01	2	PIPING & INSTRUMENTATION DIAGRAM
5	M-1.0	1	DRYPAC - ISOMETRIC
6	M-1.1	2	DRYPAC - TANK GENERAL ARRANGEMENT
7	M-1.2	1	DRYPAC - TANK SECTIONS AND DETAILS
8	M-1.3	2	DRYPAC - PLATFORM GENERAL ARRANGEMENT
9	M-1.4	2	DRYPAC - MECHANICAL GENERAL ARRANGEMENT
10	M-1.5	1	DRYPAC - MECHANICAL SECTIONS AND DETAILS
11	M-1.6	1	DRYPAC - TANK COVER
12	M-1.7	1	DRYPAC - AERATION MANIFOLD
13	M-2.0	1	DETAILS - CATWALK STAIRS
14	M-2.1	1	DETAILS - STRUCTURAL MISCALANEOUS



ISSUED FOR RECORD

2018-07-27

7/27/2018

BRIAN D. SNOW, PE DATE

PROJECT MANAGER

C.E. 80472 EXP. 3/31/19

REFERENCE DRAWINGS	
COVER SHEET - DRAWING INDEX	SHT. - G-0.01

REVISIONS

REV	DESCRIPTION				DATE
0	ISSUED FOR FABRICATION	AJM	SEA	BDS	2017-11-22
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DATE: 2017-05-02

DRAWN BY: SEA

JOB #: CL16-035

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CLOACINA

TESORO VIEJO
20,000 GPD - DRYPAC
SLUDGE DEWATERING SYSTEM

REGISTERED PROFESSIONAL ENGINEER
BRIAN D. SNOW
NO. C80472
EXP. 3/31/19
CIVIL
STATE OF CALIFORNIA
7/27/18

COVER SHEET
DRAWING INDEX

REV NO.: 1

SHEET: G-0.01

1 OF 13 SHEETS

GENERAL NOTES

1. SPECIFICATIONS
   THE PACKAGE SLUDGE HANDLING SYSTEM REPRESENTED WITHIN THIS CONTRACT DRAWINGS SET CONFORMS TO THE FOLLOWING TECHNICAL SPECIFICATIONS BY KENNEDY/JENKS CONSULTANTS FOR THE TESORO VIEJO MASTER PLANNED COMMUNITY PHASE A WATER AND WASTEWATER TREATMENT PLANTS:
   A. 01190 SEISMIC REQUIREMENTS
   B. 11001 GENERAL EQUIPMENT AND MECHANICAL REQUIREMENTS
   C. 11105 PACKAGE SLUDGE HOLDING TANK AND DEWATERTING SYSTEM

2. PIPE COATINGS
   ALL PVC AND CPVC PIPING AND FITTINGS THAT ARE NOT SHIELDED COMPLETELY FROM SUNLIGHT EXPOSURE AND ALL DUCTILE IRON PIPE (DIP) AND FITTINGS SHALL BE PREPARED AS FOLLOWS:
   A. ALL SURFACES SHALL BE CLEANED AND PREPARED IN ACCORDANCE WITH SSPC-SP1. PVC AND CPVC SURFACES SHALL BE ABRADED WITH 220-GRIT SANDPAPER.
   B. ALL SURFACES SHALL BE COATED WITH (1) COAT OF EPOXY PRIMER TO 6 MILS DFT AND (2) COATS OF POLYURETHANE TO 3 MILS DFT PER COATINGS MANUFACTURERS' DIRECTIONS.

DESIGN DATA

DEWATERING PRESS

TYPE	VOLUTE
NUMBER	1
CAPACITY, GPM	15 AT < 1% SOLIDS
CAPACITY, LBS/HR	75 AT < 3% SOLIDS

SLUDGE HOLDING TANK

VOLUME, GAL	20,000

TRANSFER PUMP

TYPE	PROGRESSING CAVITY
NUMBER	1
CAPACITY, GPM	15

AERATION BLOWER

TYPE	POSITIVE DISPLACEMENT
NUMBER	1
CAPACITY, SCFM	140
DISCHARGE PRESSURE, PSIG	4.7

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2018-07-27

REFERENCE DRAWINGS	
COVER SHEET - DRAWING INDEX	SHT. - G-0.01

REVISIONS					
0	ISSUED FOR FABRICATION	AJM	SEA	BDS	2017-11-22
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TESORO VIEJO
20,000 GPD - DRYPAC
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DESIGN DATA & GENERAL NOTES
REV NO. 1
SHEET: G-0.02
02 OF 13 SHEETS

Z:\!!!!CLOACINA PROJECTS!!!!\2017 PROJECTS\2017 PRODUCTION\CL16-035 Tesoro Viejo\2 Engineering\7 Drawings\1 Process\2 P&ID's\G-0.02-DRYPAC.dwg - abrahamm - Jul 25, 2018 - 10:05am

INSTRUMENT SYMBOLS

GENERAL INSTRUMENT OR FUNCTION SYMBOLS	PRIMARY LOCATION (NORMALLY ACCESSIBLE TO OPERATOR)	FIELD MOUNTED	AUXILIARY LOCATION (NORMALLY ACCESSIBLE TO OPERATOR)
INSTRUMENTS			
SHARED DISPLAY OR SHARED CONTROL			
COMPUTER FUNCTION			
PROGRAMMABLE LOGIC CONTROL OR LOGIC FUNCTION	PLC	PLC	PLC

RELAY FUNCTION DESIGNATORS

A/D	ANALOG TO DIGITAL TRANSDUCER
D/A	DIGITAL TO ANALOG TRANSDUCER
E/I	VOLTAGE TO CURRENT TRANSDUCER
I/P	CURRENT TO PNEUMATIC TRANSDUCER
P/I	PNEUMATIC TO CURRENT TRANSDUCER
Σ	ADD OR TOTALIZE SIGNAL SUMMATION
√	SQUARE ROOT EXTRACTION
>	HIGH SELECT
<	LOW SELECT
X	MULTIPLIER
Δ	DIFFERENTIAL OR SUBTRACTION

INTERLOCK (SOFTWARE OR HARDWARE)

PILOT LIGHT

INSTRUMENTS SHARING COMMON HOUSING

XXX
XXX-XX
INSTRUMENT WITH LONG TAG NUMBER

NORMALLY INACCESSIBLE OR BEHIND-THE-PANEL DEVICES OR FUNCTIONS MAY BE DEPICTED BY USING THE SAME SYMBOLS BUT WITH DASHED HORIZONTAL BARS, i. e..

FOR PROGRAMMABLE LOGIC CONTROLLER (PLC) IDENTIFY PLC LOCATION FOR - IDENTIFY SIGNAL TYPE FOR ##

##: AI = ANALOG INPUT
AO = ANALOG OUTPUT
DI = DISCRETE INPUT
DO = DISCRETE OUTPUT

PLC ### ### OR PLC ### ### PLC ###

SOLID CIRCLE IN UPPER LEFT HAND CORNER OR DOUBLE LINE INDICATES; REMOTE OR AUXILIARY HMI (HUMAN MACHINE INTERFACE) - RSVIEW

P & I D FUNCTIONAL IDENTIFICATION

CODE LETTER	FIRST LETTER(S): MEASURED OR INITIATING VARIABLE	FIRST LETTER(S): MODIFIER	SUCCEEDING LETTER(S): READOUT OR PASSIVE FUNCTION	SUCCEEDING LETTER(S): OUTPUT FUNCTION	SUCCEEDING LETTER(S): MODIFIER
A	ANALYSIS		ALARM		AUTO/LAG
B	BURNER FLAME				
C	CHLORINE			CONTROL	CLOSE
D	DENSITY	DIFFERENTIAL			
E	VOLTAGE		ELEMENT, SENSOR		LEAD
F	FLOW	RATIO	FUEL		FAILURE
G	GAGING		VIEWING DEVICE		
H	HAND				HIGH/HAND
I	CURRENT		INDICATE		
J	POWER	SCAN			
K	TIME	TIME RATE OF CHANGE		CONTROL STATION	
L	LEVEL		PILOT LIGHT		LOW/LOCAL
M	MOISTURE/MOTOR	MOMENTARY	MOTOR		MIDDLE/MANUAL
N	STATUS				
O	OPERATOR		ORFICE		OPEN/OVERLOAD
P	PRESSURE		POINT		
Q	EVENT	TOTALIZE	TOTAL		
R	RESET		RECORD		RUNNING/REMOTE
S	SPEED	SAFETY		SWITCH	STOP/SPEED
T	TEMPERATURE		TEST	TRANSMIT	
U	MULTIVARIABLE		MULTIFUNCTION		
V	VIBRATION			VALVE	
W	FORCE, WEIGHT		WELL		
X	TELEMETRY INTERFACE				
Y	COMPUTER INTERFACE			COMPUTE/RELAY/ CONVERTER	
Z	POSITION			ACTUATE	POSITION

SYMBOL LEGEND

- BALL VALVE
- BUTTERFLY VALVE
- CAP
- CHECK VALVE
- CLEAN-OUT
- CONCENTRIC REDUCER
- DIAPHRAGM VALVE
- DIFFUSER NOZZLE
- ECCENTRIC REDUCER
- GATE VALVE
- GLOBE VALVE
- HOSE COUPLING
- LEVEL FLOATS
- NEEDLE VALVE
- PLUG VALVE
- ROTAMETER
- ROTARY VALVE
- SPIGOT
- Y-STRAINER
- 3-WAY VALVE

ABBREVIATIONS LIST

VALVES
BV - BALL VALVE
BFV - BUTTERFLY VALVE
CK - CHECK VALVE
DV - DIAPHRAGM VALVE
GV - GATE VALVE

MISCELLANEOUS
D - DRAIN
M - MOTOR
MW - MAN WAY
OIM - OPERATOR INTERFACE MODULE
P&ID - PROCESS & INSTRUMENTATION DIAGRAM
PLC - PROGRAMMABLE LOGIC CONTROLLER
SA - SAMPLER
SC - SCREEN
SP - SAMPLE PORT
TF - TOP FLAT
US -ULTRASONIC LEVEL SENSOR
VFD -VARIABLE FREQUENCY DRIVE

EQUIPMENT TYPE
AB - AERATION BLOWER
CO - COMPRESSOR
MEM - MEMBRANE
SC - SCREEN
P - PUMP
TK - TANK
UV - ULTRAVIOLET DISINFECTION

SIGNAL TYPE
AO - ANALOG OUTPUT
AI - ANALOG INPUT
DO - DIGITAL OUTPUT
DI - DIGITAL INPUT
RO - RELAY OUTPUT

SENSORY/AUTOMATED EQUIPMENT ABBREVIATIONS
AV - AUTO VALVE
DO - DISSOLVED OXYGEN
FM - FLOW METER
LT - LEVEL TRANSDUCER
LFH - LEVEL FLOAT HIGH
LFL - LEVEL FLOAT LOW
PH - POWER OF HYDROGEN
PI - PRESSURE INDICATOR
PT - PRESSURE TRANSMITTER
PRV - PRESSURE REGULATING VALVE
PSV - PRESSURE SAFETY VALVE
SSS - MLSS/TURBIDITY
SV - SOLENOID VALVE

SERVICE LINE ABBREVIATIONS
DR - DRAIN
MA - MEMBRANE AIR
OF - OVERFLOW
PA - PROCESS AIR
PF - PERMEATE FLOW
PR - PRESSATE
PW - POTABLE WATER
RAS - RETURN ACTIVATED SLUDGE
RV - RELIEF VENT
RW - RECLAIMED WATER
TE - TREATED EFFLUENT
UA - UTILITY AIR
WAS - WASTE ACTIVATED SLUDGE
WW - WASTE WATER

VALVE ANNOTATIONS
FO - FAIL OPEN
FC - FAIL CLOSED
FL - FAIL LOCKED (POSITION DOES NOT CHANGE)
FI - FAIL INDETERMINATE
FAI - FAIL AS IS
NO - NORMALLY OPEN
NC - NORMALLY CLOSED
LO - LOCKED OPEN
LC - LOCKED CLOSED

PIPING LINE NUMBERING SYSTEM

1 1/2"-SCH.80 PVC-WW-1001

LINE SIZE
PIPING MATERIAL
SERVICE
LINE NUMBER

FLOW METERS

M MAGNETIC
ULTRASONIC

LINE TYPES

- PRIMARY PROCESS
- SECONDARY PROCESS
- EXISTING PROCESS
- ELECTRICAL SIGNAL
- PNEUMATIC SIGNAL
- SOFTWARE SIGNAL
- CAPILLARY SIGNAL

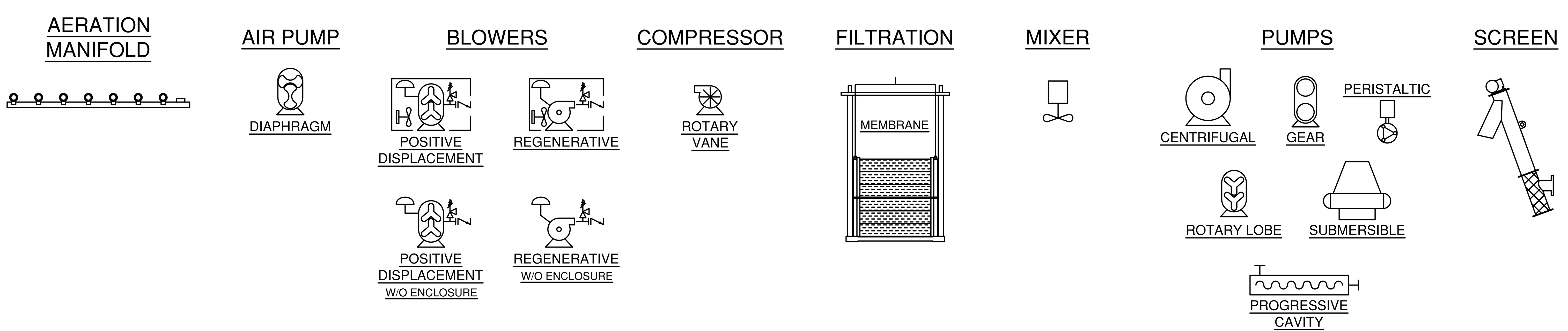
AUTO VALVE ACTUATOR SYMBOLS

DIAPHRAGM
CYLINDER/ PISTON
S SOLENOID
E/H ELECTRO-HYDRAULIC

SELF-ACTUATED DEVICES

PRESSURE RELIEF VALVE

EQUIPMENT SYMBOLS



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2018-07-27

REFERENCE DRAWINGS	
COVER SHEET - DRAWING INDEX	SHT. - G-0.01

REVISIONS					
0	ISSUED FOR FABRICATION	AJM	SEA	BDS	2017-11-22
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JOB #: CL16-035

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CLOACINA

TESORO VIEJO
250,000 GPD - DRYPAC
SLUDGE DEWATERING SYSTEM

REGISTERED PROFESSIONAL ENGINEER BRIAN D. SNOW NO. C80472 EXP. 3/31/19 CIVIL STATE OF CALIFORNIA 7/27/18

SYMBOLS & LEGENDS

REV NO. 1
SHEET: G-0.03
03 OF 13 SHEETS

NOTES:

1. THIS DWG. IS A SCHEMATIC DIAGRAM. IT MAY NOT REFLECT TRUE ORIENTATION OR LAYOUT.
2. ENGINEER TO VERIFY CONNECTING LINE SIZES OUTSIDE OF CLOACINA SCOPE.
3. (4) OTT DIFFUSERS IN SLUDGE TANK.
4. NEAT POLYMER DRUM SUPPLIED BY OTHERS.
5. DEWATERING PRESS SCHEMATIC BY PWTECH.
6. WASTE ACTIVATED SLUDGE LINE TO BE INSTALLED WITH ELBOW SWEEPS AND CLEAN OUTS.
7. REFER TO MEMPAC-M PACKAGE TREATMENT SYSTEM DRAWING PACKAGE.

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2018-07-27

REFERENCE DRAWINGS	
COVER SHEET - DRAWING INDEX	SHT. - G-0.01

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2	ISSUED FOR RECORD	AJM	SEA	BDS	2018-07-27
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1	RE-ISSUED FOR FABRICATION	AJM	SEA	BDS	2017-12-14

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JOB #: CL16-035

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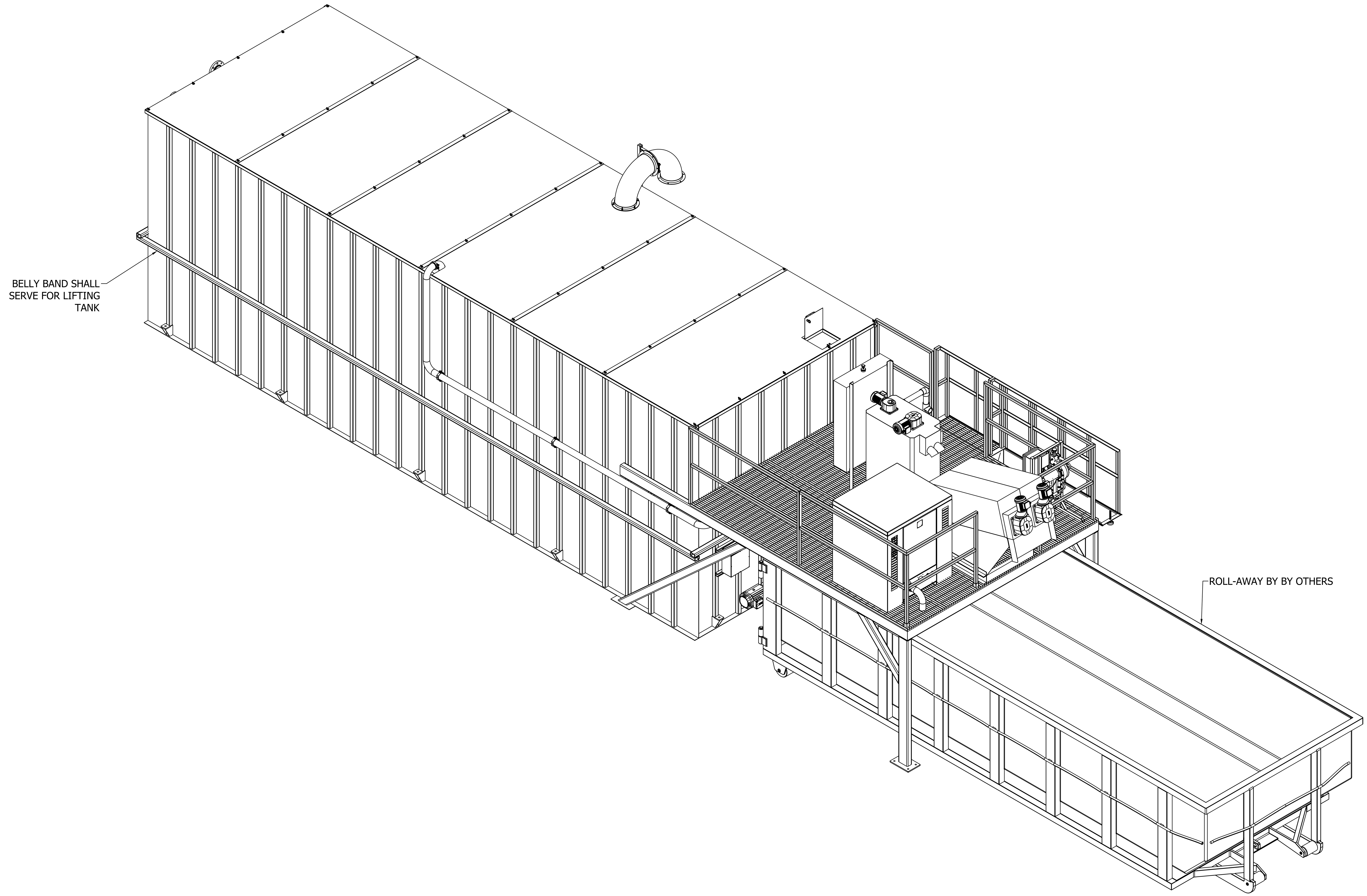
20,000 GPD - DRYPAC
SLUDGE DEWATERING SYSTEM

REGISTERED PROFESSIONAL ENGINEER BRIAN D. SNOW NO. C80472 EXP. 3/31/19 CIVIL STATE OF CALIFORNIA 7/27/18

PIPING & INSTRUMENTATION DIAGRAM

REV NO. 2
SHEET: P-0.01
04 OF 13 SHEETS

Z:\!!!!CLOACINA PROJECTS!!!!\2017 PROJECTS\2017 PRODUCTION\CL16-035 Tesoro Viejo\2 Engineering\7 Drawings\1 Process\2 P&ID's\P-0.01-DRYPAC.dwg – abrahamm – Jul 25, 2018 – 10:05am



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2018-07-27

REFERENCE DRAWINGS	
COVER SHEET - DRAWING INDEX	SHT. - G-0.01

REVISIONS					
0	ISSUED FOR FABRICATION	AJM	SEA	BDS	2017-11-22
1	ISSUED FOR RECORD	AJM	SEA	BDS	2018-07-27

SCALE: NOT TO SCALE
DATE: 2017-05-02
DRAWN BY: SEA
JOB #: CL16-035

P.O. BOX 1647
ARROYO GRANDE, CA
PHONE: 888.483.8469
FAX: 888.483.6134
info@cloacina.com

CLOACINA

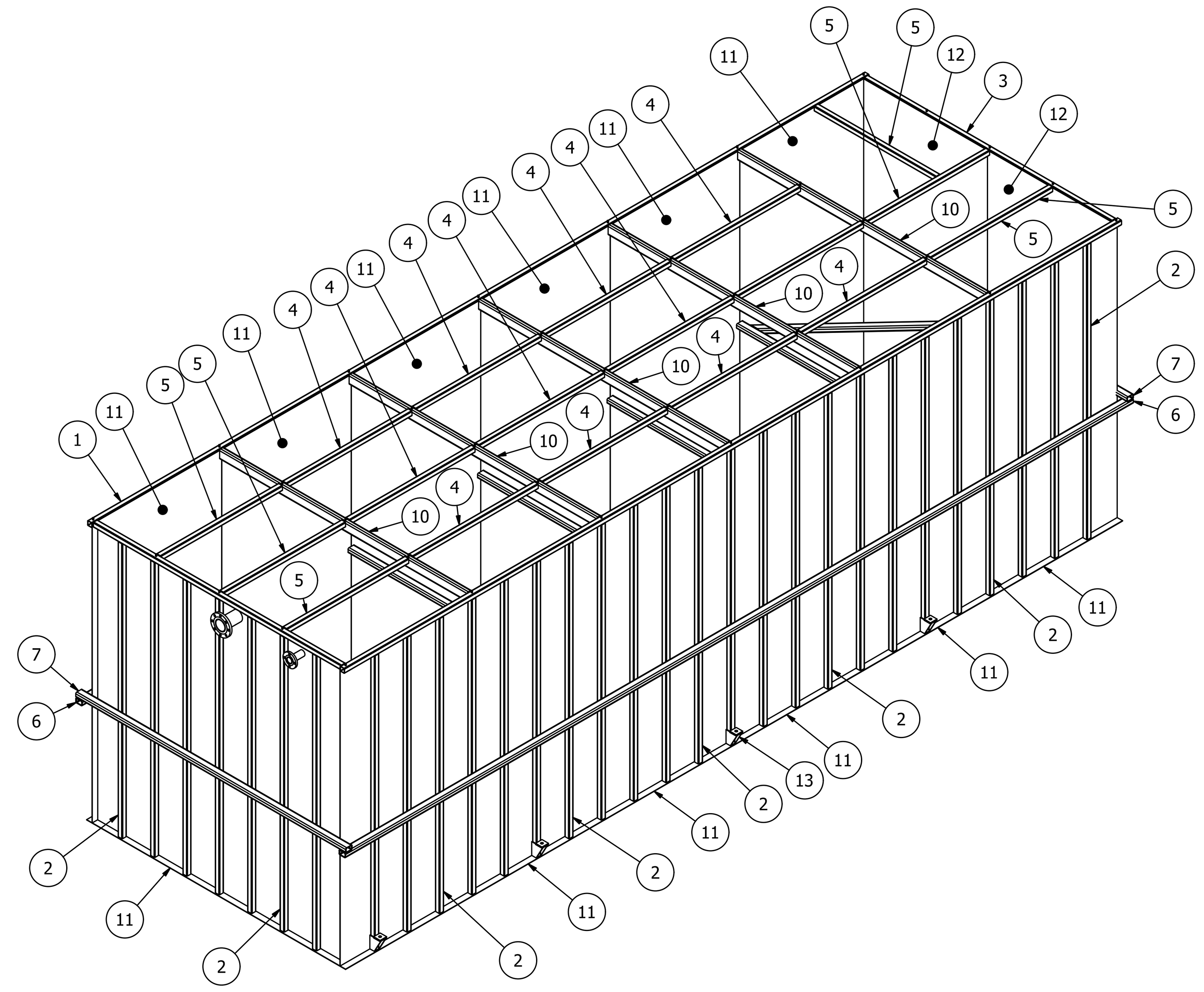
TESORO VIEJO
20,000 GPD - DRYPAC
SLUDGE DEWATERING SYSTEM

REGISTERED PROFESSIONAL ENGINEER
BRIAN D. SNOW
NO. C80472
EXP. 3/31/19
CIVIL
STATE OF CALIFORNIA
7/27/18

DRYPAC - ISOMETRIC

REV NO. 1
SHEET: M-1.0
5 OF 13 SHEETS

Z:\!!!CLOACINA PROJECTS!!!\2017 PROJECTS\2017 PRODUCTION\CL16-035 Tesoro Viejo\2 Engineering\7 Drawings\2 Mechanical\3. AutoCAD Drawings\M-1.0-DRYPAC.dwg - abrahamm - Jul 25, 2018 - 10:05am

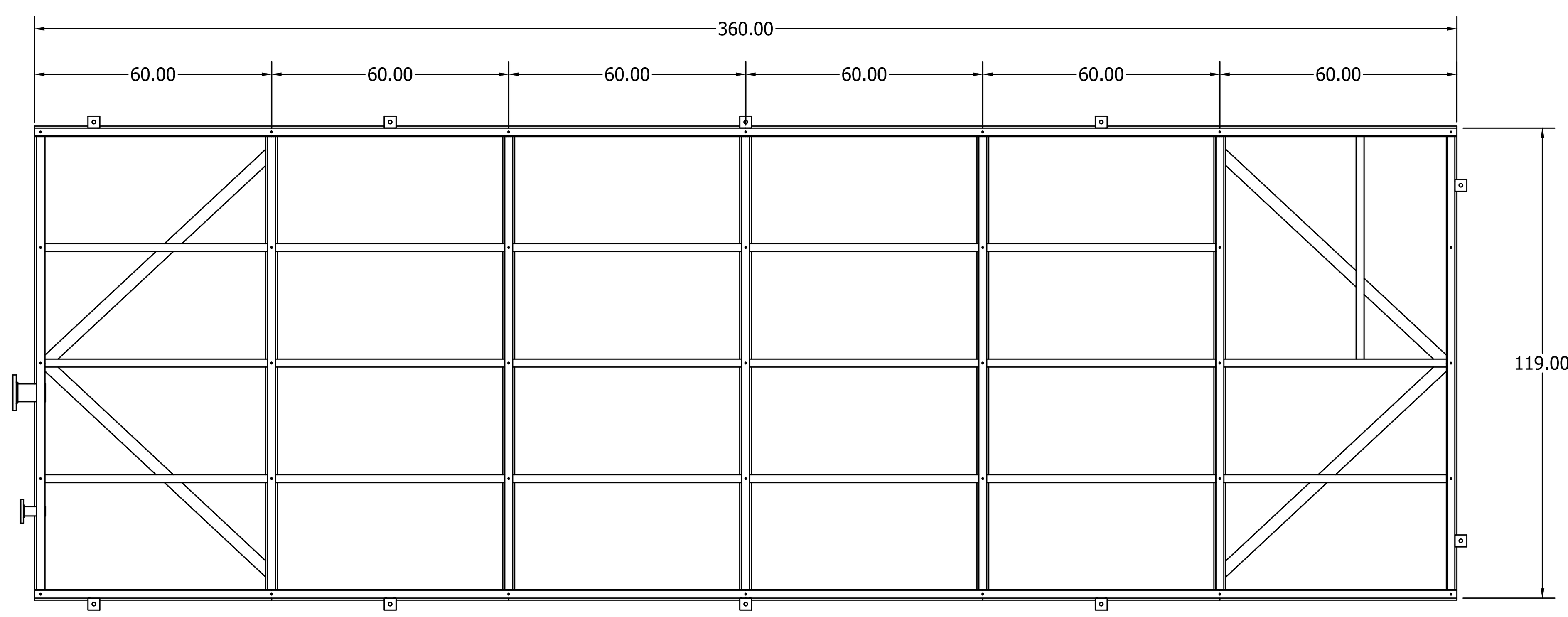


ISOMETRIC VIEW

PARTS LIST			
ITEM	ITEM QTY	QTY	DESCRIPTION
1	2	720.000 in	SQUARE TUBE, 2" X 2" X 1/8", 304 SS, ASTM-A-A554 - 360
2	60	7102.500 in	SQUARE TUBE, 2" X 2" X 1/8", 304 SS, ASTM-A-A554 - 118.375
3	2	229.460 in	SQUARE TUBE, 2" X 2" X 1/8", 304 SS, ASTM-A-A554 - 114.73
4	12	696.000 in	SQUARE TUBE, 2" X 2" X 1/8", 304 SS, ASTM-A-A554 - 58
5	6	338.190 in	SQUARE TUBE, 2" X 2" X 1/8", 304 SS, ASTM-A-A554 - 56.36
6	2	730.000 in	RECTANGULAR TUBE, 3" X 2" X 1/4", 304 SS, ASTM-A-A554 - 365
7	2	250.000 in	RECTANGULAR TUBE, 3" X 2" X 1/4", 304 SS, ASTM-A-A554 - 125
8	5	573.650 in	RECTANGULAR TUBE, 3" X 2" X 1/4", 304 SS, ASTM-A-A554 - 114.73
9	4	313.750 in	RECTANGULAR TUBE, 3" X 2" X 1/4", 304 SS, ASTM-A-A554 - 79.18
10	5	573.650 in	RECTANGULAR TUBE, 4" X 2" X 1/4", 304 SS, ASTM-A-A554 - 114.73
11	18	18	SHEET, 10 GA, 48" x 120", 304 SS, ASTM-A-240, 2B FINISH
12	4	4	SHEET, 10 GA, 57.3575" x 120", 304 SS, ASTM-A-240, 2B FINISH
13	10	10	ANCHOR CHAIR
14	1	6.250 in	PIPE, 2", SCH 10S, SS, ASTM A312/SA312, - 6.25 LG
15	1	1	FLANGE, 2", SLIP-ON, FF, 304 SS, ASME B16.5
16	1	8.250 in	PIPE, 4", SCH 10S, SS, ASTM A312/SA312, - 8.25 LG
17	1	1	FLANGE, 4", SLIP-ON, FF, 304 SS, ASME B16.5

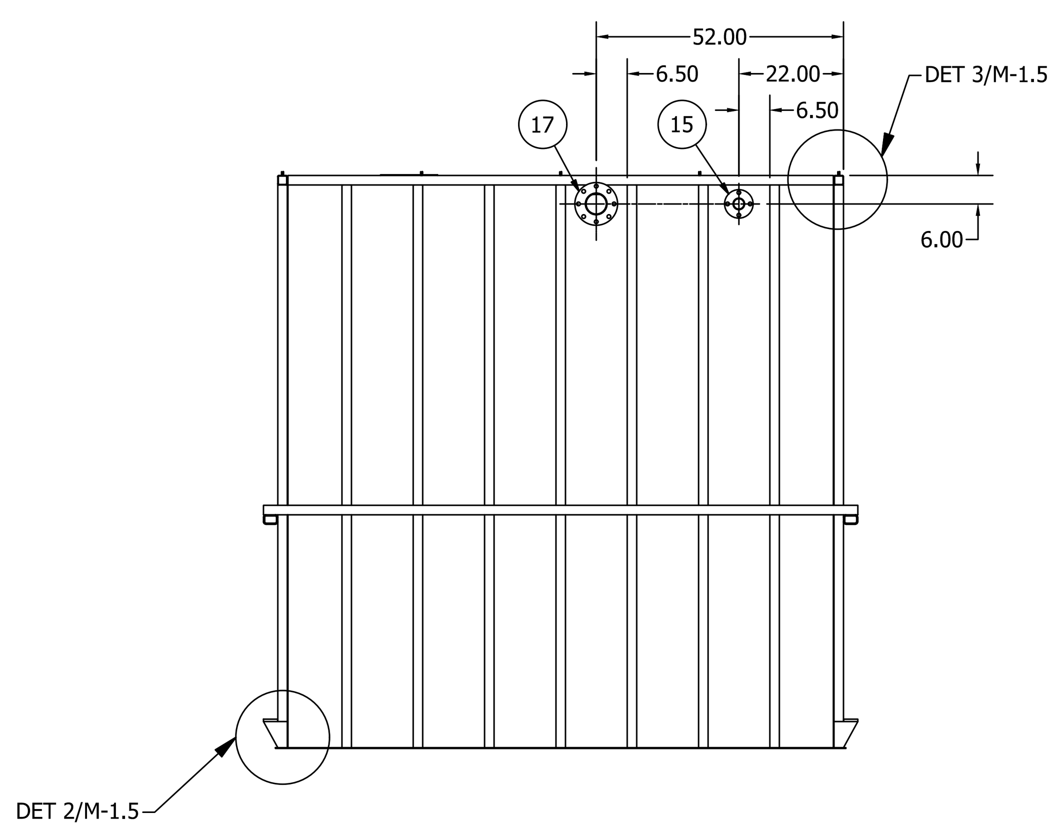
NOTES:

1. 10 GA TANK WALLS & FLOOR (WETTED BOUNDARY): FULL PEN WELDS ALL LOCATIONS (OR EQUAL)
2. HSS 2X2X1/8 VERT WALL STIFFENERS TO 10 GA TANK PLATE: 3/16" F.W. STITCH WELD 1.25" LONG @ 12" O.C.
3. INTERNAL HORIZONTAL STIFFENERS: 3/16" F.W. ALL AROUND TUBE ENDS TO INSIDE 10 GA TANK PLATE OR TO ANOTHER HSS TUBE (OR FULL PEN WELD IS ACCEPTABLE). SEAL WELD ENDS OF ALL INTERNAL TUBES SO WATER CANNOT GET INSIDE.
4. EXTERNAL HSS 3X2X1/4 STIFFENER AT 4' ELEVATION: 3/16" F.W. TOP AND BOTTOM WHERE IT CROSSES EACH HSS 2X2X1/8 VERT WALL STIFFENER. FULL PEN WELDS WHERE ENDS BUTT TOGETHER.
5. NOZZLE PENETRATIONS: 3/16" F.W. ALL AROUND INSIDE & OUT BEFORE REPAD/STIFFENERS ARE INSTALLED (OR FULL PEN WELD IS ACCEPTABLE); 3/16" F.W. ALL AROUND REPAD /STIFFENERS TO NOZZLE NECK AND TANK SHELL.
6. END OF TUBING SHALL BE CAPPED WITH 1/8" PLATE STEEL.
7. ALL WELDS SHALL BE PASSIVATED.



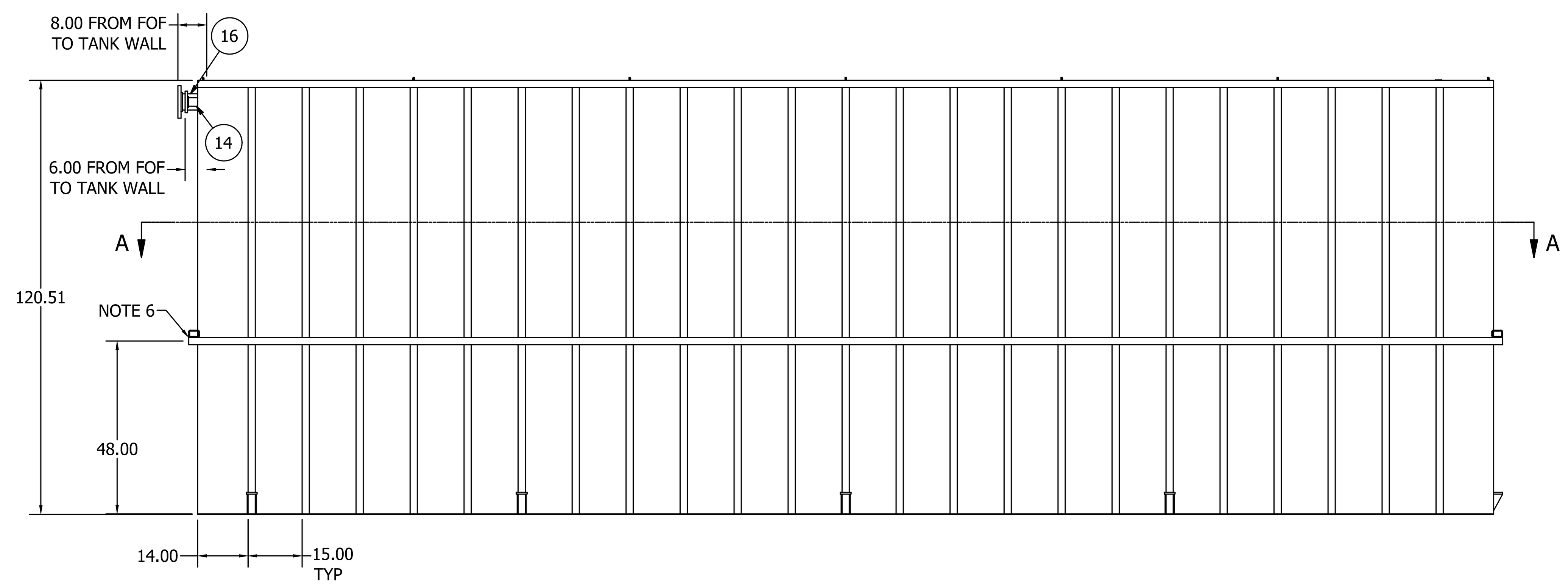
PLAN VIEW

SCALE: 3/8"=1'-0"



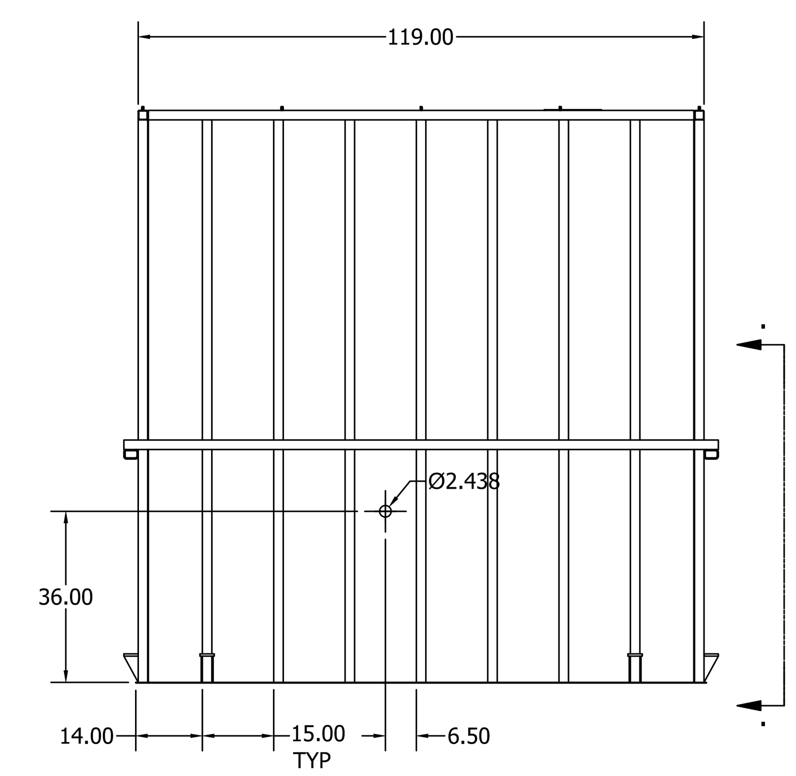
SIDE VIEW

SCALE: 3/8"=1'-0"



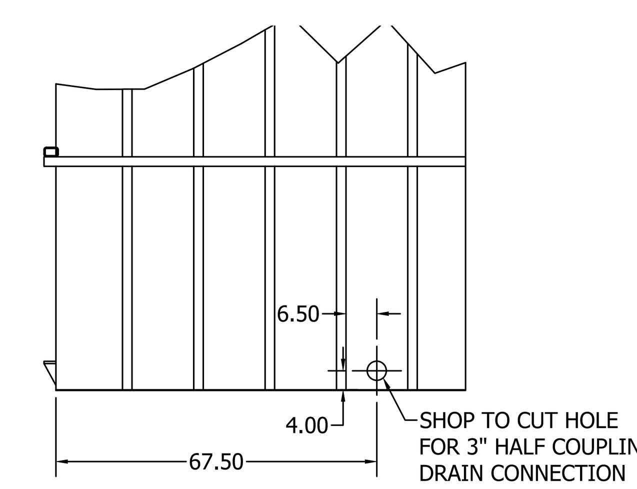
ELEVATION VIEW

SCALE: 3/8"=1'-0"



SIDE VIEW

SCALE: 3/8"=1'-0"



GENERAL NOTES:

- SHOP TO VERIFY ALL DIMENSIONS PRIOR TO FABRICATION.
- ALL EDGES TO BE DEBURRED AND CHAMFERED.
- ALL WELDS TO BE CLEANED OF ALL DEPOSITS/WELD SPLATTER & TO BE FREE OF ANY UNDERCUT.

ISSUED FOR FABRICATION

2018-07-27

REFERENCE DRAWINGS	
COVER SHEET - DRAWING INDEX	SHT. - G-0.01

REVISIONS									
2	ISSUED FOR RECORD	AJM	SEA	BDS	0	ISSUED FOR FABRICATION	AJM	SEA	BDS
		2018-07-27					2017-11-06		
					1	RE-ISSUED FOR FABRICATION	AJM	SEA	BDS
							2017-11-28		

SCALE: NOT TO SCALE
DATE: 2017-05-02
DRAWN BY: SEA
JOB #: CL16-035

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CLOACINA

TESORO VIEJO
20,000 GPD - DRYPAC
SLUDGE DEWATERING SYSTEM

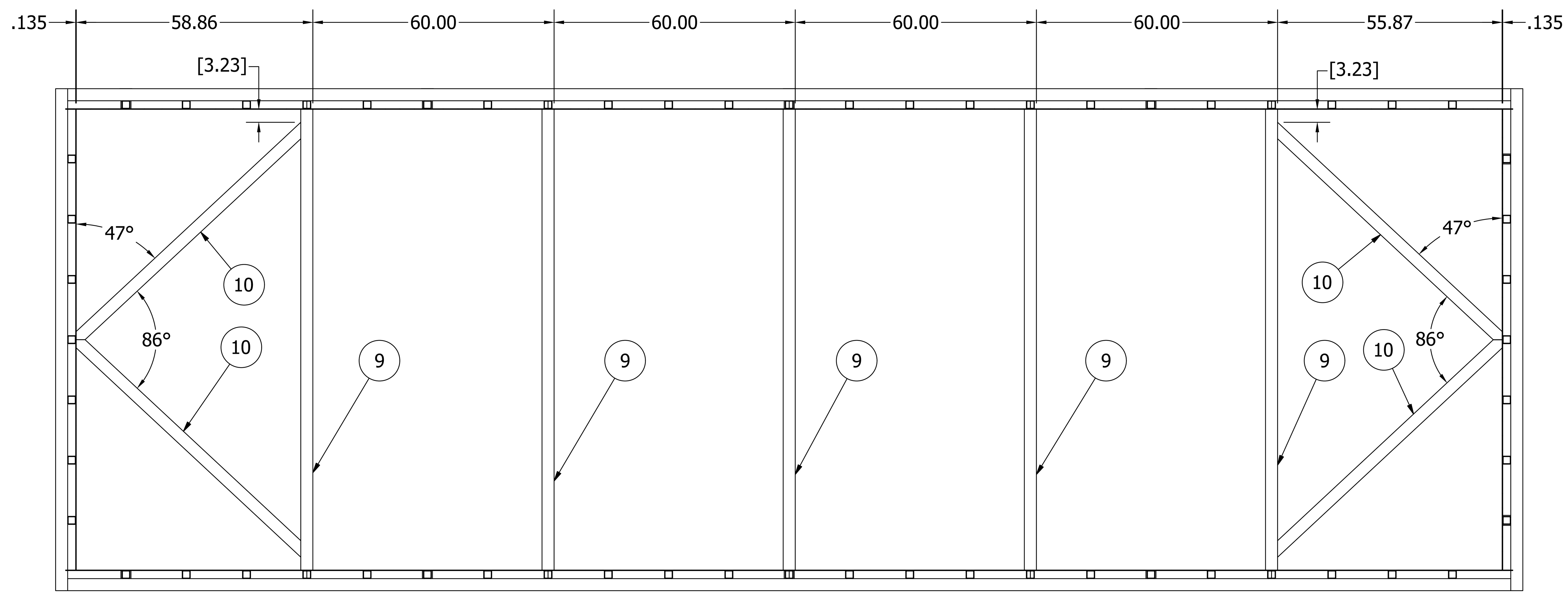
REGISTERED PROFESSIONAL ENGINEER BRIAN D. SNOW NO. C80472 EXP. 3/31/19 CIVIL STATE OF CALIFORNIA 7/27/18

DRYPAC - TANK GENERAL ARRANGEMENT

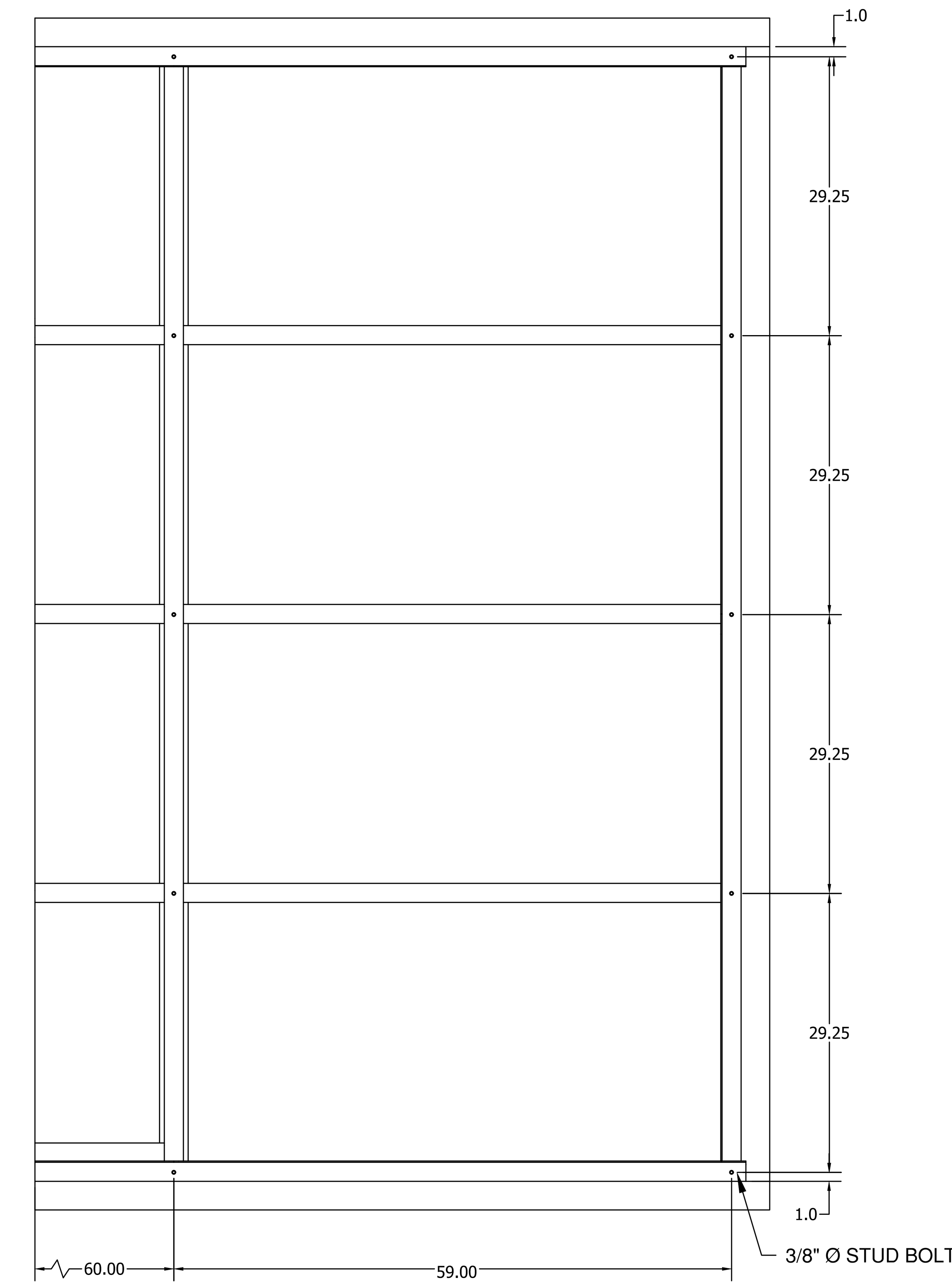
REV NO. 2

SHEET: M-1.1

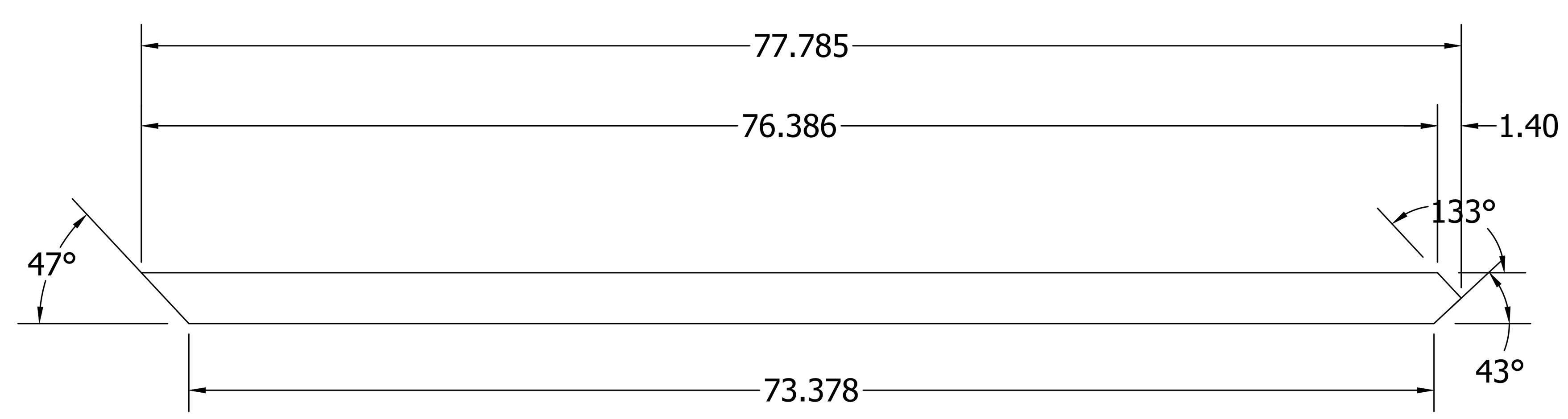
06 OF 13 SHEETS



SECTION VIEW
A / M-1.1
SCALE: 1/2"=1'-0"



DETAIL: COVER STUDS
1 / M-1.1
SCALE: 1/2"=1'-0"



DETAIL
11 / -

GENERAL NOTES:

- SHOP TO VERIFY ALL DIMENSIONS PRIOR TO FABRICATION.
- ALL EDGES TO BE DEBURRED AND CHAMFERED.
- ALL WELDS TO BE CLEANED OF ALL DEPOSITS/WELD SPLATTER & TO BE FREE OF ANY UNDERCUT.

ISSUED FOR RECORD
2018-07-27

REFERENCE DRAWINGS	
COVER SHEET - DRAWING INDEX	SHT. - G-0.01

REVISIONS					
0	ISSUED FOR FABRICATION	AJM	SEA	BDS	2017-11-06
1	ISSUED FOR RECORD	AJM	SEA	BDS	2018-07-27

SCALE: NOT TO SCALE
DATE: 2017-05-02
DRAWN BY: SEA
JOB #: CL16-035

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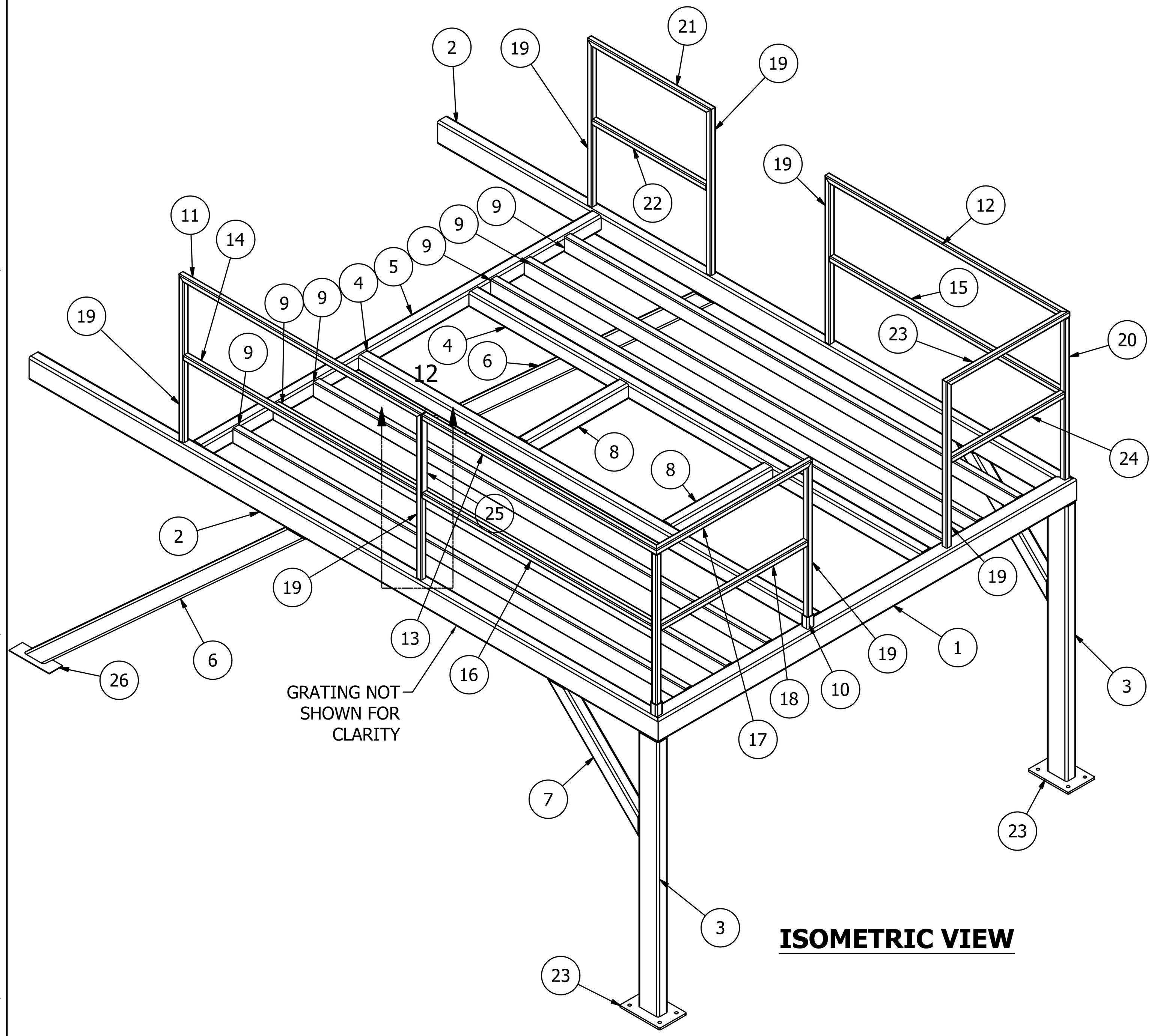
TESORO VIEJO
20,000 GPD - DRYPAC
SLUDGE DEWATERING SYSTEM

REGISTERED PROFESSIONAL ENGINEER
BRIAN D. SNOW
NO. C80472
EXP. 3/31/19
CIVIL
STATE OF CALIFORNIA
7/27/18

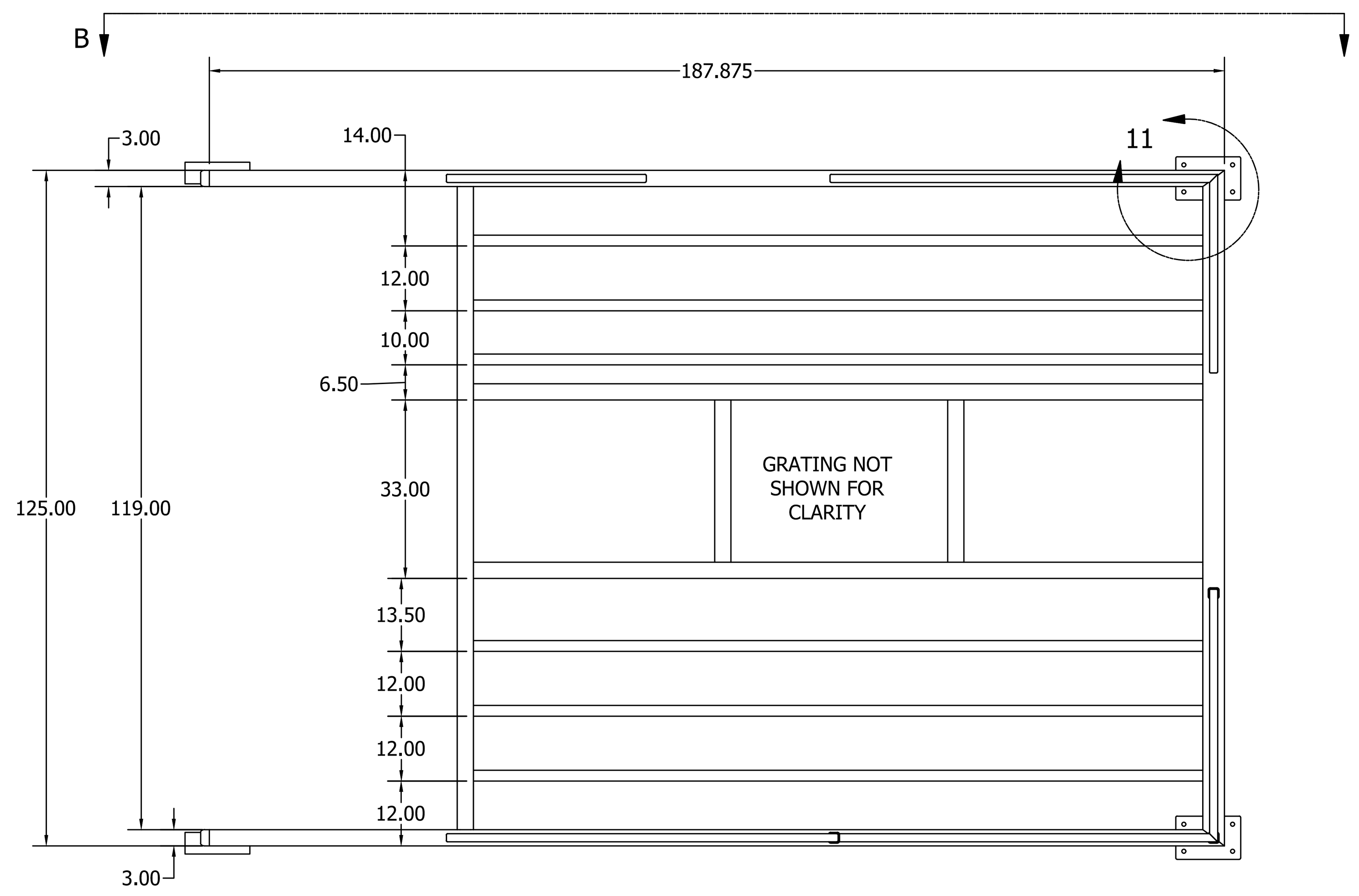
DRYPAC - TANK
SECTIONS AND DETAILS

REV NO. 1
SHEET: M-1.2
07 OF 13 SHEETS

Z:\!!!!CLOACINA PROJECTS!!!!\2017 PROJECTS\2017 PRODUCTION\CL16-035 Tesoro Viejo\2 Engineering\7 Drawings\2 Mechanical\3. AutoCAD Drawings\M-1.2-DRYPAC.dwg - abrahamm - Jul 25, 2018 - 10:05am



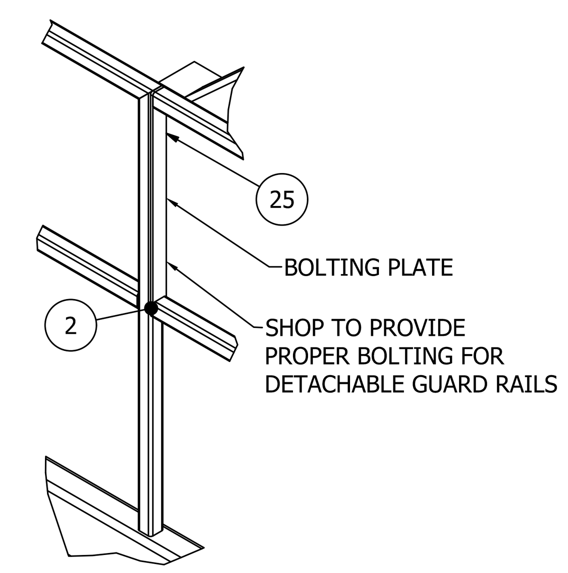
ISOMETRIC VIEW



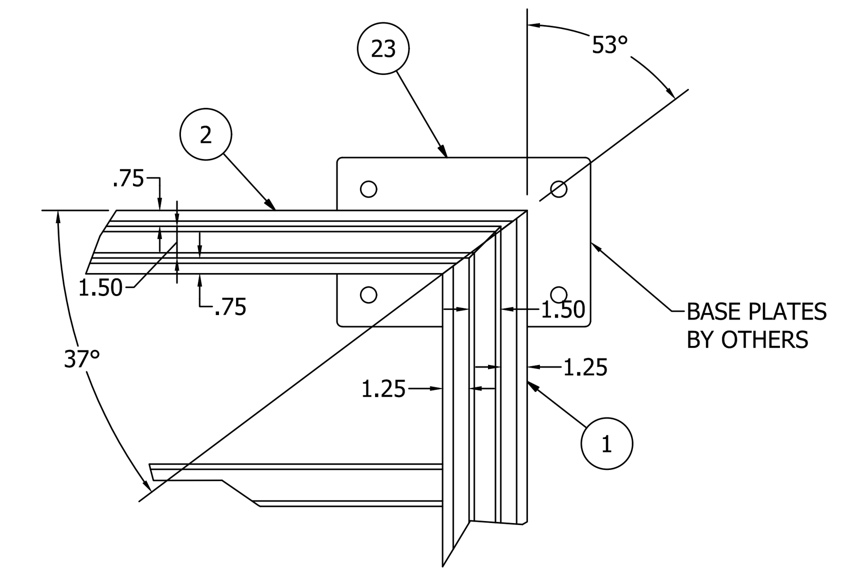
PLAN VIEW

SCALE: 1/2"=1'-0"

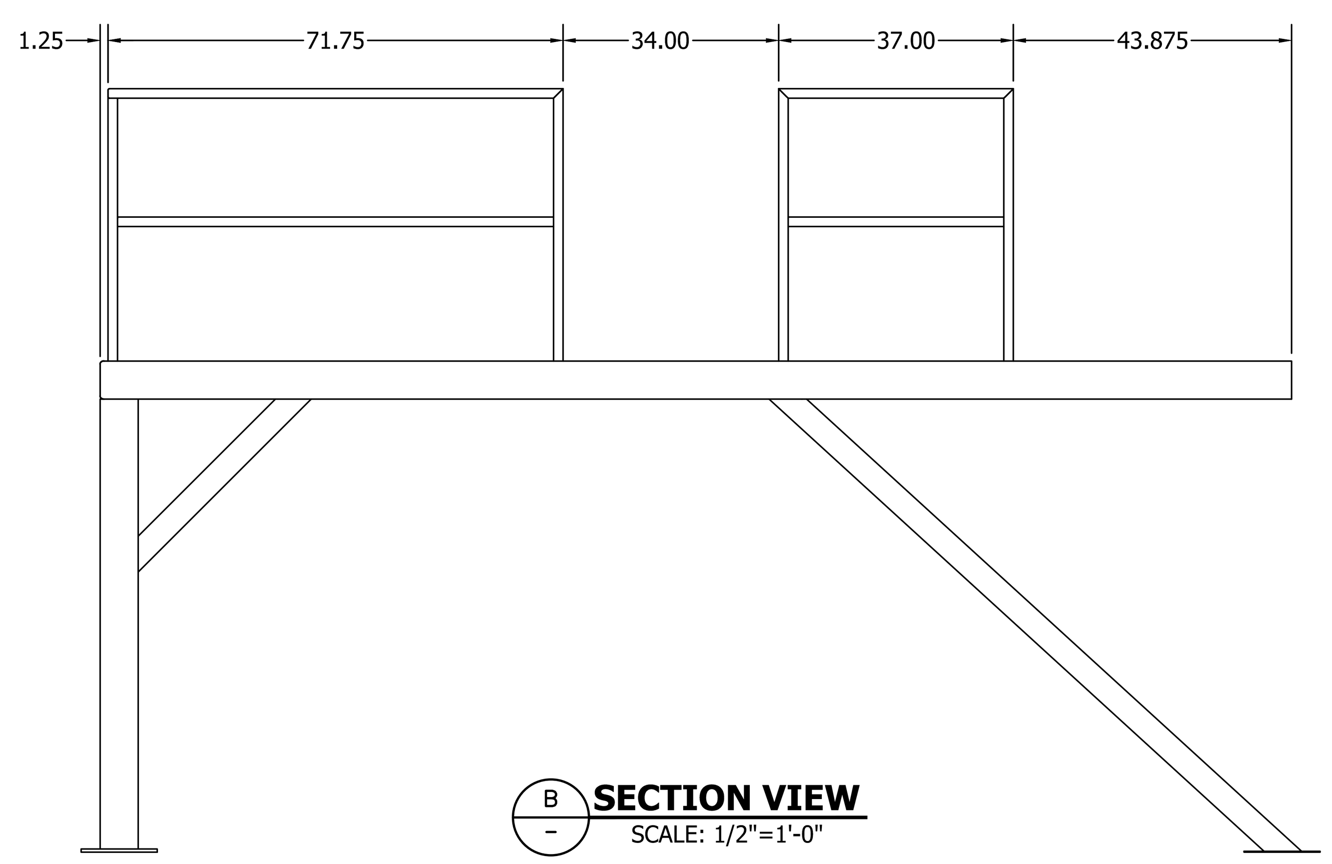
PARTS LIST			
ITEM	ITEM QTY	QTY	DESCRIPTION
1	1	125.000 in	RECTANGULAR TUBE, 6" X 4" X 1/4", 304 SS, ASTM-A-A554, 125.000 in
2	2	375.750 in	RECTANGULAR TUBE, 6" X 3" X 1/4", 304 SS, ASTM-A-A554, 187.875 in
3	2	142.020 in	RECTANGULAR TUBE, 6" X 3" X 1/4", 304 SS, ASTM-A-A554, 71.010 in
4	2	270.000 in	RECTANGULAR TUBE, 4" X 3" X 1/4", 304 SS, ASTM-A-A554, 135.000 in
5	1	119.000 in	RECTANGULAR TUBE, 4" X 3" X 1/4", 304 SS, ASTM-A-A554, 119.000 in
6	2	220.298 in	RECTANGULAR TUBE, 4" X 3" X 1/4", 304 SS, ASTM-A-A554, 110.149 in
7	2	77.197 in	RECTANGULAR TUBE, 4" X 3" X 1/4", 304 SS, ASTM-A-A554, 38.599 in
8	2	60.000 in	RECTANGULAR TUBE, 4" X 3" X 1/4", 304 SS, ASTM-A-A554, 30.000 in
9	6	810.000 in	RECTANGULAR TUBE, 4" X 2" X 1/8", 304 SS, ASTM-A-A554, 135.000 in
10	2	6.000 in	SQUARE TUBE, 2" X 2" X 3/16", 304 SS, ASTM-A-A554, 3.000 in
11	1	72.500 in	SQUARE TUBE, 1 1/2" X 1 1/2" X 1/8", 304 SS, ASTM-A-A554, 72.500 in
12	1	71.750 in	SQUARE TUBE, 1 1/2" X 1 1/2" X 1/8", 304 SS, ASTM-A-A554, 71.750 in
13	1	70.000 in	SQUARE TUBE, 1 1/2" X 1 1/2" X 1/8", 304 SS, ASTM-A-A554, 70.000 in
14	1	69.500 in	SQUARE TUBE, 1 1/2" X 1 1/2" X 1/8", 304 SS, ASTM-A-A554, 69.500 in
15	1	68.750 in	SQUARE TUBE, 1 1/2" X 1 1/2" X 1/8", 304 SS, ASTM-A-A554, 68.750 in
16	1	68.500 in	SQUARE TUBE, 1 1/2" X 1 1/2" X 1/8", 304 SS, ASTM-A-A554, 68.500 in
17	1	46.750 in	SQUARE TUBE, 1 1/2" X 1 1/2" X 1/8", 304 SS, ASTM-A-A554, 46.750 in
18	1	43.750 in	SQUARE TUBE, 1 1/2" X 1 1/2" X 1/8", 304 SS, ASTM-A-A554, 43.750 in
19	7	301.000 in	SQUARE TUBE, 1 1/2" X 1 1/2" X 1/8", 304 SS, ASTM-A-A554, 43.000 in
20	2	83.000 in	SQUARE TUBE, 1 1/2" X 1 1/2" X 1/8", 304 SS, ASTM-A-A554, 41.500 in
21	1	37.001 in	SQUARE TUBE, 1 1/2" X 1 1/2" X 1/8", 304 SS, ASTM-A-A554, 37.001 in
22	1	34.001 in	SQUARE TUBE, 1 1/2" X 1 1/2" X 1/8", 304 SS, ASTM-A-A554, 34.001 in
23	1	36.750 in	SQUARE TUBE, 1 1/2" X 1 1/2" X 1/8", 304 SS, ASTM-A-A554, 36.750 in
24	1	33.750 in	SQUARE TUBE, 1 1/2" X 1 1/2" X 1/8", 304 SS, ASTM-A-A554, 33.750 in
25	1	21.750 in	FLAT BAR, 1 1/2x1/4, 304 SS, ASTM A-240, 21.75" LG
26	2	2	SHEET, 10 GA, 4" X 12", 304 SS ASTM-A-240, 2B FINISH



12 – DETAIL 12

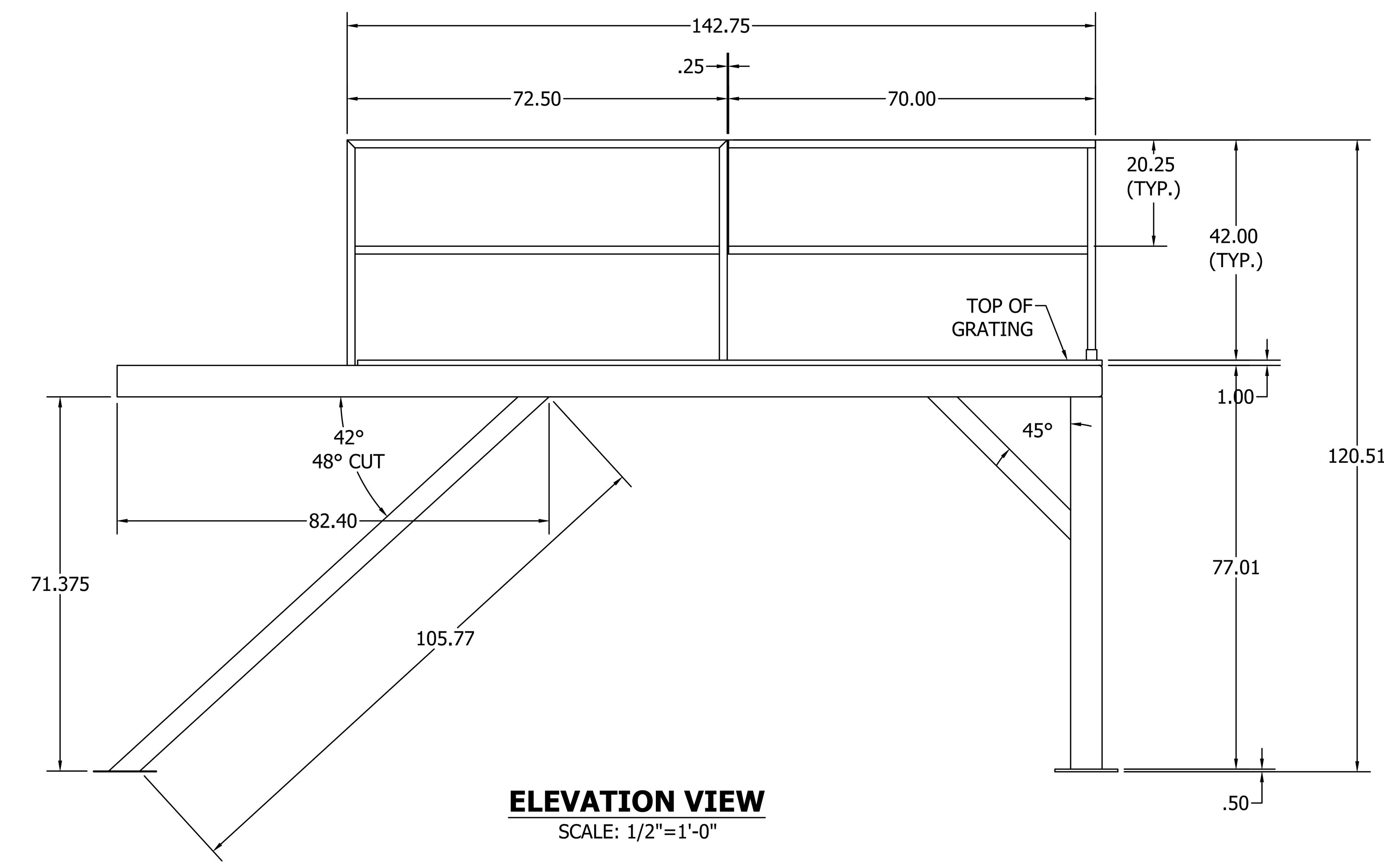


11 – DETAIL 11



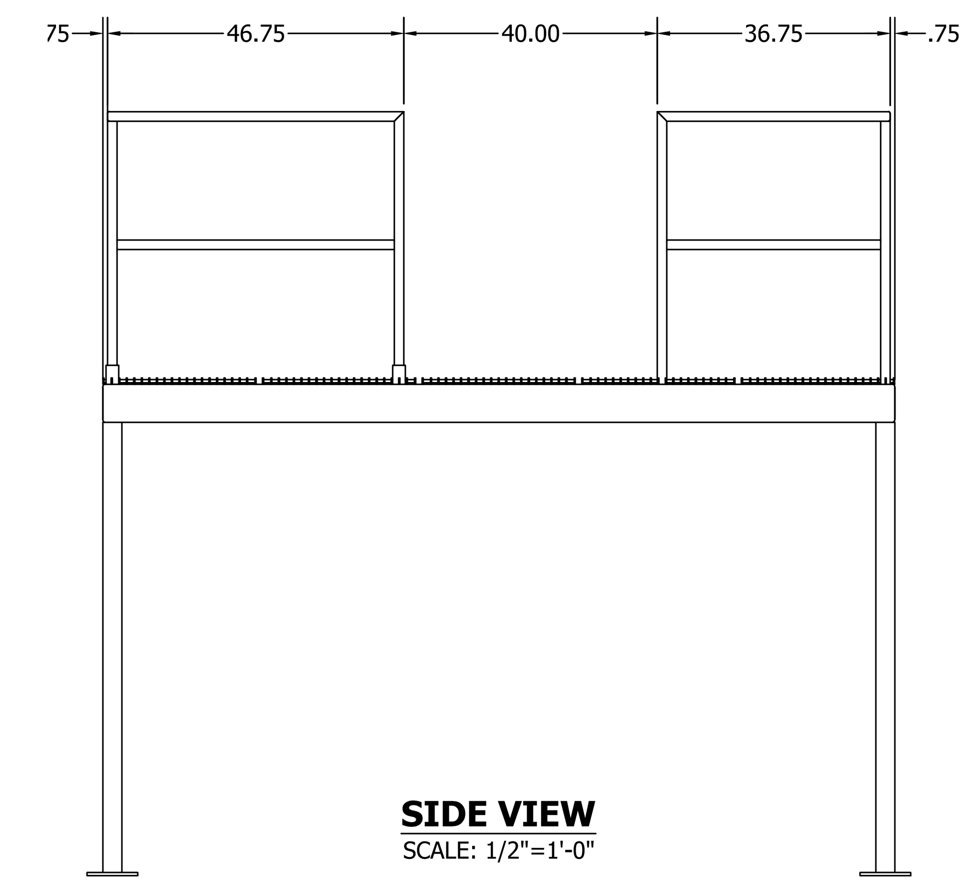
B – **SECTION VIEW**

SCALE: 1/2"=1'-0"



ELEVATION VIEW

SCALE: 1/2"=1'-0"



SIDE VIEW

SCALE: 1/2"=1'-0"

NOTES:

1. PLATFORM GUARDRAILS TO BE UNBOLTABLE.
2. 10 GA TANK WALLS & FLOOR (WETTED BOUNDARY): FULL PEN WELDS ALL LOCATIONS (OR EQUAL)
3. HSS 2X2X1/8 VERT WALL STIFFENERS TO 10 GA TANK PLATE: 3/16" F.W. STITCH WELD 1.25" LONG @ 12" O.C.
4. INTERNAL HORIZONTAL STIFFENERS: 3/16" F.W. ALL AROUND TUBE ENDS TO INSIDE 10 GA TANK PLATE OR TO ANOTHER HSS TUBE (OR FULL PEN WELD IS ACCEPTABLE). SEAL WELD ENDS OF ALL INTERNAL TUBES SO WATER CANNOT GET INSIDE.
5. EXTERNAL HSS 3X2X1/4 STIFFENER AT 5' ELEVATION: 3/16" F.W. TOP AND BOTTOM WHERE IT CROSSES EACH HSS 2X2X1/8 VERT WALL STIFFENER. FULL PEN WELDS WHERE ENDS BUTT TOGETHER.
6. NOZZLE PENETRATIONS: 3/16" F.W. ALL AROUND INSIDE & OUT BEFORE REPAD/STIFFENERS ARE INSTALLED (OR FULL PEN WELD IS ACCEPTABLE); 3/16" F.W. ALL AROUND REPAD /STIFFENERS TO NOZZLE NECK AND TANK SHELL.
7. END OF TUBING SHALL BE CAPPED WITH 1/8" PLATE STEEL.
8. ALL WELDS SHALL BE PASSIVATED.

GENERAL NOTES:

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- ALL EDGES TO BE DEBURRED AND CHAMFERED.
- ALL WELDS TO BE CLEANED OF ALL DEPOSITS/WELD SPLATTER & TO BE FREE OF ANY UNDERCUT.

ISSUED FOR RECORD

2018-07-27

REFERENCE DRAWINGS	
COVER SHEET - DRAWING INDEX	SHT. - G-0.01

REVISIONS					
2	ISSUED FOR RECORD	AJM	SEA	BDS	2018-07-27
1	RE-ISSUED FOR FABRICATION	AJM	SEA	BDS	2018-011-28
0	ISSUED FOR FABRICATION	AJM	SEA	BDS	2017-11-06

SCALE: NOT TO SCALE
DATE: 2017-05-02
DRAWN BY: SEA
JOB #: CL16-035

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TESORO VIEJO
20,000 GPD - DRYPAC
SLUDGE DEWATERING SYSTEM

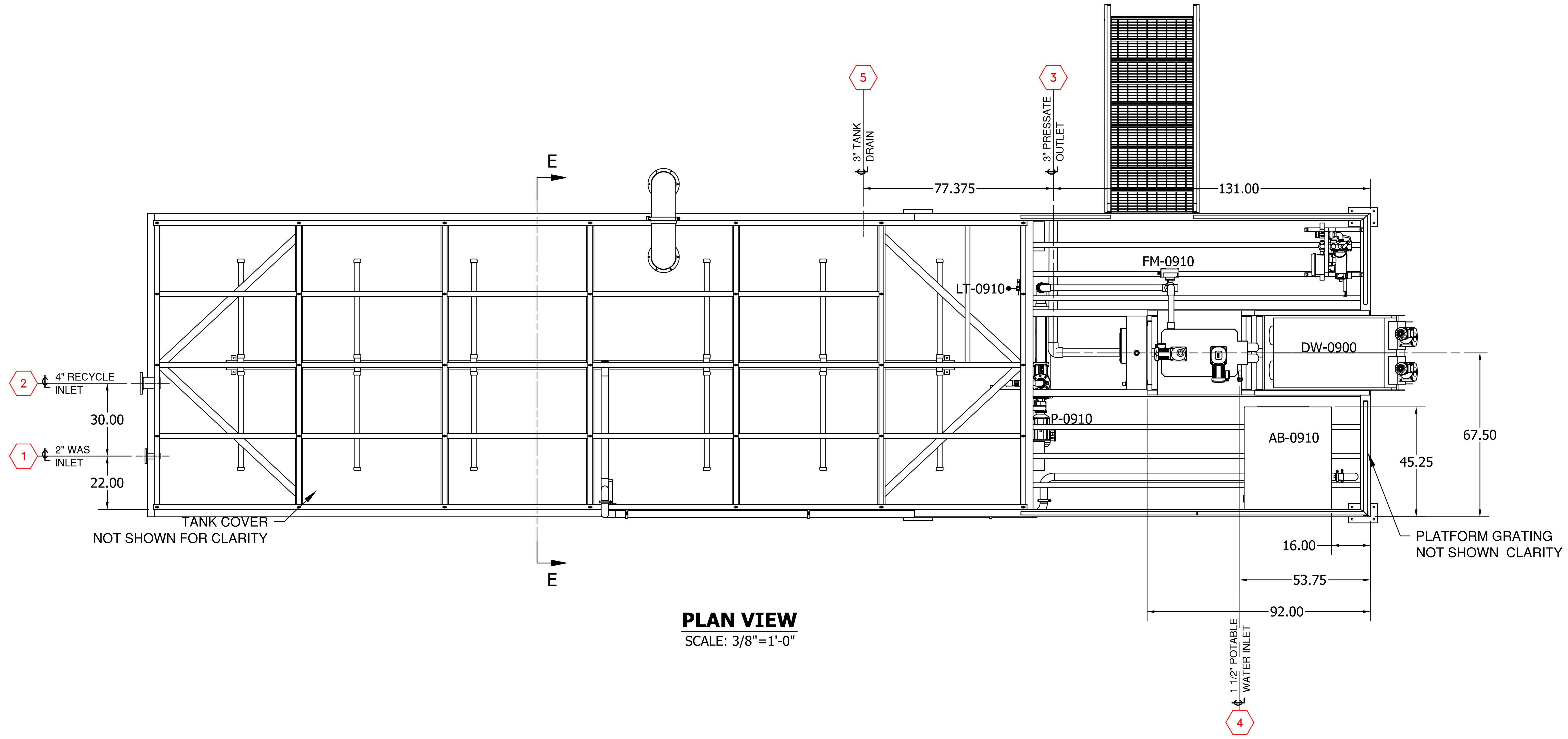
REGISTERED PROFESSIONAL ENGINEER BRIAN D. SNOW NO. C80472 EXP. 3/31/19 CIVIL STATE OF CALIFORNIA 7/27/18

DRYPAC - PLATFORM GENERAL ARRANGEMENT

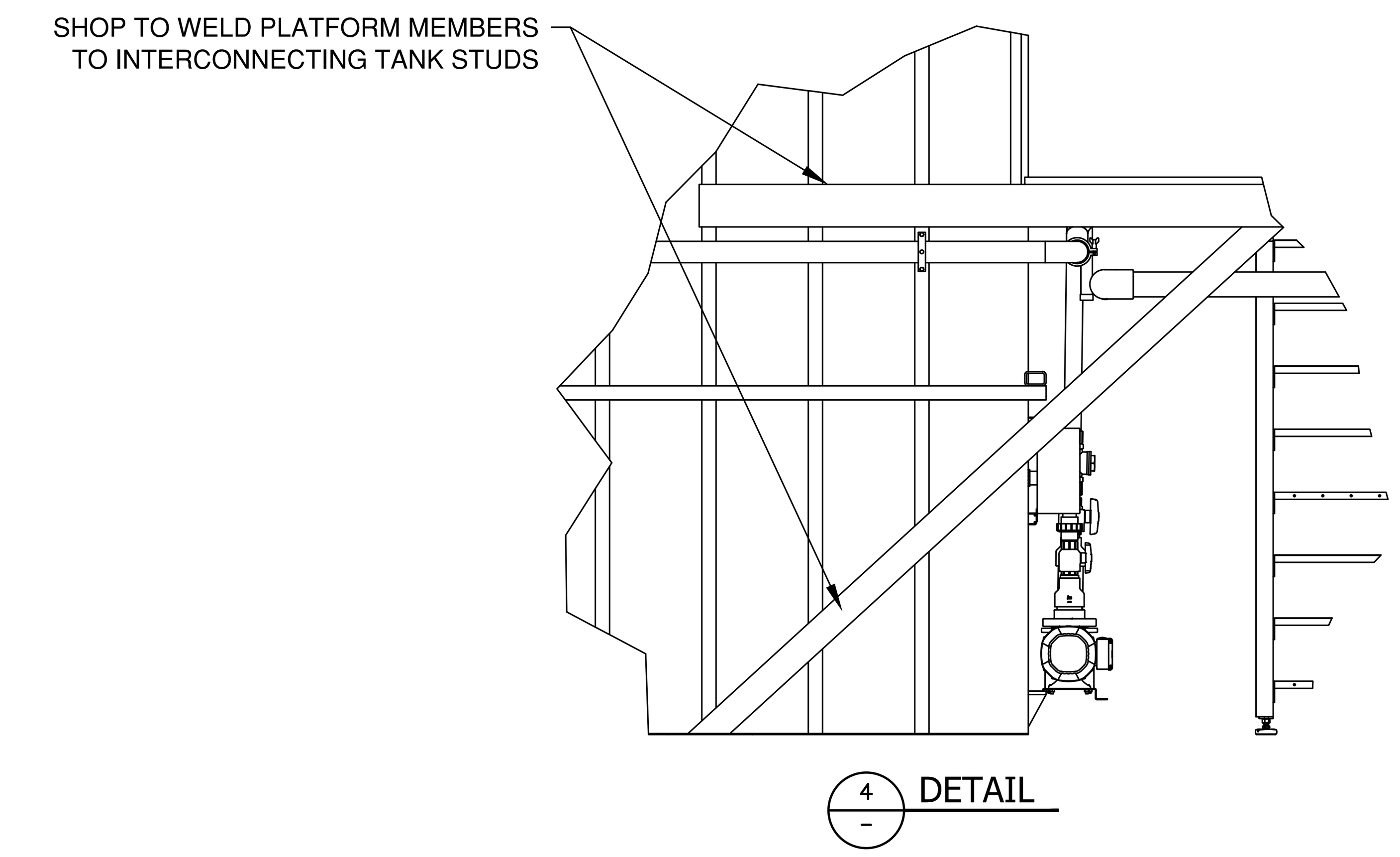
REV NO. 2 | SHEET: M-1.3 | 08 OF 13 SHEETS

Z:\!!!!CLOACINA PROJECTS!!!!\2017 PROJECTS\2017 PRODUCTION\CL16-035 Tesoro Viejo\2 Engineering\7 Drawings\2 Mechanical\3. AutoCAD Drawings\M-1.3-DRYPAC.dwg – abrahamm – Jul 25, 2018 – 10:05am

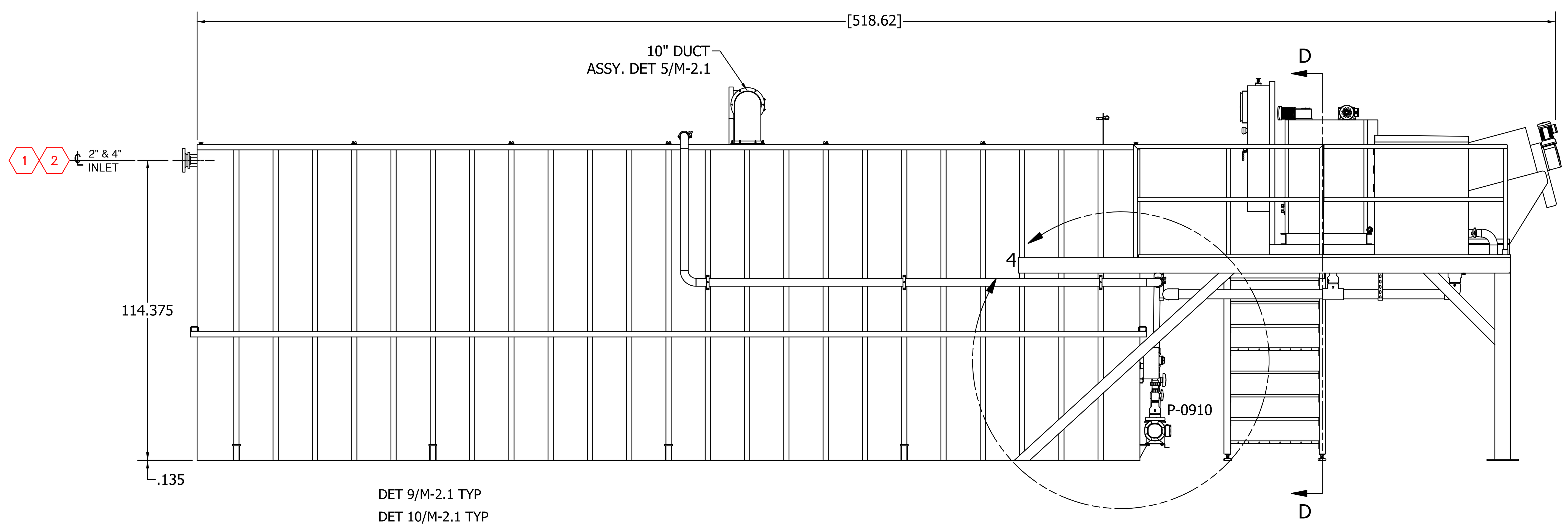
TIE IN LIST		
TIE PT.	LINE SIZE/SPEC	PROCESS
1	2" SCH 80 PVC	WAS INLET FROM MEMPAC-M
2	4"	RECYCLED WASH WATER INLET
3	3" SCH 80 PVC	PRESSATE OUTLET TO DRAIN
4	1 1/2" SCH 80 PVC	POTABLE WATER INLET
5	3"	TANK DRAIN OUTLET
6	-	POWER INLET
7	-	COMMUNICATIONS INLET



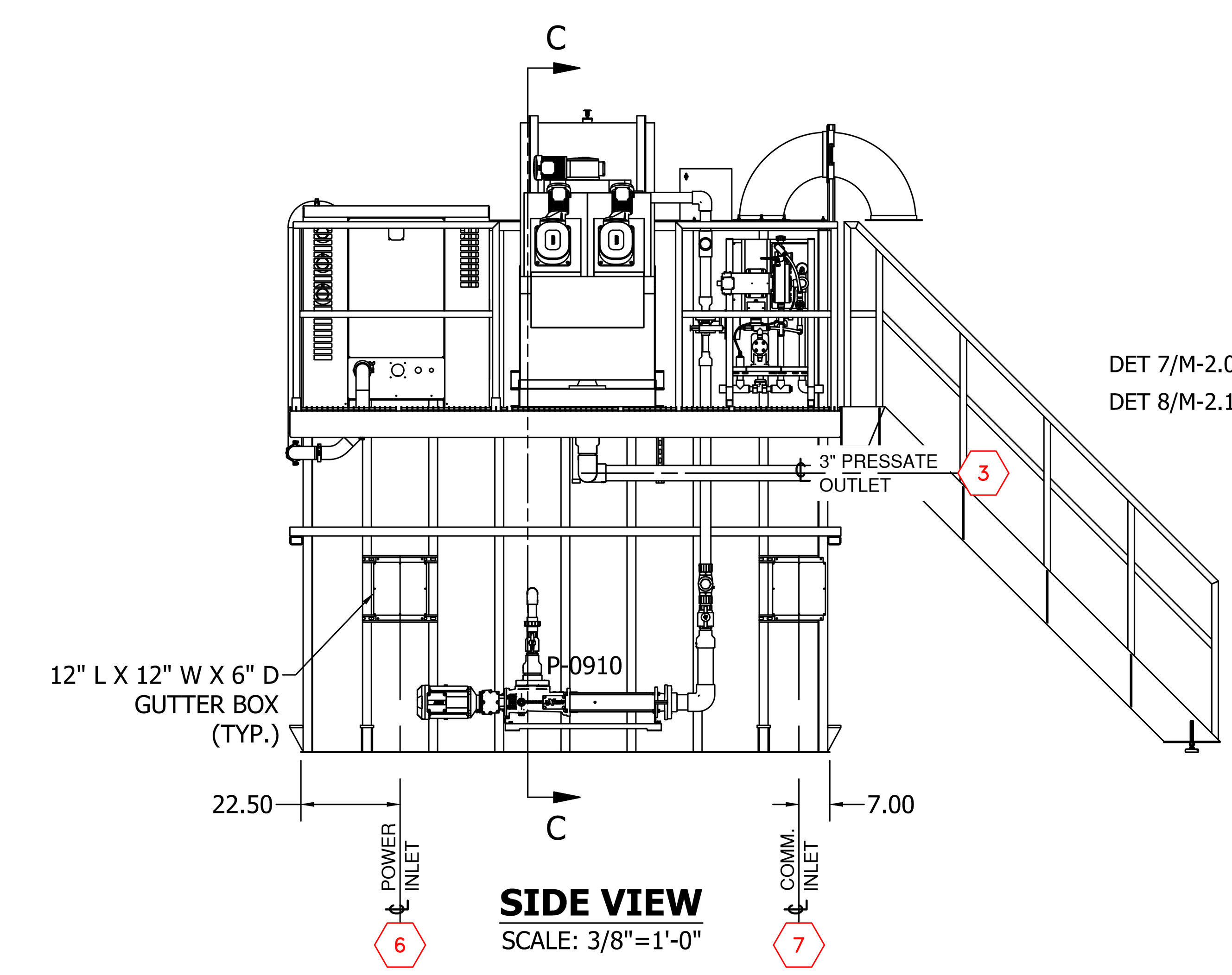
PLAN VIEW
SCALE: 3/8"=1'-0"



4 DETAIL



ELEVATION VIEW
SCALE: 3/8"=1'-0"



SIDE VIEW
SCALE: 3/8"=1'-0"

GENERAL NOTES:

- SHOP TO VERIFY ALL DIMENSIONS PRIOR TO FABRICATION.
- ALL EDGES TO BE DEBURRED AND CHAMFERED.
- ALL WELDS TO BE CLEANED OF ALL DEPOSITS/WELD SPLATTER & TO BE FREE OF ANY UNDERCUT.

ISSUED FOR RECORD
2018-07-27

REFERENCE DRAWINGS	
COVER SHEET - DRAWING INDEX	SHT. - G-0.01

REVISIONS					
2	ISSUED FOR RECORD	AJM	SEA	BDS	2018-07-27
0	ISSUED FOR FABRICATION	AJM	SEA	BDS	2017-11-28
1	RE-ISSUED FOR FABRICATION	AJM	SEA	BDS	2018-01-02

SCALE: NOT TO SCALE
DATE: 2017-05-02
DRAWN BY: SEA
JOB #: CL16-035

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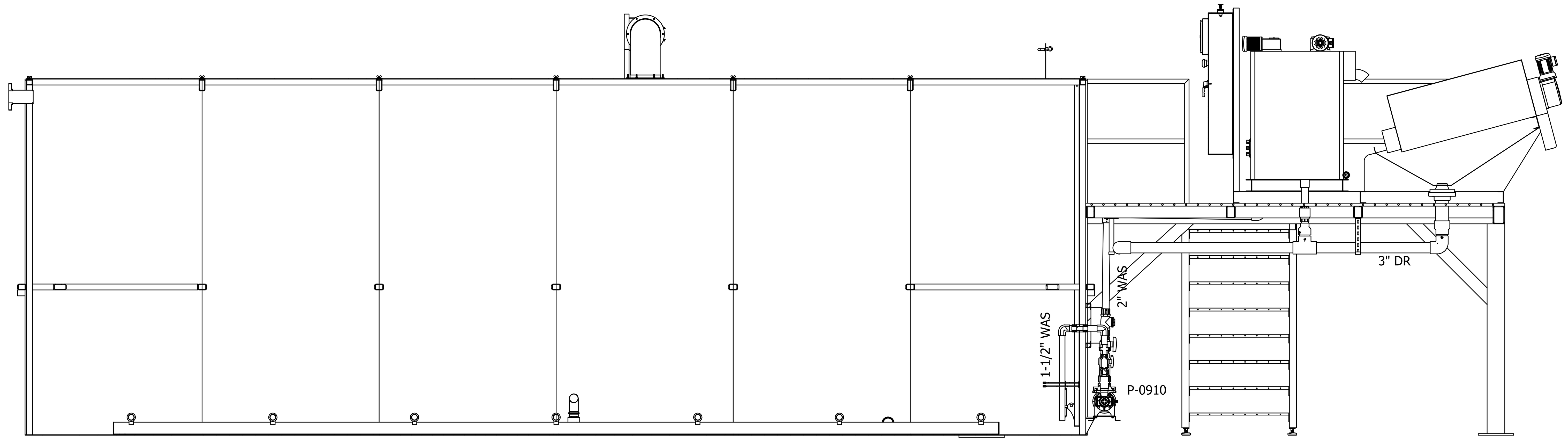
TESORO VIEJO
20,000 GPD - DRYPAC
SLUDGE DEWATERING SYSTEM

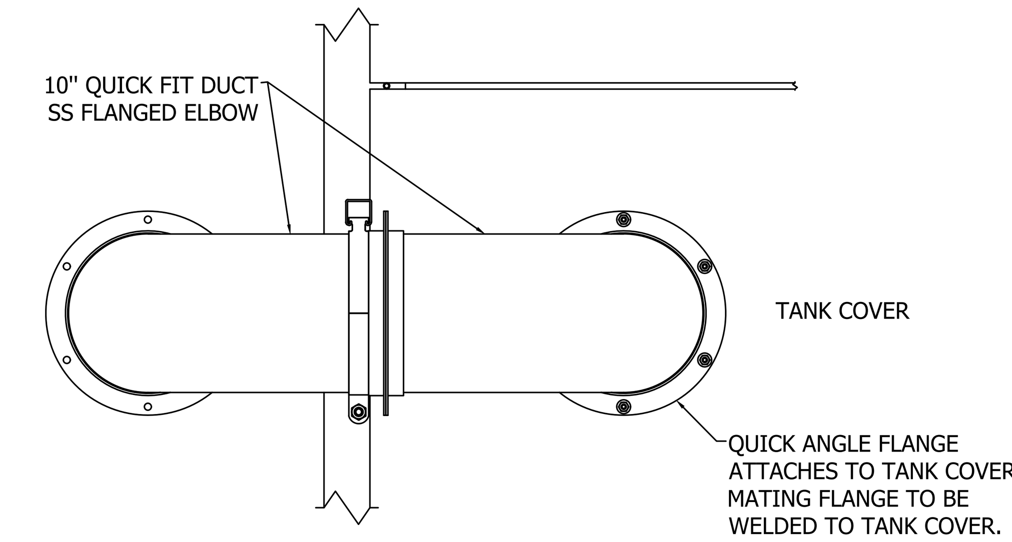
REGISTERED PROFESSIONAL ENGINEER BRIAN D. SNOW NO. C80472 EXP. 3/31/19 CIVIL STATE OF CALIFORNIA 7/27/18

DRYPAC - MECHANICAL GENERAL ARRANGEMENT

REV NO. 2
SHEET: M-1.4
09 OF 13 SHEETS

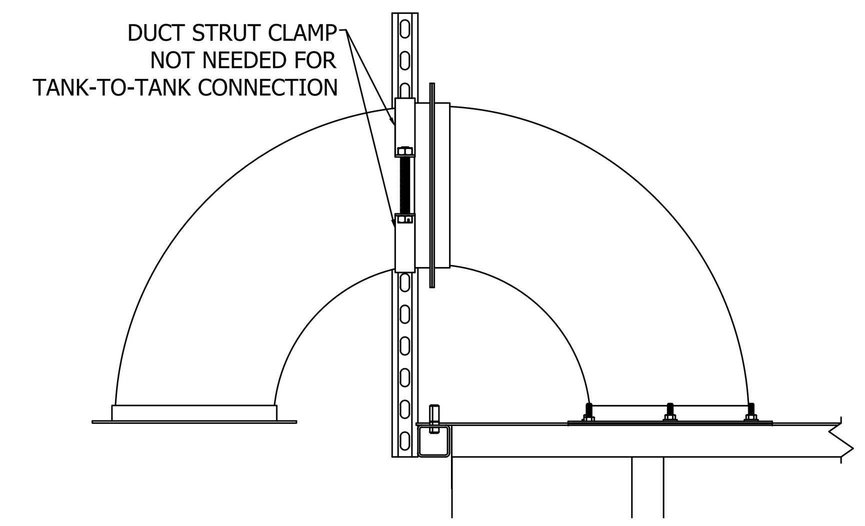


C SECTION VIEW
M-1.4 SCALE: 3/8"=1'-0"

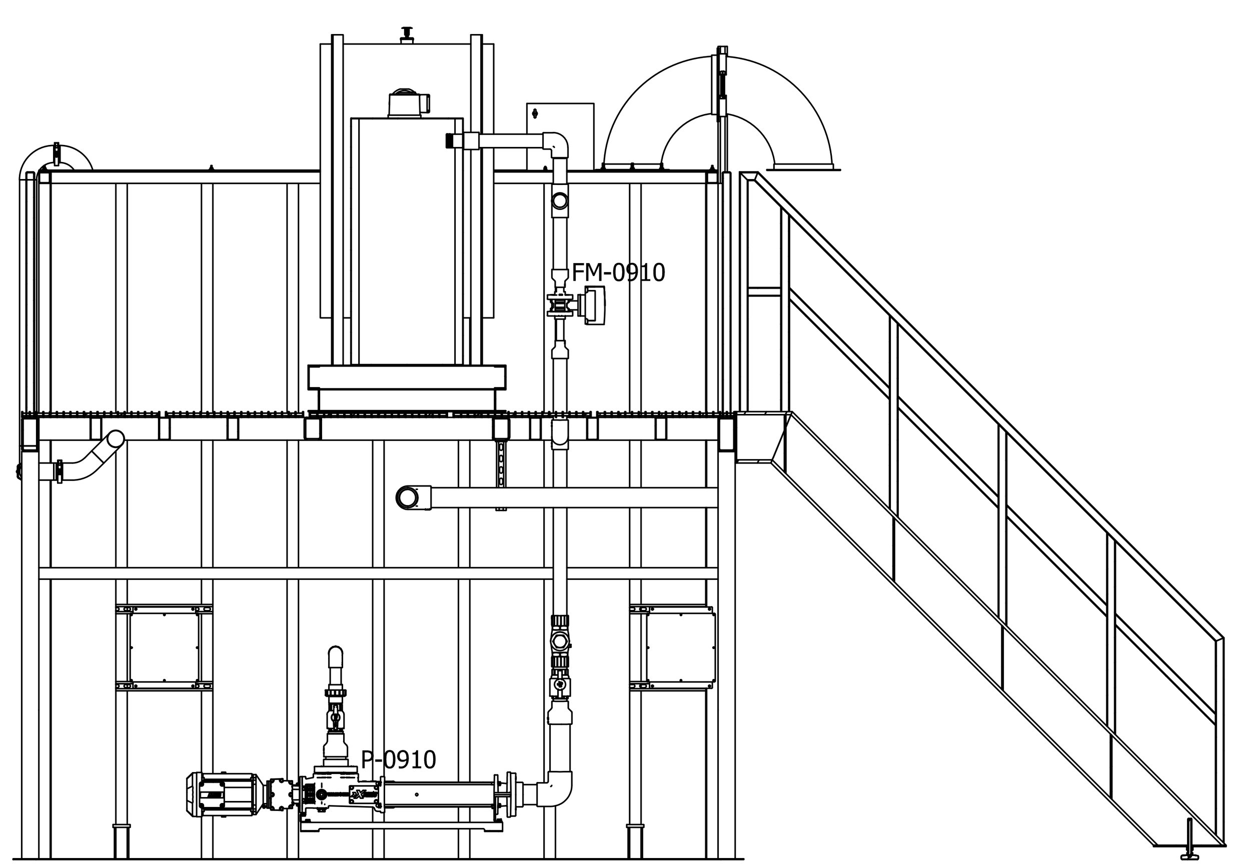


PLAN VIEW
SCALE: 3/4"=1'-0"

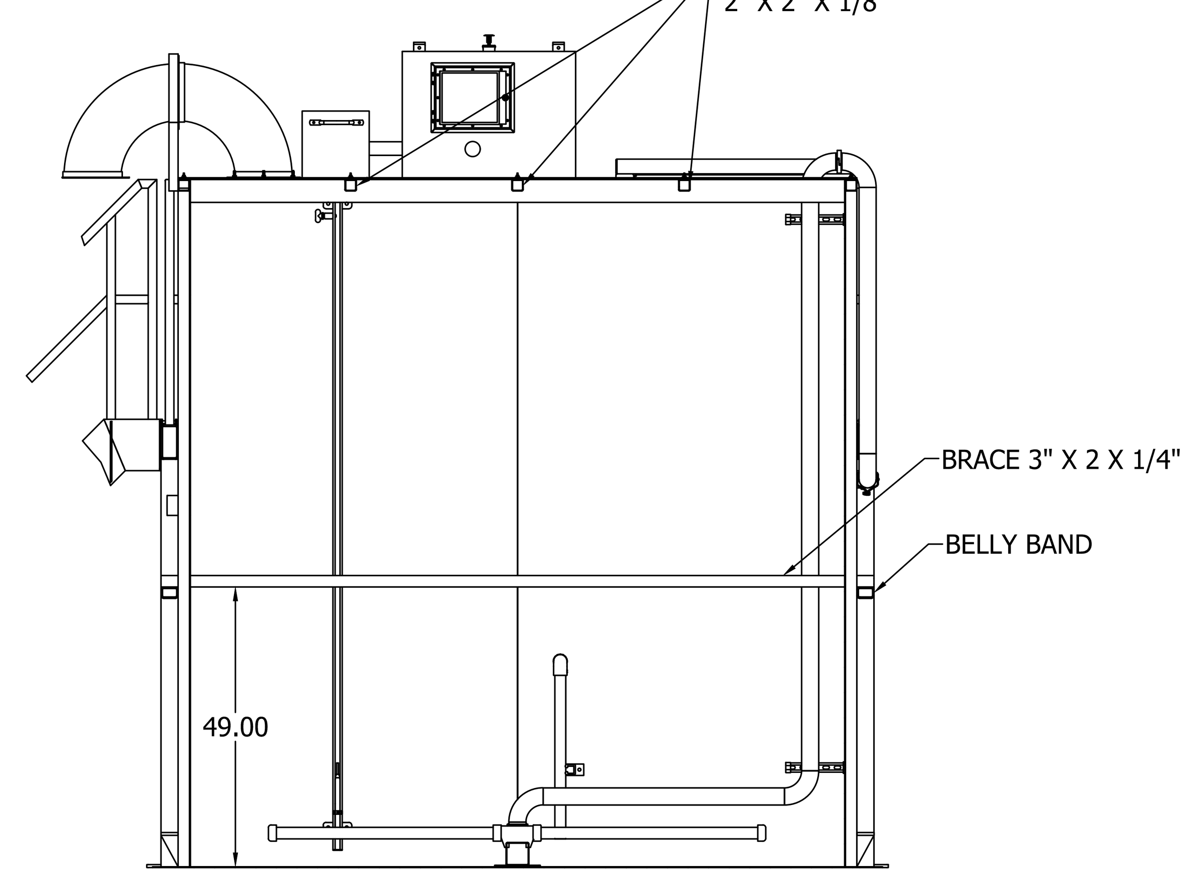
5 **DETAIL: DUCT ASSEMBLY**
M-1.4



ELEVATION VIEW
SCALE: 3/4"=1'-0"



D SECTION VIEW
M-1.4 SCALE: 3/8"=1'-0"



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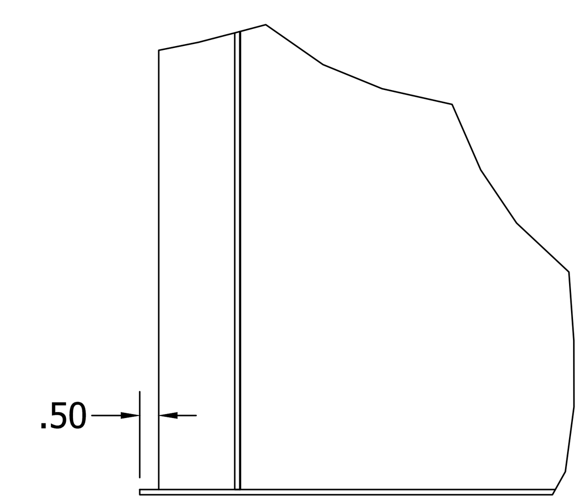
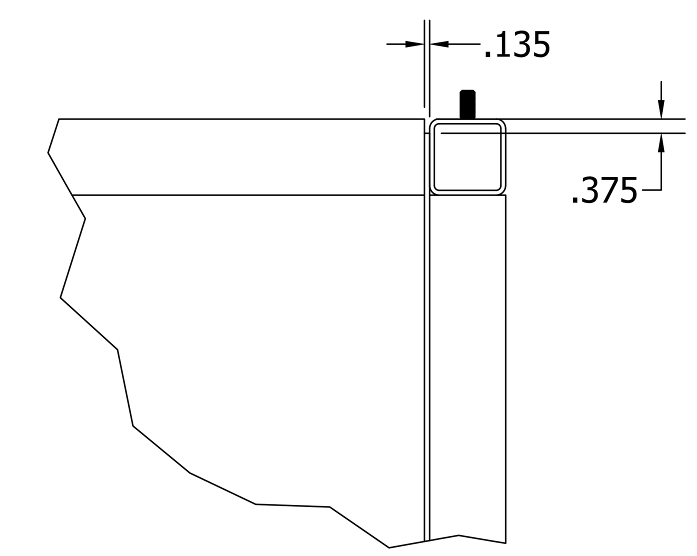
M-1.4 SCALE: 3/8"=1'-0"



2 DETAIL
M-1.1



3 DETAIL
M-1.1

GENERAL NOTES:

- SHOP TO VERIFY ALL DIMENSIONS PRIOR TO FABRICATION.
- ALL EDGES TO BE DEBURRED AND CHAMFERED.
- ALL WELDS TO BE CLEANED OF ALL DEPOSITS/WELD SPLATTER & TO BE FREE OF ANY UNDERCUT.

ISSUED FOR RECORD
2018-07-27

REFERENCE DRAWINGS	
COVER SHEET - DRAWING INDEX	SHT. - G-0.01

REVISIONS					
0	ISSUED FOR FABRICATION	AJM	SEA	BDS	2017-11-28
1	ISSUED FOR RECORD	AJM	SEA	BDS	2018-07-27

SCALE: NOT TO SCALE
DATE: 2017-05-02
DRAWN BY: SEA
JOB #: CL16-035

P.O. BOX 1647
ARROYO GRANDE, CA
PHONE: 888.483.8469
FAX: 888.483.6134
info@cloacina.com

CLOACINA

TESORO VIEJO
20,000 GPD - DRYPAC
SLUDGE DEWATERING SYSTEM

REGISTERED PROFESSIONAL ENGINEER BRIAN D. SNOW NO. C80472 EXP. 3/31/19 CIVIL STATE OF CALIFORNIA 7/27/18

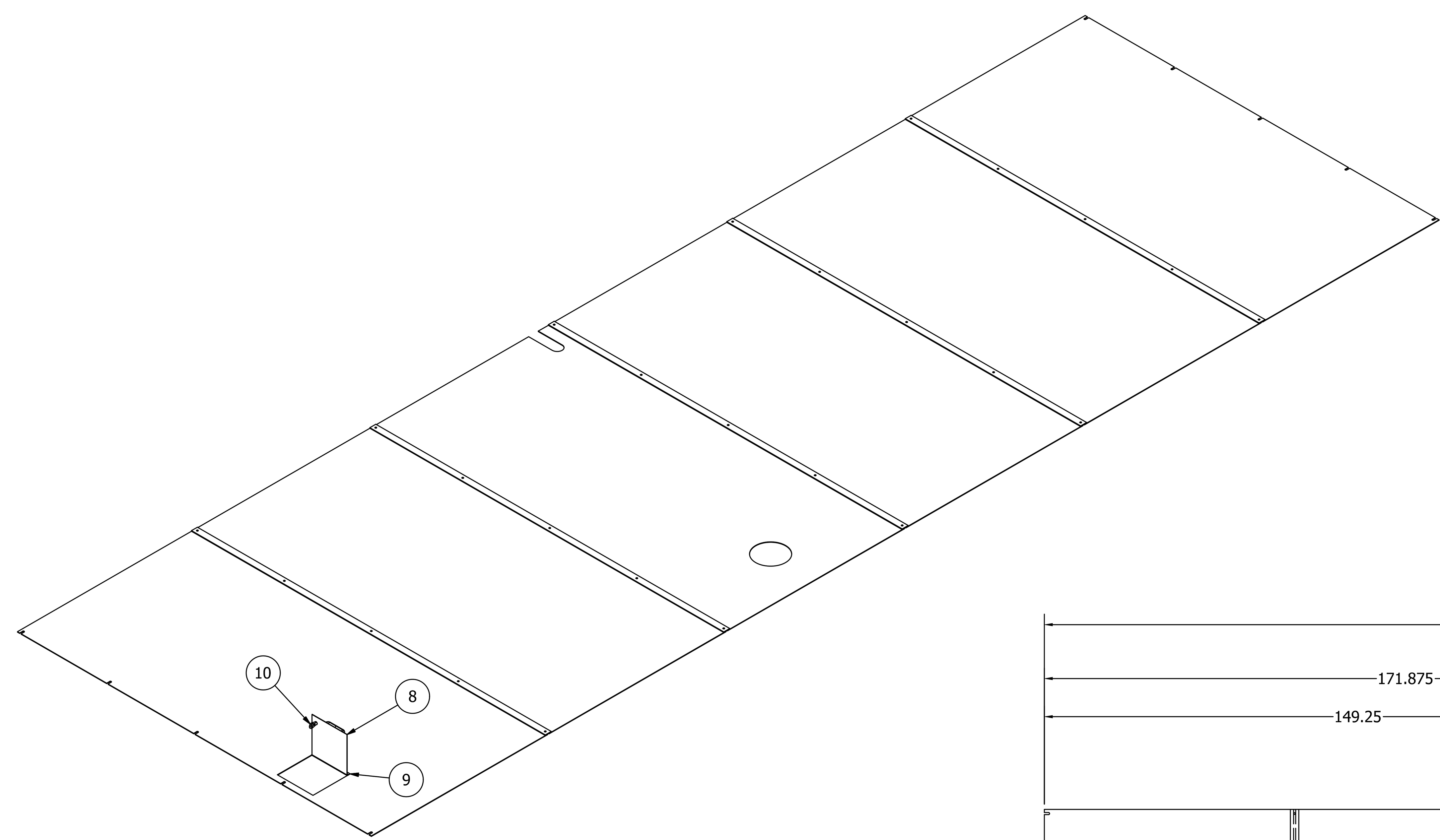
DRYPAC - MECHANICAL SECTIONS AND DETAILS

REV NO. 1

SHEET: M-1.5

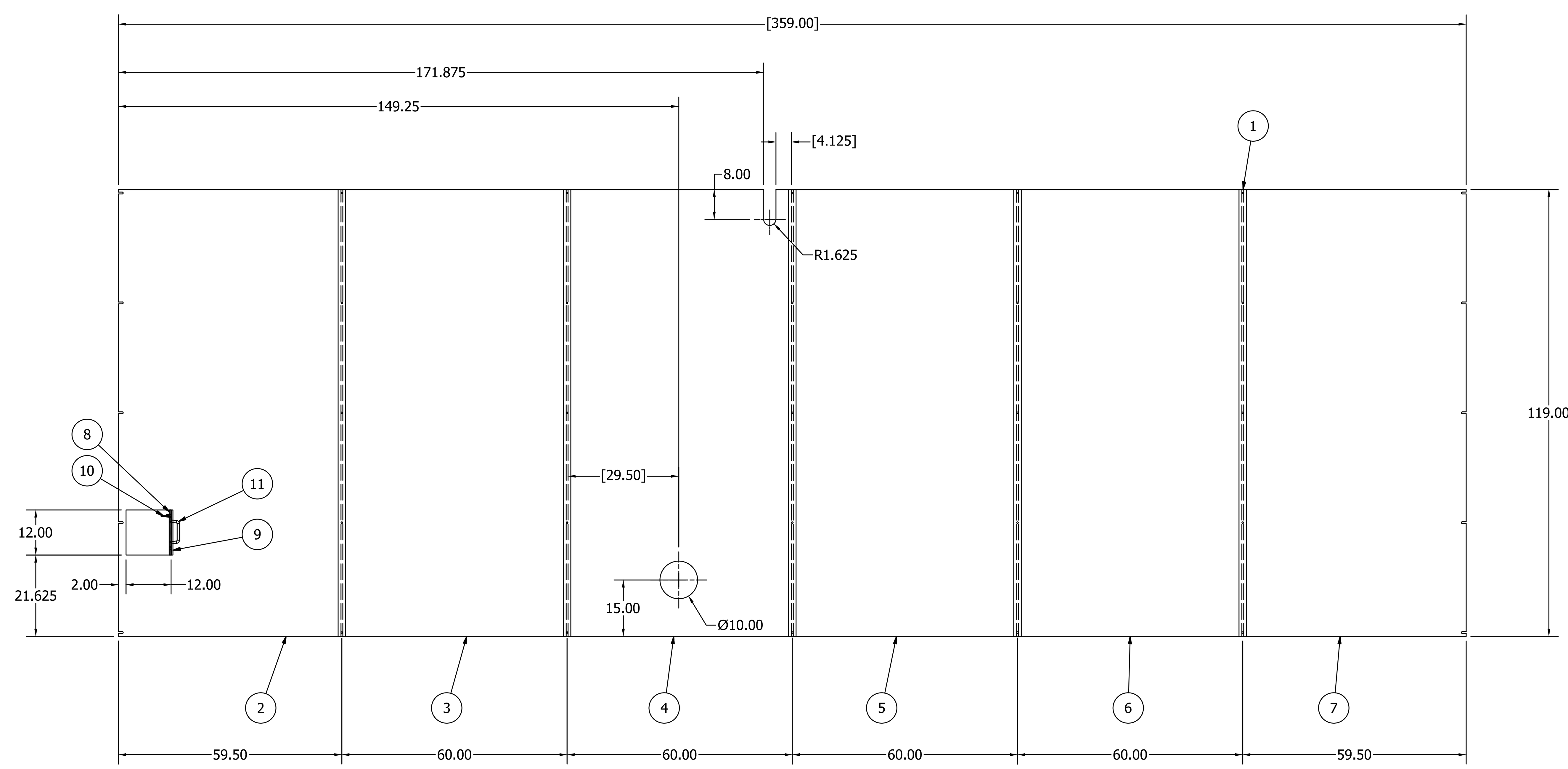
10 OF 13 SHEETS

Z:\!!!!CLOACINA PROJECTS!!!!\2017 PROJECTS\2017 PRODUCTION\CL16-035 Tesoro Viejo\2 Engineering\7 Drawings\2 Mechanical\3. AutoCAD Drawings\M-1.5-DRYPAC.dwg – abrahamm – Jul 25, 2018 – 10:06am



ISOMETRIC VIEW

PARTS LIST		
ITEM	QTY	DESCRIPTION
1	600.000 in	FLAT BAR, 2" x 3/16", 304 SS, 120" LG
2	1	SHEET, 59.25" x 119", 14 GA, 304 SS, ASTM-A-240, 2B FINISH, SHEET 1
3	1	SHEET, 59.5" x 119", 14 GA, 304 SS, ASTM-A-240, 2B FINISH, SHEET 2
4	1	SHEET, 59.5" x 119", 14 GA, 304 SS, ASTM-A-240, 2B FINISH, SHEET 3
5	1	SHEET, 59.5" x 119", 14 GA, 304 SS, ASTM-A-240, 2B FINISH, SHEET 4
6	1	SHEET, 59.5" x 119", 14 GA, 304 SS, ASTM-A-240, 2B FINISH, SHEET 5
7	1	SHEET, 59.25" x 119", 14 GA, 304 SS, ASTM-A-240, 2B FINISH, SHEET 6
8	1	SHEET, 11.75" x 11.75", 14 GA, 304 SS, ASTM-A-240, 2B FINISH, SMALL HATCH
9	1	TYPE 304 SS PIANO HINGE WITHOUT HOLES
10	1	316 SS OVAL EYE NUT - FOR LIFTING
11	1	HATCH HANDLE

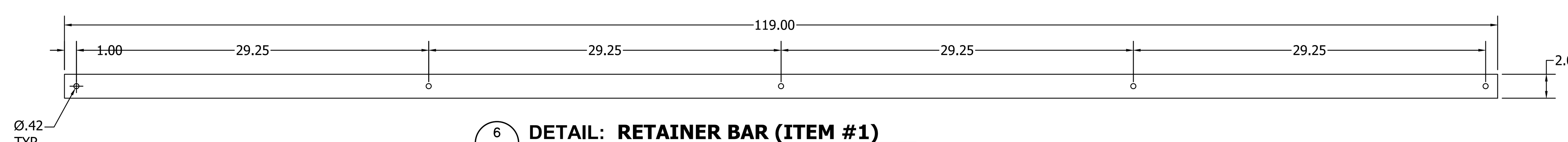


PLAN VIEW

SCALE: 3/8"=1'-0"

NOTE:

1. SHOP TO VERIFY ALL COVER PENATRATIONS BEFORE COVER FABRICATION.



6 / - **DETAIL: RETAINER BAR (ITEM #1)**

SCALE: 1/2"=1'-0"

GENERAL NOTES:

- SHOP TO VERIFY ALL DIMENSIONS PRIOR TO FABRICATION.
- ALL EDGES TO BE DEBURRED AND CHAMFERED.
- ALL WELDS TO BE CLEANED OF ALL DEPOSITS/WELD SPLATTER & TO BE FREE OF ANY UNDERCUT.

ISSUED FOR RECORD
2018-07-27

REFERENCE DRAWINGS	
COVER SHEET - DRAWING INDEX	SHT. - G-0.01
DRYPAC - MECHANICAL	SHT. - M-1.4

REVISIONS					
0	ISSUED FOR FABRICATION	AJM	SEA	BDS	2017-11-22
1	ISSUED FOR RECORD	AJM	SEA	BDS	2018-07-27

SCALE: NOT TO SCALE
DATE: 2017-05-02
DRAWN BY: SEA
JOB #: CL16-035

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TESORO VIEJO
20,000 GPD - DRYPAC
SLUDGE DEWATERING SYSTEM

REGISTERED PROFESSIONAL ENGINEER BRIAN D. SNOW NO. C80472 EXP. 3/31/19 CIVIL STATE OF CALIFORNIA 7/27/18

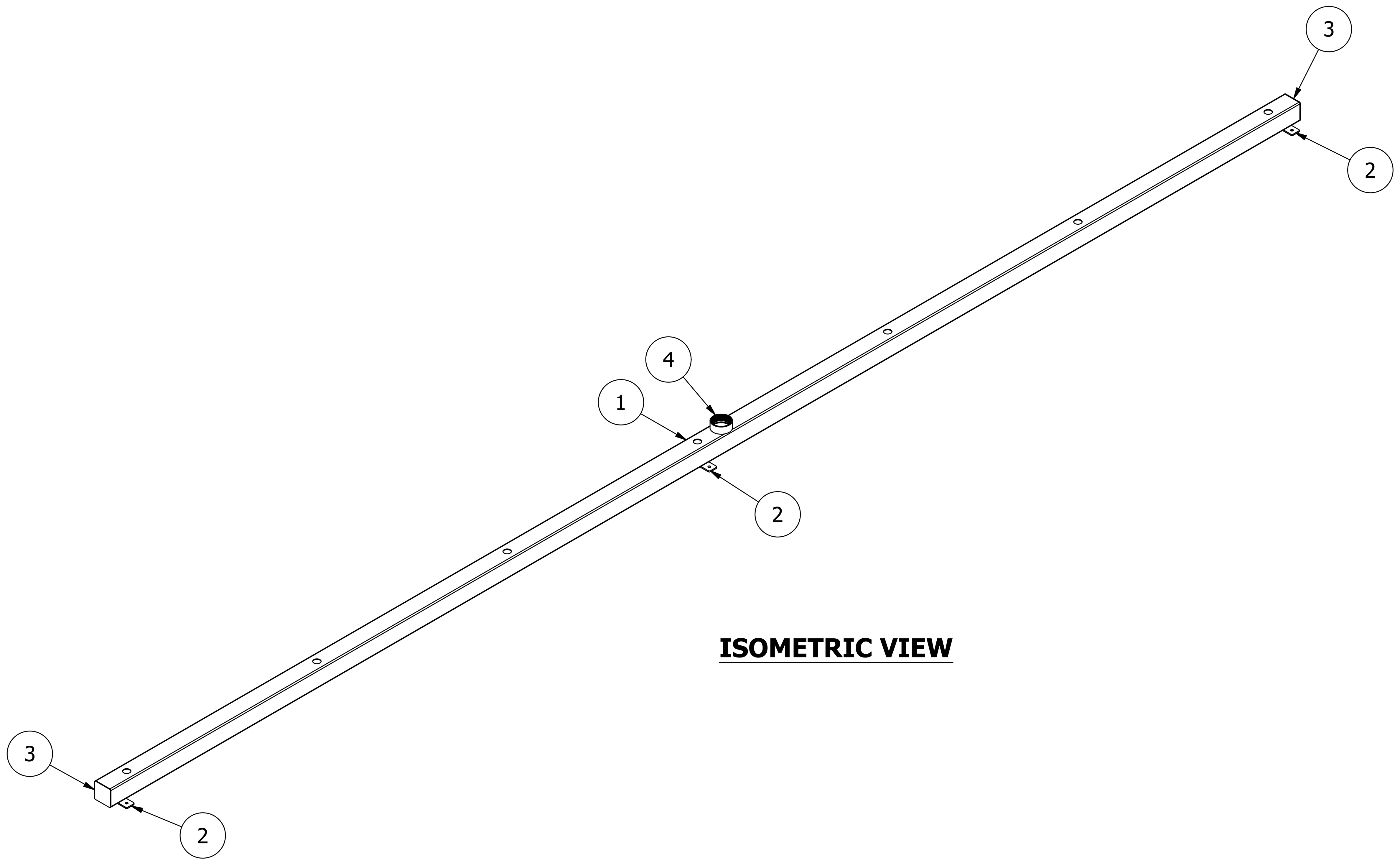
DRYPAC - TANK COVER

REV NO. 1

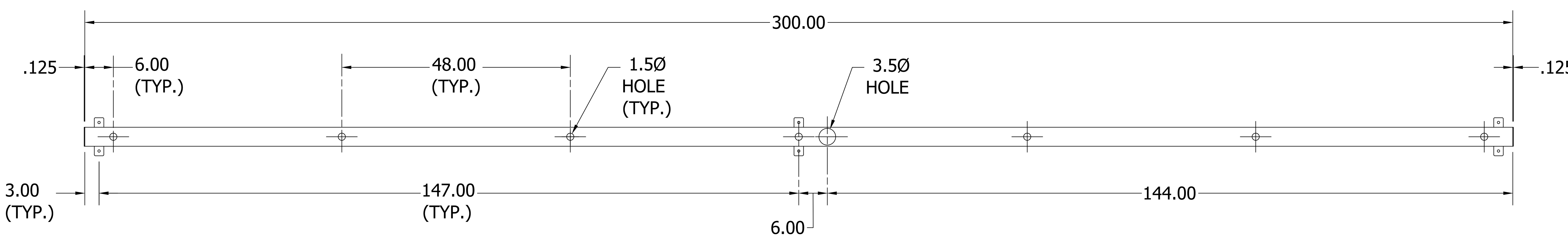
SHEET: M-1.6

11 OF 13 SHEETS

PARTS LIST		
ITEM	QTY	DESCRIPTION
1	300.000 in	RECTANGULAR TUBE, 4" X 4" X .25", 304 SS, ASTM-A-A554, 300 in
2	3	PLATE, 8" X 2" X .25" THK, 304 SS, ASTM-A-240
3	2	END CAP, 4" X 4" X .125 THK, 304 SS
4	1	COUPLING, HALF, 3", 304 SS



ISOMETRIC VIEW



PLAN VIEW

SCALE: 1"=1'-0"

GENERAL NOTES:

- SHOP TO VERIFY ALL DIMENSIONS PRIOR TO FABRICATION.
- ALL EDGES TO BE DEBURRED AND CHAMFERED.
- ALL WELDS TO BE CLEANED OF ALL DEPOSITS/WELD SPLATTER & TO BE FREE OF ANY UNDERCUT.

ISSUED FOR RECORD
2018-07-27

REFERENCE DRAWINGS	
COVER SHEET - DRAWING INDEX	SHT. - G-0.01

REVISIONS					
0	ISSUED FOR FABRICATION	AJM	SEA	BDS	2017-11-02
1	ISSUED FOR RECORD	AJM	SEA	BDS	2018-07-27

SCALE: NOT TO SCALE
DATE: 2017-05-02
DRAWN BY: SEA
JOB #: CL16-035

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CLOACINA

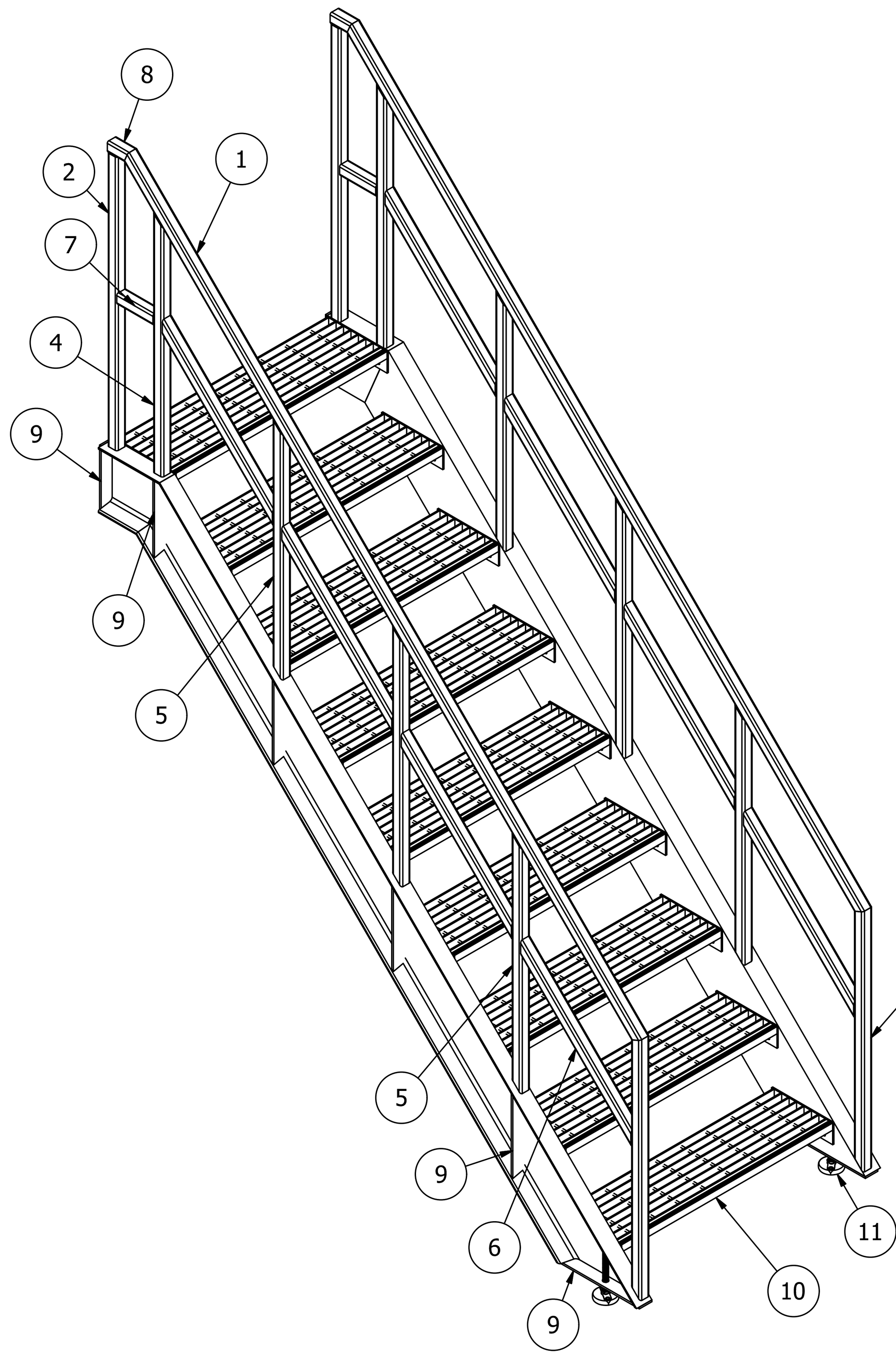
TESORO VIEJO
20,000 GPD - DRYPAC
SLUDGE DEWATERING SYSTEM

REGISTERED PROFESSIONAL ENGINEER
BRIAN D. SNOW
NO. C80472
EXP. 3/31/19
CIVIL
STATE OF CALIFORNIA
7/27/18

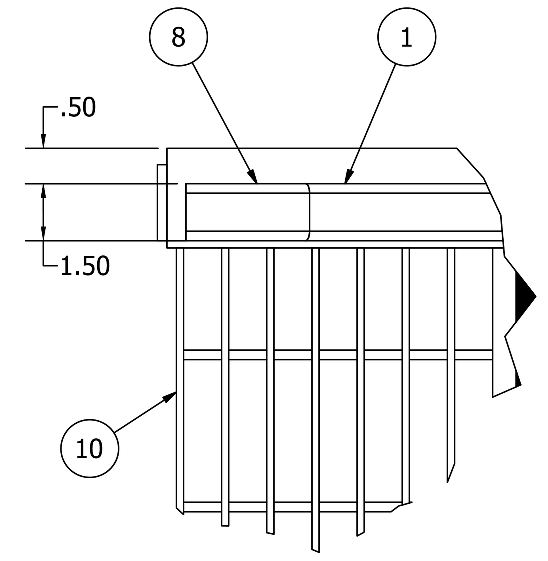
DRYPAC - AERATION MANIFOLD

REV NO.: 1
SHEET: M-1.7
12 OF 13 SHEETS

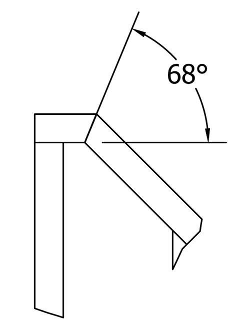
Z:\!!!CLOACINA PROJECTS!!!!\2017 PROJECTS\2017 PRODUCTION\CL16-035 Tesoro Viejo\2 Engineering\7 Drawings\2 Mechanical\3. AutoCAD Drawings\M-1.7-DRYPAC.dwg - abrahamm - Jul 25, 2018 - 10:06am



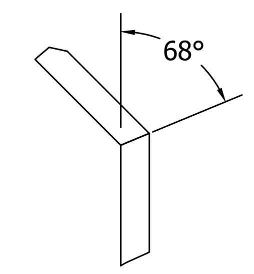
ISOMETRIC VIEW
NOT TO SCALE



12 – DETAIL
SCALE: 3" = 1'-0"



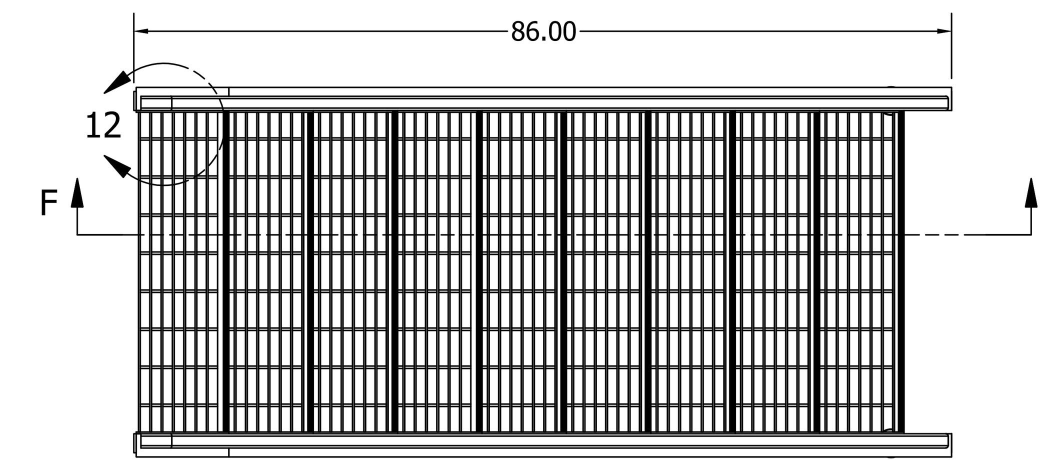
14 – DETAIL
SCALE: 1 1/2" = 1'-0"



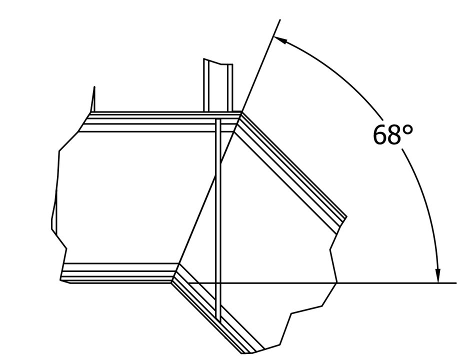
15 – DETAIL
SCALE: 1 1/2" = 1'-0"

PARTS LIST

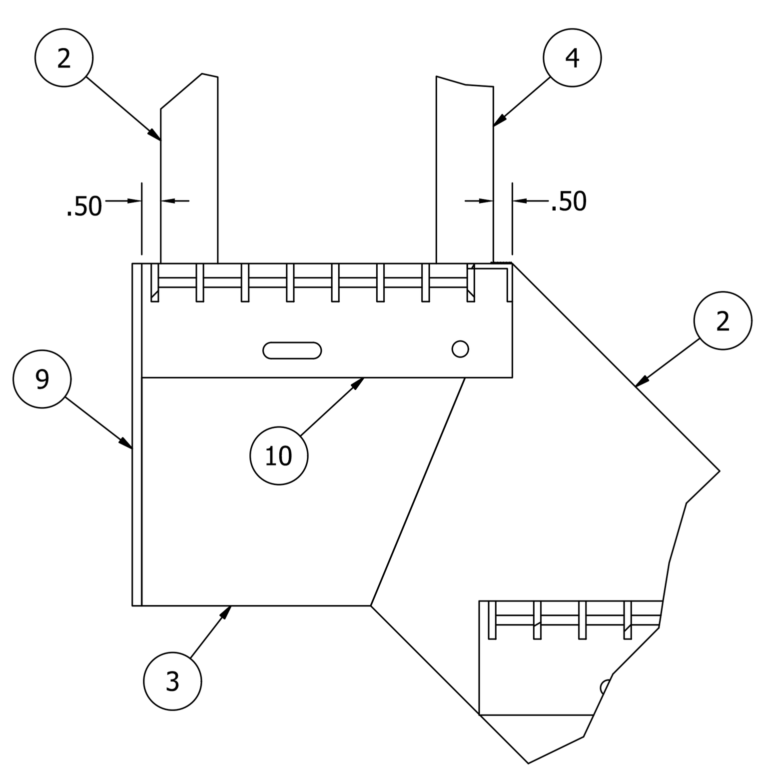
ITEM	QTY	DESCRIPTION
1	230.931 in	SQUARE TUBE, 1 1/2" X 1 1/2" X 1/8", 304 SS, ASTM-A-A554, 115.466 in
2	81.000 in	SQUARE TUBE, 1 1/2" X 1 1/2" X 1/8", 304 SS, ASTM-A-A554, 40.500 in
3	72.000 in	SQUARE TUBE, 1 1/2" X 1 1/2" X 1/8", 304 SS, ASTM-A-A554, 36.000 in
4	71.757 in	SQUARE TUBE, 1 1/2" X 1 1/2" X 1/8", 304 SS, ASTM-A-A554, 35.879 in
5	212.272 in	SQUARE TUBE, 1 1/2" X 1 1/2" X 1/8", 304 SS, ASTM-A-A554, 35.379 in
6	210.404 in	SQUARE TUBE, 1 1/2" X 1 1/2" X 1/8", 304 SS, ASTM-A-A554, 26.301 in
7	11.500 in	SQUARE TUBE, 1 1/2" X 1 1/2" X 1/8", 304 SS, ASTM-A-A554, 5.750 in
8	6.500 in	SQUARE TUBE, 1 1/2" X 1 1/2" X 1/8", 304 SS, ASTM-A-A554, 3.250 in
9	136.569 in	FLAT BAR, 2x1/4, 304 SS, ASTM A-240
10	9	STAIR TREAD, 9.75" W, 34" L, ALUMINUM
11	2	SWIVEL LEVELING MOUNT



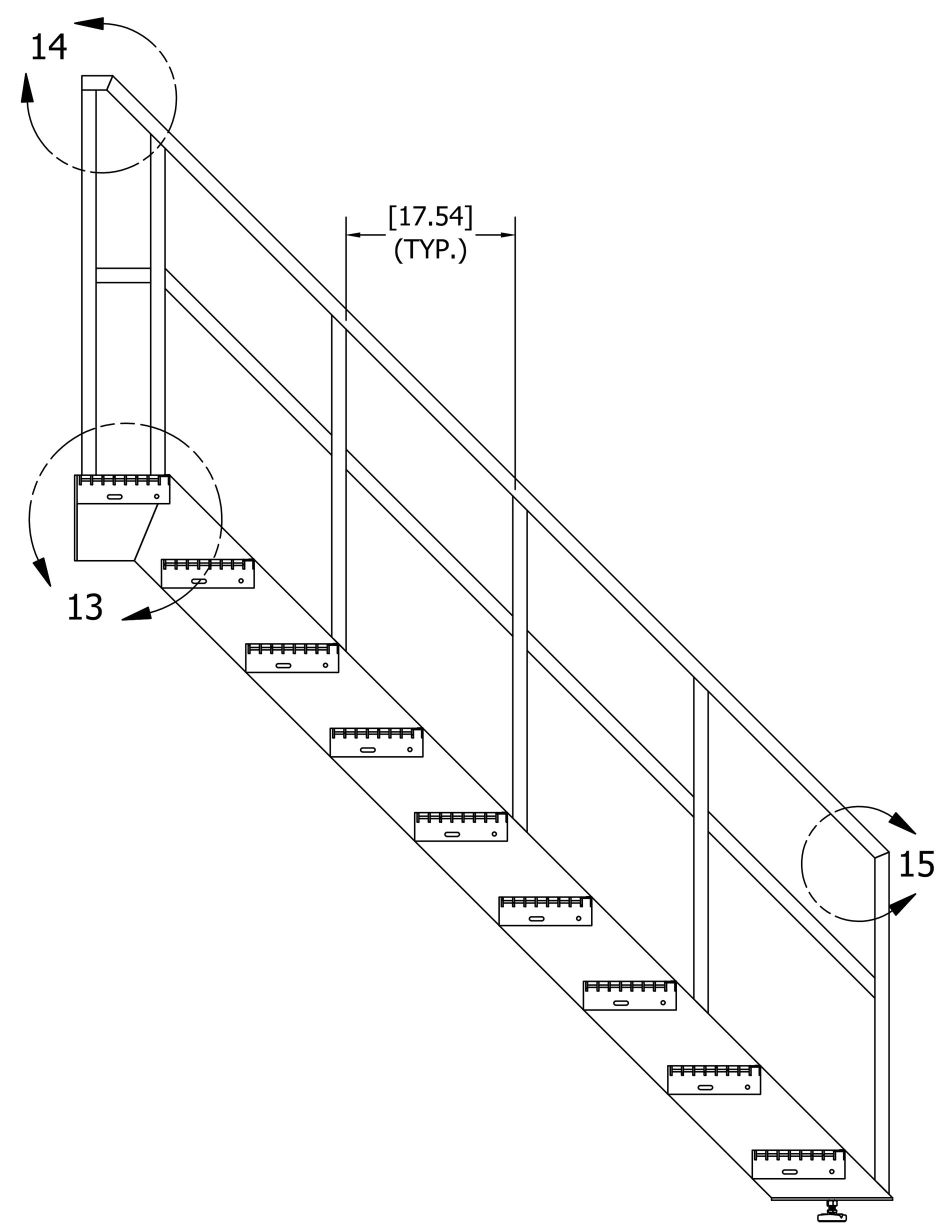
– PLAN VIEW
SCALE: 3/4" = 1'-0"



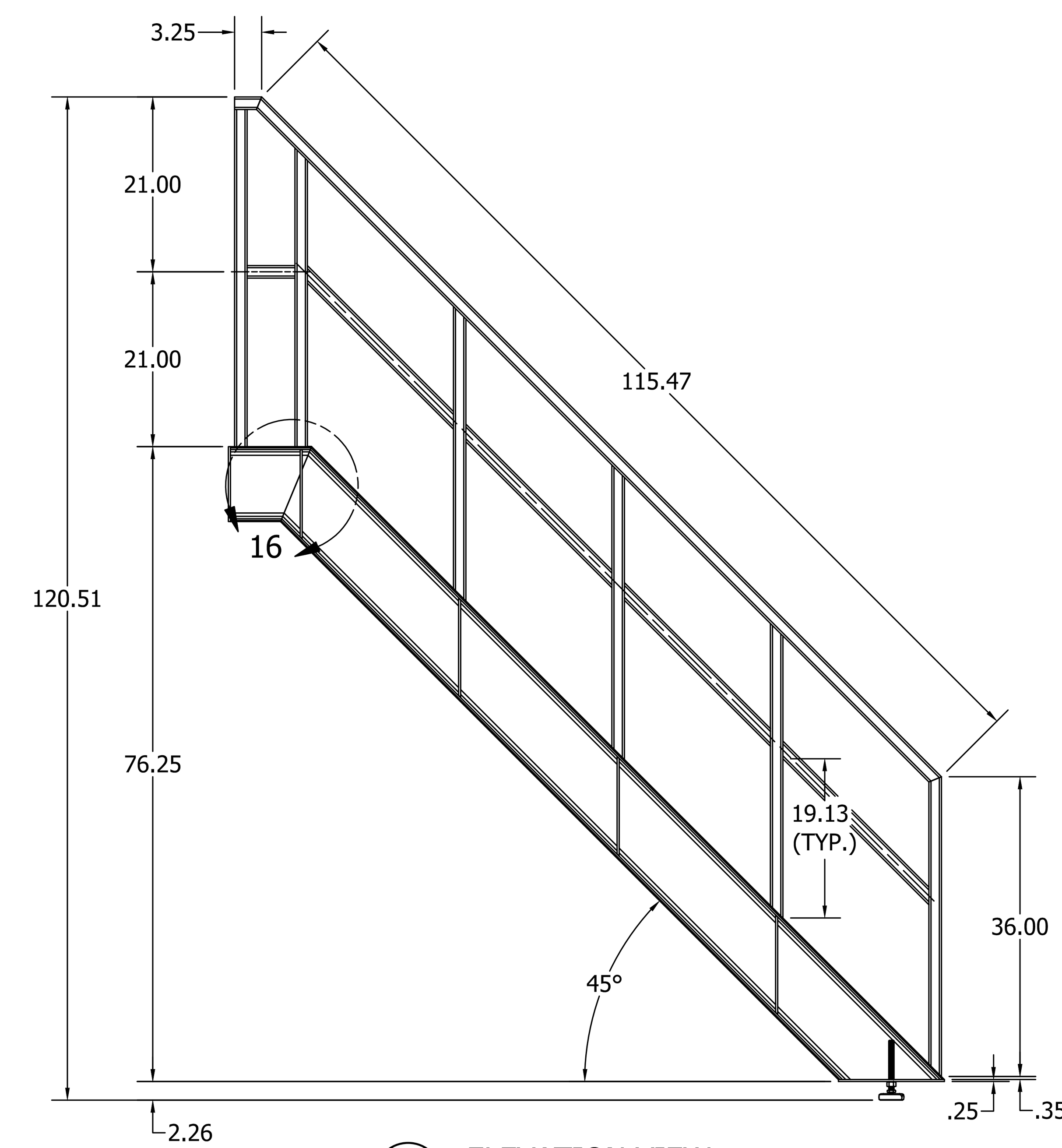
16 – DETAIL
SCALE: 1 1/2" = 1'-0"



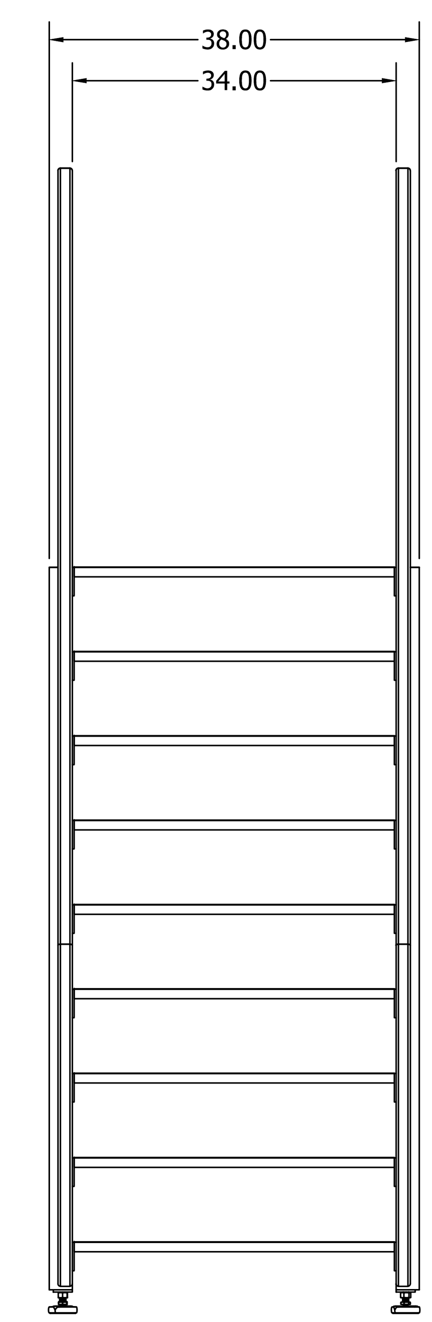
13 – DETAIL
SCALE: 3" = 1'-0"



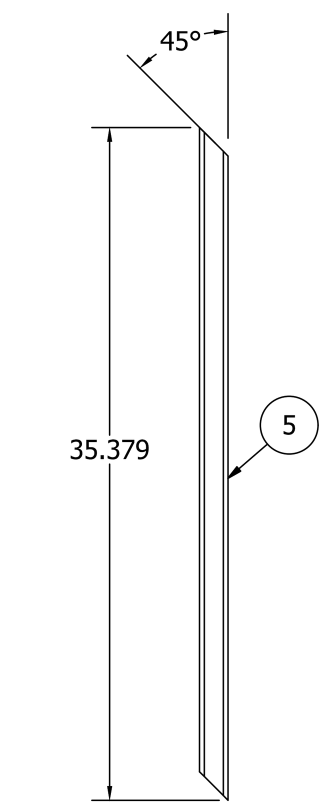
F – SECTION VIEW
SCALE: 3/4" = 1'-0"



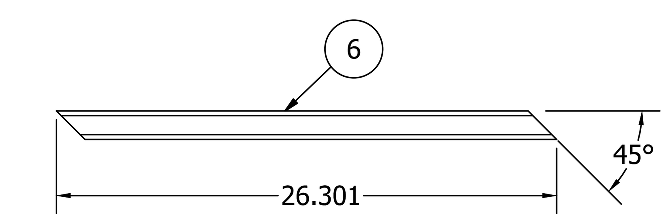
– ELEVATION VIEW
SCALE: 3/4" = 1'-0"



– SIDE VIEW
SCALE: 3/4" = 1'-0"



17 – DETAIL



18 – DETAIL

GENERAL NOTES:

- SHOP TO VERIFY ALL DIMENSIONS PRIOR TO FABRICATION.
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7 / M-1.4 CATWALK STAIRS DETAILS

ISSUED FOR RECORD
2018-07-27

REFERENCE DRAWINGS	
COVER SHEET - DRAWING INDEX	SHT. - G-0.01

REVISIONS

0	ISSUED FOR FABRICATION	AJM	SEA	BDS	2017-11-22
1	ISSUED FOR RECORD	AJM	SEA	BDS	2018-07-27

SCALE: NOT TO SCALE
DATE: 2017-05-02
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JOB #: CL16-035

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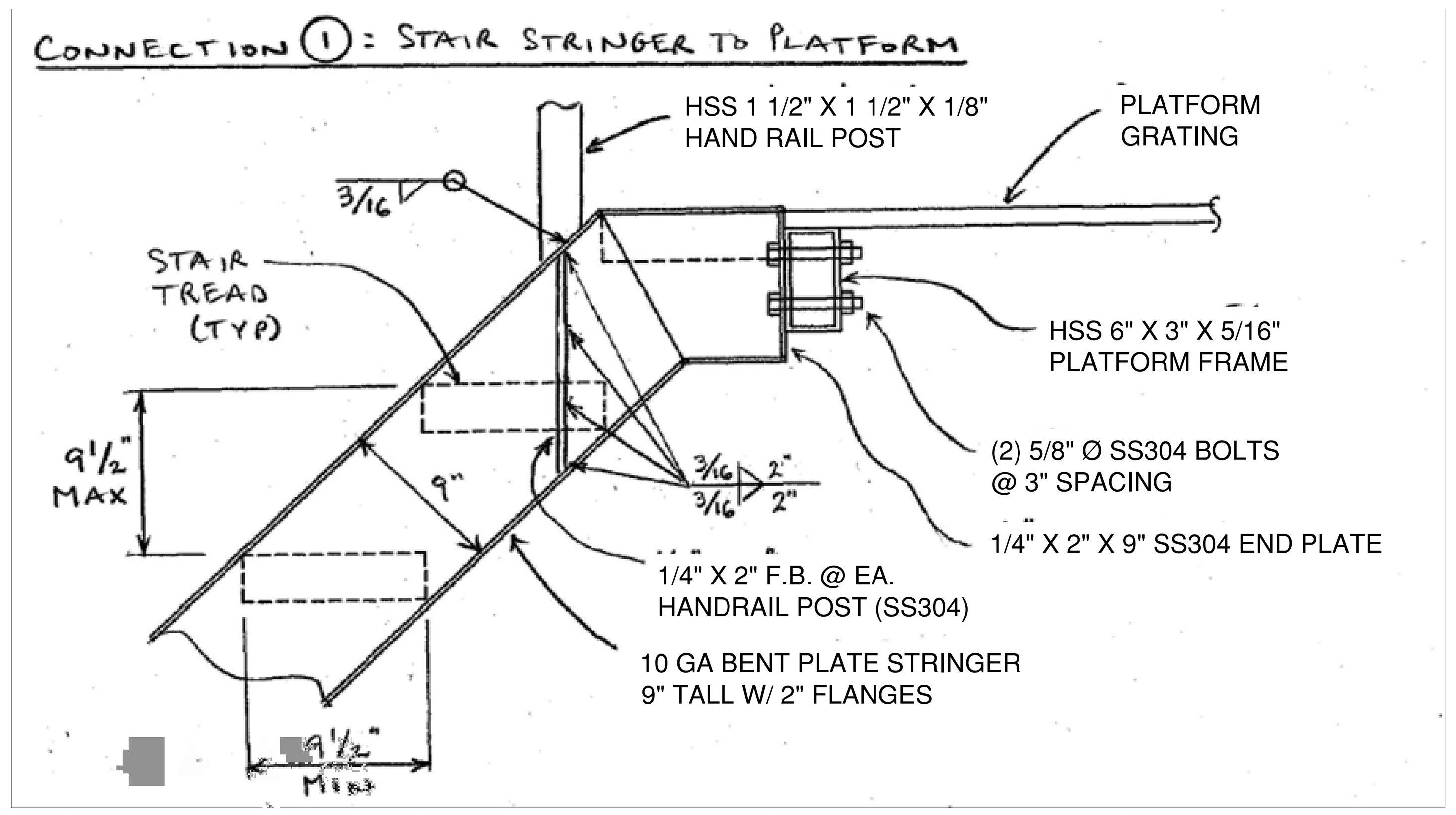
TESORO VIEJO
20,000 GPD - DRYPAC
SLUDGE DEWATERING SYSTEM

REGISTERED PROFESSIONAL ENGINEER BRIAN D. SNOW NO. C80472 EXP. 3/31/19 CIVIL STATE OF CALIFORNIA 7/27/18

CATWALK STAIRS - DETAILS
REV NO. 1
SHEET: M-2.0
12 OF 13 SHEETS

Z:\!!!CLOACINA PROJECTS!!!!\2017 PROJECTS\2017 PRODUCTION\CL16-035 Tesoro Viejo\2 Engineering\7 Drawings\2 Mechanical\3. AutoCAD Drawings\M-2.0-DRYPAC.dwg – abrahamm – Jul 25, 2018 – 10:06am

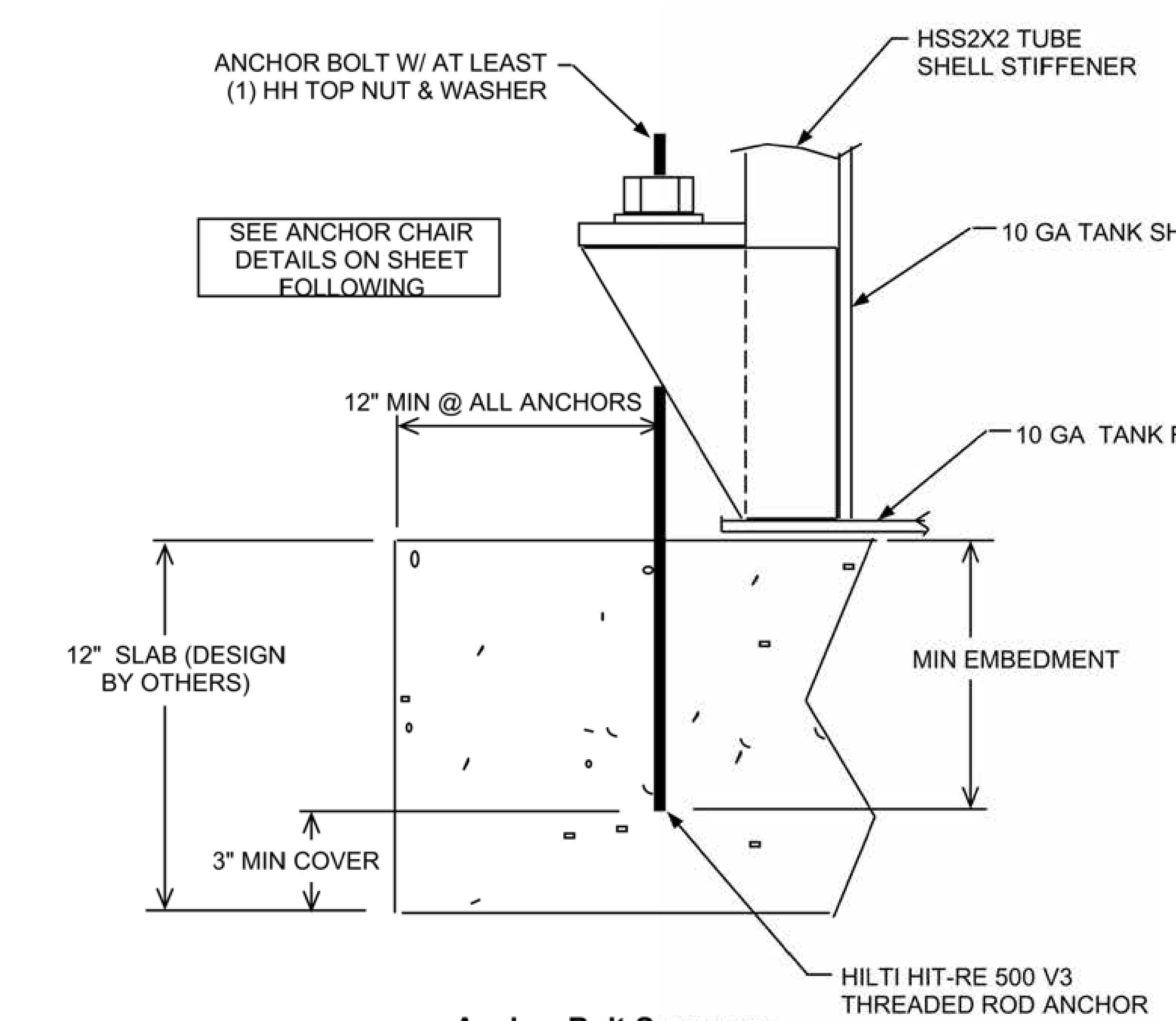
CONNECTION DETAILS



CONNECTION 2: STAIR STRINGER TO SLAB
USE ADJUSTABLE FEET SUPPORTED VERTICALLY BY CONCRETE SLAB, BUT NO ANCHORAGE TO SLAB IS REQUIRED.

8 / M-1.4 DETAIL

ANCHORAGE & SLAB FOUNDATION SUMMARY



Anchor Bolt Summary

Use (10) - 0.625 inch diameter threaded rod Anchor Bolts [(4) along each side of tank]

Material = SS316 [ASTM F593 CW2 (316)] (threaded rod)
(Recommended min) Projection above slab = 8 in + grout thickness (if this vessel is grouted)
Min Embedment = 8.0 in

Slab Foundation Summary (Design by Others)

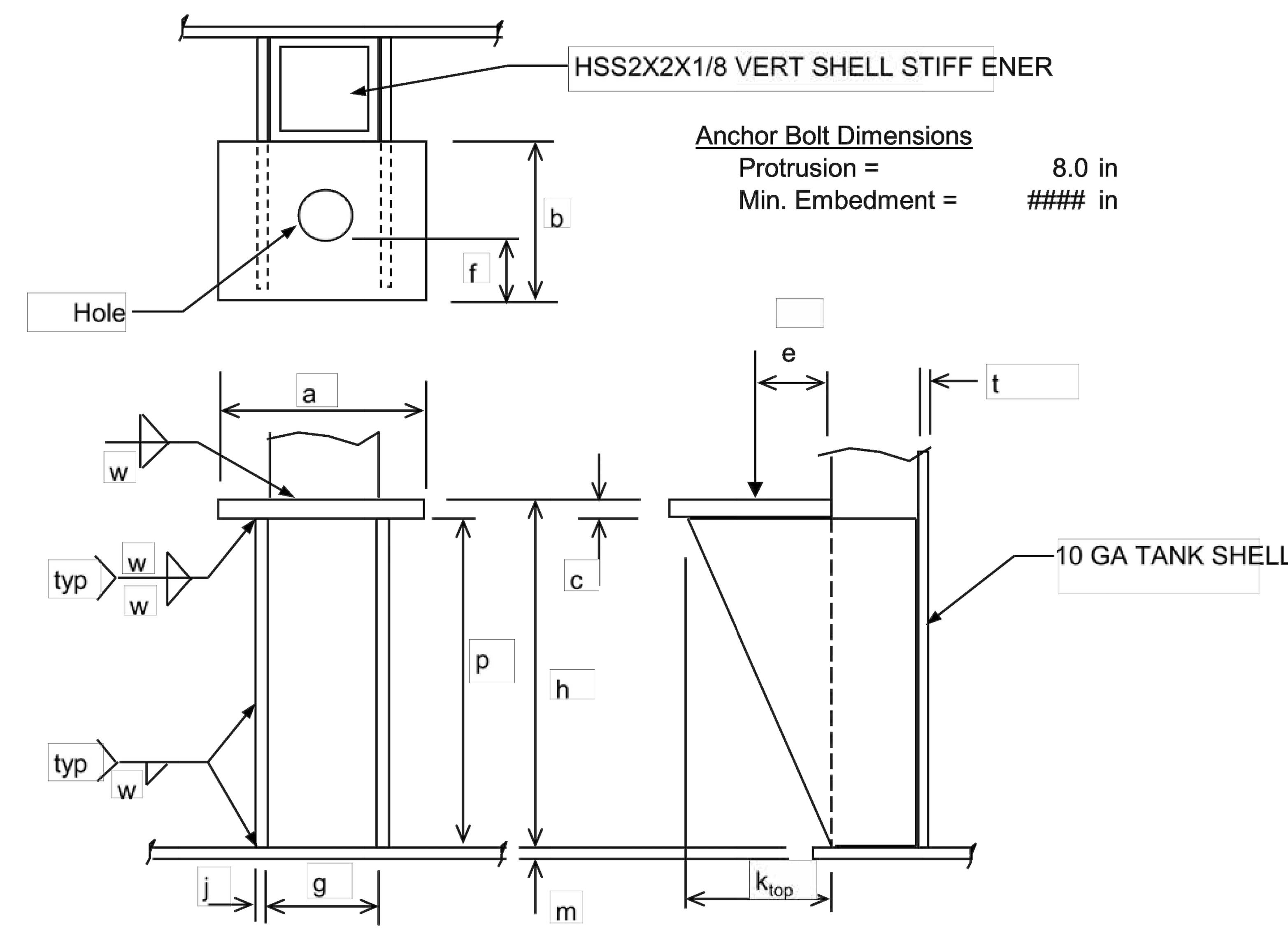
Min concrete f'_c = 3000 psi
Slab thickness under tank = 12 in

9 / VAR DETAIL

SUMMARY OF ANCHOR CHAIR COMPONENTS

MATERIALS LIST

	Description	Quantity	Material	Weight Ea
Top plate	PLATE, 0.5" x 3" x 3" LG.	10	SS304	1.43
Side plates	PLATE, 0.25" x 5" x 5.5" LG.	20	SS304	1.31
Backing plate	PLATE, 3/16" x 2" x 5.125" LG.	10	A36	0.5



Anchor Bolt Dimensions
Protrusion = 8.0 in
Min. Embedment = #### in

Anchor Chair Dimensions

a =	3.00 in	j =	0.250 in
b =	3.000 in	k_{top} =	3.000 in
c =	0.500 in	k_{bot} =	0.000 in
Bolt dia (d) =	0.625 in	m =	0.135 in
e =	1.500 in	p =	5.500 in
f =	1.063 in	t =	0.135 in
g =	2.000 in	w =	0.188 in
h =	6.00 in	Hole size =	0.875 in dia

10 / VAR DETAIL

ISSUED FOR RECORD
2018-07-27

REFERENCE DRAWINGS	
COVER SHEET - DRAWING INDEX	SHT. - G-0.01

REVISIONS

Rev	Description	By			Date
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SLUDGE DEWATERING SYSTEM

REGISTERED PROFESSIONAL ENGINEER BRIAN D. SNOW NO. C80472 EXP. 3/31/19 CIVIL STATE OF CALIFORNIA 7/27/18

STRUCTURAL DETAILS

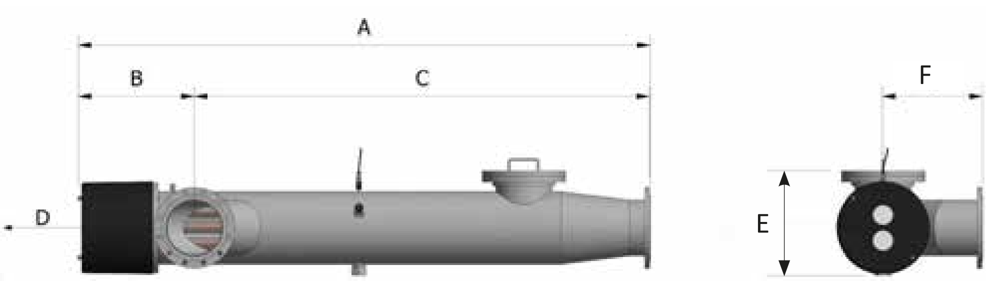
REV NO. 1 SHEET: M-2.1 13 OF 13 SHEETS

ETS-UV™
an evoqua brand

SPECIFICATION SHEET UVLW RANGE

The UVLW is a range of 800W low pressure, high output amalgam UV systems that are validated to the 2003 and 2012 NWRI Reuse Guidelines

Model	Connection (Inches)	# of Lamps (800W)	Dimensions						Panel Dimensions		
			A	B	C	D	E	F	W	H	D
ULVW-6800-10	8	6	102	28	74	75	15	10	32	79	24
UVLW-6800-14	10	6	109	37	74	75	17	12	32	79	24
UVLW-8800-14	10	8	109	35	74	75	17	12	62	79	24
UVLW-16800-20	16	16	118	44	74	75	24	15	62	79	24
UVLW-20800-20	16	20	118	44	74	75	24	15	94	79	24
UVLW-22800-24	20	22	119	45	74	75	29	18	94	79	24
UVLW-30800-24	20	30	119	45	74	75	29	18	94	79	24
UVLW-30800-30	20	30	128	54	74	75	31	21	94	79	24
UVLW-45800-30	20	45	128	54	74	75	31	21	125	79	24



CHAMBER

316L SS
ANSI 150# flanged connections
Install inline, horizontally or vertically
Features:
Acess Hatch
Twist lock lamp connections
Dry UV intensity monitor
High purity quartz thimbles
Low voltage automatic wiper
One piece wiper ring
Temperature sensor
Drain and vent ports

CONTROL SYSTEM

NEMA 12 epoxy coated mild steel enclosure
Operational 32-113°F, RH <90%
Features:
7" HMI
Spectra II control system
MODBUS
Multiple warnings and alarms
Variable power lamps
480V/3-phase

SYSTEM OPTIONS

304 or 316 NEMA 4X enclosures
Effluent flange location
Skid mounted
Containerized
Internal/external polish or electropolish

INSTALLATION NOTES

Provide necessary maintenance space
Install in a dry area
Provide floor drain or sump
Lamps submerged at all times
Minimum of two conduits required
Chamber must be grounded

APPENDIX H

PRELIMINARY VENDOR INFORMATION FOR SBR SYSTEMS

FLUIDYNE
CORPORATION
[illegible]
[illegible]
[illegible]

March 26, 2019

Mr. Mike Jensen, PE
HydroScience Engineers

RE: St. Helena, California
Wastewater Treatment Plant
Sequencing Batch Reactor

We are pleased to submit our preliminary proposal for the supply of Fluidyne Sequencing Batch Reactor equipment and technology to be used at the St. Helena, California, Wastewater Treatment Plant. We are enclosing process calculations, layout drawings, a cost proposal and other technical information for consideration.

The design data indicates both current and future design and ADMMF conditions. Please note that the ADMMF conditions dictate the size of the tankage and equipment since these are maximum month conditions.

We have looked at a couple of options. The first option is to provide two (2) SBR tanks now for the current design and ADMMF conditions and then add a third SBR in the future to handle the future design and ADMMF conditions. Since the current conditions are about 77% of the future conditions, with this option, when the third train is added, the system would be a little oversized.

With this option, the tanks would be sized as follows:

[illegible]
[illegible]

Another option is to provide a two-tank system now for both the current and future conditions. With this option, the tanks would be sized as follows:

[illegible]

Tank sizes are flexible given any site constraints.

Fluidyne Corporation is the oldest SBR system supplier in North America. We have provided hundreds of SBRs over the past 38 years. Fluidyne's headquarters including sales, engineering and manufacturing are located in Cedar Falls, Iowa. Fluidyne manufacturers all the stainless-steel components including jet aeration and mixing manifolds, decanters, supports, baffles and accessory piping in Cedar Falls.

Our local sales representative's contact information is as follows:

Mr[illegible]

[illegible]

El Dorado Hills, CA

Tel: 916 933-5500

Email: jimzaiser@jbiwater.com

Fluidyne is proposing our conventional two-tank SBR utilizing jet aeration and mixing and our fixed type decanter. A floating type decanter is also available.

Advantages of the process include:

- Control strategies are based on varying aeration/mixing requirements depending on the strength of the incoming wastewater. This design minimizes operating costs and controls over/under aeration.
- Energy efficient jet aeration equipment provides high alpha values and oxygen transfer. Test data demonstrates alpha values of 0.9. With jet aeration it is easier to transfer oxygen into solution in dirty water (wastewater) compare other types of aeration systems.
- Jet aeration equipment will last 3 to 4 times as long as coarse or fine bubble diffusers. This results in less maintenance and operation costs.
- Jets have large solids handling capability with minimum 1 1/2" solids handling. A built in back-flush allows cleaning of the jet header without entering or draining the tank. Therefore plugging or fouling is not a concern compared to fine or coarse bubble diffusers.
- The decanter has no moving parts in the basin that can freeze or malfunction.
- Submerged aeration/mixing headers provide multipoint mixing locations for energy efficient off-bottom solids suspension. The jet manifold provides anoxic mixing by not running the blower. This minimizes in-basin equipment, as a separate mixer is not required.
- All pump and blower motors come with VFD compatible motors to allow control and process optimization.
- Please see our general sales brochure for other advantages of the Fluidyne SBR system.
- The proposed system has the ability to provide denitrification without any additional equipment. Independent control of oxygen transfer and mixing

can be accomplished with the blowers turned off for anoxic mixing. Control programming in our control system provides this operation.

One of Fluidyne's key strengths over the past thirty plus years is our long, successful history of providing exceptional after sales service. As a family business, Fluidyne takes great pride in the service we provide to our customers. We welcome service phone calls from plant operators long after the warranty is over. In fact, many plants that we commissioned as far back as the 1980s still call us to ask questions and get our input for process optimization. Today, with the advancements in technology and the appropriate technology provided on site, we have the ability to go on-line or dial in on a dedicated phone line and review and monitor how plants are operating. This can also allow changes to be made to the program including special requests made by the operator after the plant has started up.

We know we can provide St. Helena, a highly reliable, proven and efficient solution to their wastewater treatment needs. We know our process can meet the effluent limits.

Thank you for the opportunity to submit a proposal on this exciting project. If you require clarification or have any questions, please do not hesitate to contact Fluidyne Corporation or our local representative, Jim Zaiser (916 933 5500)

Sincerely,

Fluidyne Corporation

Erick Mandt, Vice President Sales and Marketing

CC: Jim Zaiser – JBI Water and Wastewater

FLUIDYNE
CORPORATION

FLUIDYNE CORPORATION (HEREINAFTER CALLED THE COMPANY) AGREES TO SELL TO THE PURCHASER AND THE PURCHASER AGREES TO BUY AND ACCEPT FROM THE COMPANY, THE ITEM (S) DESCRIBED HEREIN.

PROJECT:

PROPOSAL NO.: FLC 032619

DATE WRITTEN: March 26, 2019

WRITTEN BY: Erick Mandt

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Fluidyne Corporation proposes to supply Sequencing Batch Reactor (SBR) equipment and technology for the St. Helena, California WWTP. Our proposed design is based on Sequencing Batch Reactor technology. We have sized the equipment based on the following:

Current ADWF:	0.50 MGD
Future ADWF:	0.65 MGD
Current AWWF:	0.95 MGD
Future AWWF:	1.22 MGD
Current ADMMF:	1.12 MGD
Future ADMMF:	1.46 MGD
Influent BOD5 Current ADWF:	439 mg/l (1,829 lbs/day)
Influent BOD5 Future ADWF:	360 mg/l (1,953 lbs/day)
Influent BOD5 Current ADMMF:	247 mg/l (2,305 lbs/day)
Influent BOD5 Future ADMMF:	202 mg/l (2,461 lbs/day)
Influent TSS Current ADWF:	283 mg/l (1,180 lbs/day)
Influent TSS Future ADWF:	232 mg/l (1,260 lbs/day)
Influent TSS Current ADMMF:	211 mg/l (1,971 lbs/day)
Influent TSS Future ADMMF:	173 mg/l (2,104 lbs/day)
Influent NH3-N Current ADWF:	85 mg/l (354 lbs/day)
Influent NH3-N Future ADWF:	70 mg/l (378 lbs/day)
Influent NH3-N Current ADMMF:	47 mg/l (443 lbs/day)
Influent NH3-N Future ADMMF:	39 mg/l (473 lbs/day)
Temperature:	10 to 20 degrees C
pH:	Neutral
Alkalinity:	Sufficient

Effluent BOD5:	15 mg/l or less
Effluent TSS:	15 mg/l or less

Fluidyne has assumed the wastewater is non-toxic and readily biodegradable with a neutral pH and the plant will be properly operated and maintained.

We have looked at a couple of options. The first option is to provide two (2) SBR tanks now for the current design conditions and then add a third SBR in the future to handle the future conditions. Since the current conditions are about 77% of the future conditions, with this option, when the third train is added, the system would be a little oversized.

With this option, the tanks would be sized as follows:

[illegible] 80 [illegible] 0 [illegible] 8 [illegible]

[illegible] 80 [illegible] 0 [illegible] 8 [illegible]

Fluidyne proposes to supply the following equipment for the two tank SBR for the first phase:

Two (2) 12” Diameter Electric Operated Influent Control Plug Valves. Valves to have 120/1/60 AUMA electric actuator.

Two (2) 3 HP Submersible Waste Sludge Pumps with elbow discharge, guide rail brackets, guide rails and lifting chain.

Two (2) Fluidyne model# BDM2JA18 Jet Aeration Headers including all in-basin liquid piping, submerged air piping, stainless steel supports, and back-flush piping. Air piping to terminate with a flange connection just above top water level to mate to the air distribution piping. Liquid piping to terminate with a flange connection to mate to the jet mixing pump discharge connection.

Two (2) 25 HP Submersible Jet Motive Pumps with discharge fitting, guide rail brackets, guide rails and lifting chain.

Two (2) Fluidyne model #SED-24 Decanters with all in-basin piping and supports. The decanter is to terminate with a 12” flange connection to mate to the tank wall spool flange.

Two (2) 12” Diameter Electric Operated Effluent Control Butterfly Valves. Valves to have 120/1/60 AUMA electric actuator.

Two (2) Dissolved Oxygen Sensors with one multi-channel analyzer

Two (2) Submersible Level Transducers with cable a 4-20 mA signal.

Two (2) High Water Level Float Level Sensors with support bracket.

Three (3) 40 HP Positive Displacement Blower Packages with inlet filter/silencer, flex connector, v-belt drive, drive guard, discharge silencer, check valve, pressure relief valve, pressure gauge and full sound enclosure. One blower package to be a 100% standby spare.

One (1) SBR Control Panel housed in NEMA 12 enclosure with Allen-Bradley PLC, digital input cards, digital output cards, analog card, indicating lights, switches, relays, modem, UPS and PanelView 1000+ operator interface to automatically control the SBR system control functions. The control panel will include Ethernet to allow sending information to SCADA. (SCADA is not included in our scope).

[illegible] 580 000 [illegible]

[illegible]

For the second phase, a third SBR tank of equal size would be built. Fluidyne would provide equipment for the third tank.

[illegible]

[illegible]

Another option is to provide a two-tank system now for both the current and future conditions. With this option, the tanks would be sized as follows:

[illegible]

Fluidyne proposes to supply the following equipment for the final phase flow now:

Two (2) 12” Diameter Electric Operated Influent Control Plug Valves. Valves to have 120/1/60 AUMA electric actuator.

Two (2) 3 HP Submersible Waste Sludge Pumps with elbow discharge, guide rail brackets, guide rails and lifting chain.

Two (2) Fluidyne model# BDM2JA22 Jet Aeration Headers including all in-basin liquid piping, submerged air piping, stainless steel supports, and back-flush piping. Air piping to terminate with a flange connection just above top water level to mate to the air distribution piping. Liquid piping to terminate with a flange connection to mate to the jet mixing pump discharge connection.

Two (2) 30 HP Submersible Jet Motive Pumps with discharge fitting, guide rail brackets, guide rails and lifting chain.

Two (2) Fluidyne model #DSED-20 Decanters with all in-basin piping and supports. The decanter is to terminate with a 16” flange connection to mate to the tank wall spool flange.

Two (2) 16” Diameter Electric Operated Effluent Control Butterfly Valves. Valves to have 120/1/60 AUMA electric actuator.

Two (2) Dissolved Oxygen Sensors with one multi-channel analyzer

Two (2) Submersible Level Transducers with cable a 4-20 mA signal.

Two (2) High Water Level Float Level Sensors with support bracket.

Three (3) 50 HP Positive Displacement Blower Packages with inlet filter/silencer, flex connector, v-belt drive, drive guard, discharge silencer, check valve, pressure relief valve, pressure gauge and full sound enclosure. One blower package to be a 100% standby spare.

One (1) SBR Control Panel housed in NEMA 12 enclosure with Allen-Bradley PLC, digital input cards, digital output cards, analog card, indicating lights, switches, relays, modem, UPS and PanelView 1000+ operator interface to automatically control the SBR system control functions. The control panel will include an Ethernet port to allow sending information to SCADA. (SCADA is not included in our scope).

[illegible] 50 000 [illegible]

[illegible] Service has been provided in the amount of eight (8) man days to be provided in two (2) trips for either of the above options. Additional service can be provided at a rate of $1200.00 / day plus travel and living expenses

[illegible] Not furnished by Fluidyne are the following; tanks; any pipe, supports, fittings or valves except those specifically included above; out of basin or interconnecting piping, valves or supports other than those referenced above; tank wall spools and interconnecting hardware and gaskets; parshall flume; grit removal equipment and accessories; screening equipment and accessories; standby generator; disinfection equipment; sludge disposal or handling equipment; effluent filtration equipment and accessories; sampler; auto dialer; access hatches; hoists; handrail; grating; explosion proof equipment; remote panels or controls, disconnects, junction boxes, conduit or wiring between mechanical equipment and the control panel; motor starters; VFDs; auto transfer switch; transformer; pump or blower shop performance tests; electrical and mechanical installation labor; off-loading of equipment; jobsite testing; lab testing; jobsite storage; taxes; duties; insurance and other items not specifically mentioned in the body of this proposal.

[illegible] The price quoted is based on a target shipment date of 12 to 16 weeks after receipt of approved drawings.

[illegible] Any applicable duties, sales, use, excise or similar taxes are not included in the quoted price.

[illegible] shall apply only when payments are made in full and according to the following schedule:

10% with order, 15% with approved shop drawings,
65% N30 days from shipment 10% N30 days after start-up, not to exceed 120 days from shipment.

Unless other terms are specified, all payments shall be in United States Dollars and pro rata payments shall become due as deliveries are made. If date of delivery is delayed by purchaser, date of readiness for delivery shall be deemed date of delivery for payment purposes. If purchaser delays manufacture, a payment shall be made based on the purchase price and percentage of completion; balance payable in accordance with the terms stated.

If, at any time in Company's judgment, purchaser may be or maybe become unable or unwilling to meet the terms specified, Company may require satisfactory assurances or full or partial payment as a condition of commencing or continuing manufacture; or in advance of shipment, if it shipment has been made, recover the product(s) from the carrier.

This proposal shall remain in effect for 30 days after proposal date, unless changed in the interim upon written notice.

FLUIDYNE CORPORATION - TERMS OF SALE

The conditions stated below shall constitute a part of the agreement resulting from the acceptance of an order for the whole or any part of the equipment covered by this quotation.

1. ACCEPTANCE:

All orders shall be made out to Fluidyne Corp., 5436 Nordic Drive, Suite D, Cedar Falls, Iowa 50613, and shall be subject to acceptance by Fluidyne. Orders may not be canceled without Fluidyne's written consent, and then only on terms indemnifying Fluidyne against loss. Fluidyne reserves the right to correct any typographical or clerical errors in the proposal, pricing, or specification. Acceptance of any contract by Fluidyne shall be contingent upon credit approval. Performance shall be subject to strikes, fires, accidents, or curtailments in manufacturing or due to delays unavoidable or beyond the control of Fluidyne. No direct or liquidated damages or penalties shall be accepted. Receipt of the original copy of this proposal, signed by the purchaser, shall constitute a purchase order. The drawings and bulletin illustrations submitted with this proposal shall be general type, arrangement and approximate dimensions of the equipment to be furnished. Fluidyne reserves the right to alter such details in design or arrangement of its equipment, which in its judgment would constitute an improvement in construction, application or operation. Fluidyne shall promptly forward all necessary engineering information for installation of its equipment to the purchaser upon receipt of this accepted proposal. Any changes in equipment, arrangement of equipment, or application of equipment requested by purchaser after acceptance of proposal will be made at purchaser's expense.

2. TAXES

The prices quoted are subject to any addition, which may be necessary to cover any tax charge now existing or hereafter imposed by Federal, State, or Municipal authorities upon equipment or services herein described or the production, sale,

3. BINDING RESPONSIBILITIES:
Sales representatives are not authorized to bind us. Typographical errors are not binding.

4. CANCELLATION:
After acceptance, an order shall not be subject to cancellation unless cancellation charges are borne by the Purchaser for work done by the Seller up to the time of receipt of cancellation notice; nor shall such orders be subject to change unless price increases are born by the Purchaser.

5. SHIPMENT AND DELIVERY:
All deliveries quoted are estimates based on Fluidyne's best judgment at the time of this proposal, but shipment on these dates is not guaranteed. Deliveries are figured from date of receipt in Cedar Falls, Iowa of approved order and technical data. Fluidyne will not accept any claims caused by delay in shipment or delivery. It is further understood that storage charges of 1 percent per month will apply commencing 30 days from date of equipment completion if purchaser asks the delivery be delayed after production is started. Billing will be made at time of completion of equipment and paid per standard terms.

6. TERMS OF PAYMENT:
Terms of payment are 100% Net 30 days from shipping unless stipulated otherwise in the body of this proposal. Accounts not paid on net cash due date bear interest at the rate of 1.5 percent per month not to exceed the maximum permissible by law. Title shall not pass to purchaser or end user until all payments including final payment and any retention for all goods and services have been received in full by Fluidyne.

7. INSTALLATION AND INITIAL OPERATION:
All equipment shall be installed by and at the expense of the Purchaser unless otherwise stipulated. The Seller will furnish at its option, engineers to supervise the installation and starting up of the equipment. Field service will be provided by a factory-trained representative at a per diem rate of $950_ plus travel and expenses on any additional period not stated in this contract.

8. WARRANTY:
Fluidyne warrants the equipment proposed and described herein against defects in material and workmanship under normal service for a period of one year after date of start-up, not to eighteen months from date of shipment. Parts of products manufactured by others and provided by Fluidyne are warranted only to the extent of the original manufacturers' warranty. This warranty is valid provided that the installation operation and maintenance of the equipment is made in accordance with Fluidyne's instructions. The purchaser must promptly give written notice of any equipment defects to Fluidyne. Under warranty, Fluidyne will provide, without cost to the purchaser, such replacement parts as may be required to repair or replace the defective equipment. All labor as may be required to make such

replacements must be made by purchaser unless stated otherwise in this proposal. Qualified Fluidyne personnel or its agents must perform all startup service, or this warranty is void. Fluidyne will not warrant nor replace any material involved when repairs are made without prior written authorization from Fluidyne.

THIS IS FLUIDYNE'S SOLE WARRANTY. FLUIDYNE MAKES NO OTHER WARRANTY OF ANY KIND, IMPLIED OR EXPRESSED: ALL IMPLIED OR EXPRESSED WARRANTY MADE BY ANY PERSON, AGENT OR REPRESENTATIVE WHICH EXCEEDS FLUIDYNE'S AFOREMENTIONED OBLIGATION ARE HEREBY DISCLAIMED BY FLUIDYNE AND EXCLUDED FROM THIS WARRANTY.

9. PATENTS:
The equipment provided by Fluidyne may be covered by patents pending or issued. Fluidyne grants the right to use this equipment with further charges. Fluidyne does not grant rights to use, royalties, or protection against patent litigation arising from use of this equipment in patented processes controlled by others unless otherwise listed above.

10. CHANGE ORDERS:
Any change orders shall be mutually agreeable between buyer and seller.

11. LIABILITY:
In no event shall either party be liable to the other party for anticipated profits or for incidental, special, indirect, punitive or consequential damages under any circumstances. A party’s liability on any claim of any kind for any loss or damage arising out of, connected with, or resulting from this Agreement or from the performance or breach thereof shall, in no case, exceed the price allocable to the Equipment or the Services or any unit thereof which gives rise to the claim. Neither Buyer nor Seller shall be liable for penalties of any description.

12. PRICING
Fluidyne pricing is based on these terms of sale. No monies have been included for acceptance of different, additional or modified terms of sale.

SUBMITED BY: FLUIDYNE CORPORATION
DATE: March 26, 2019
PROJECT: St. Helena, CA

ACCEPTED BY: ______________________________
(Sign and Title)

(Company Name)
DATED: ______________________________

FLUIDYNE SBR DESIGN DATA

PROJECT: St. Helena, CA	OPTION 1	OPTION 1	OPTION 1	OPTION 1
DATE : March 26, 2019	Two tank Current Design	Three tank Future Design	Two Tank Current ADMMF	Three Tank Future ADMMF
INFLUENT CONDITIONS				
Site Elevation (in feet)	650	610	610	610
Flow (mgd)	0.50	0.65	1.12	1.46
BOD (mg/l)	439	360	247	202
(lb/d)	1829	1953	2305	2461
TSS (mg/l)	283	232	211	173
(lb/d)	1180	1260	1971	2104
NH3-N (mg/l)	85	70	47	39
(lb/d)	354	378	443	473
EFFLUENT REQUIREMENTS (Monthly Average)				
BOD (mg/l)	15	15	15	15
TSS (mg/l)	15	15	15	15

Pound of Oxygen/ pound of BOD	1.4	1.4	1.4	1.4
Pound of Oxygen/pound of TKN	N/A	N/A	N/A	N/A
Oxygen credit for De-Nit	N/A	N/A	N/A	N/A
Actual Oxygen Demand (lb 02/d) Total	2561	2734	3227	3445
Alpha	0.85	0.85	0.85	0.85
Beta	0.95	0.95	0.95	0.95
Theta	1.024	1.024	1.024	1.024
Average Operating Dissolved oxygen (mg/l)	2	2	2	2
Clean Water oxygen sat. at op. temp (mg/l)	9.09	9.09	9.09	9.09
Clean Water oxygen sat. at std. temp (mg/l)	9.09	9.09	9.09	9.09
Clean water 02 sat, std temp,mid depth(mg/l)	11.50	11.50	11.50	11.50
Std. condition ambiant pressure (psia)	14.7	14.7	14.7	14.7
Oper. condition ambiant pressure (psia)	14.37	14.37	14.37	14.37
Wastewater temperature (c)	20	20	20	20
SOR/AOR ratio	1.56	1.56	1.56	1.56
Standard Oxygen Demand (lb 02/d) total	3992	4261	5031	5371
Standard Oxygen Demand (lb 02/hr/tank)	200	200	200	199
Specific oxygenation rate (mg/l-hr)	56	56	56	55
Pounds of oxygen/pound of air	0.23	0.23	0.23	0.23
Clean water efficency (%)	24	24	24	24
Pounds of air/cubic foot of air	0.075	0.075	0.075	0.075
Aeration hours per day	10.0	7.1	12.6	9.0
Air flow rate (scfm/tank)	803	805	804	801
Air pressure losses (lines and nozzle)	0.7	0.7	0.7	0.7
Maximum air pressure (psig)	7.6	7.6	7.6	7.6
Average air pressure (psig)	6.8	6.8	6.8	6.8

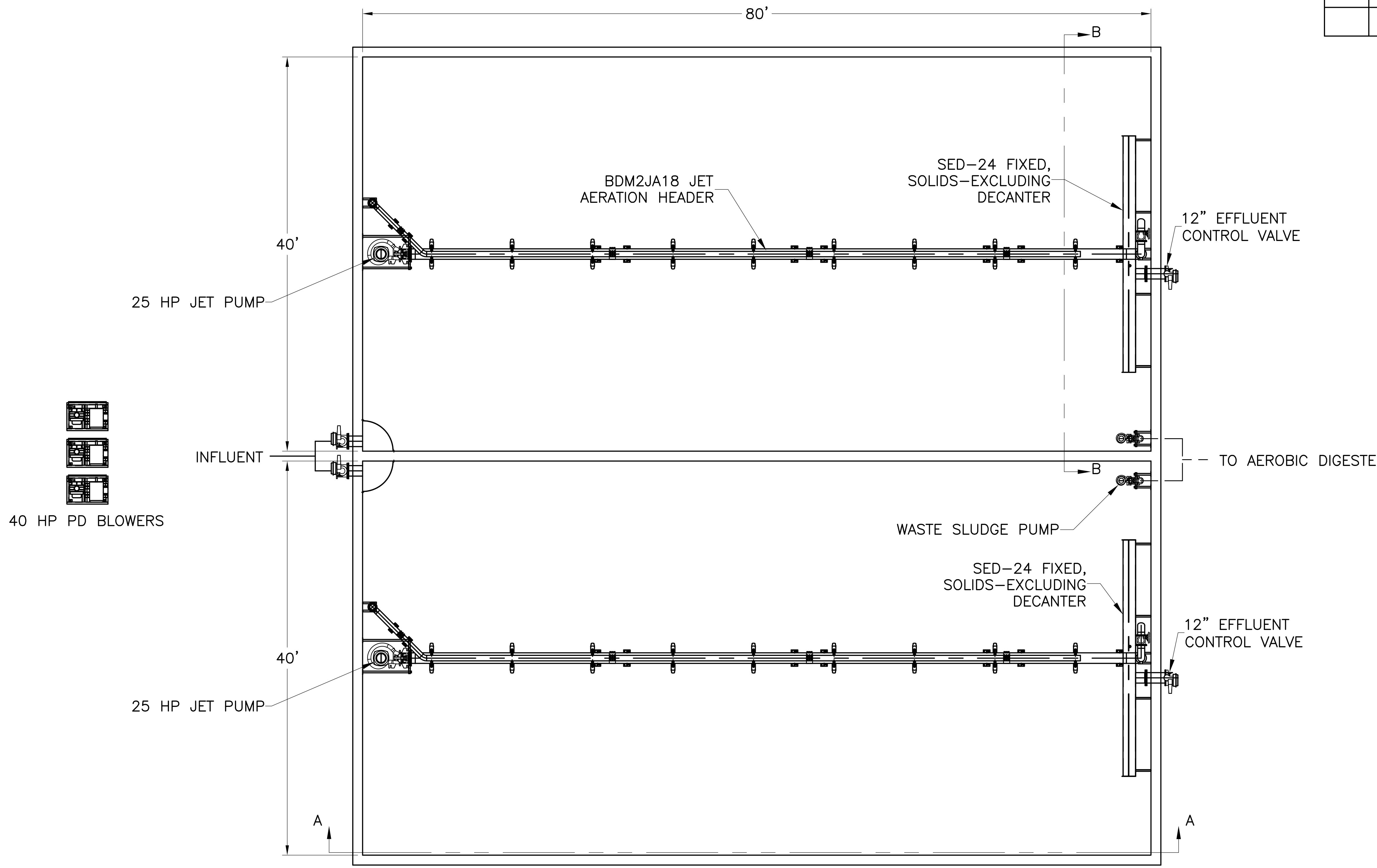
PROJECT: St. Helena, CA

SBR TANK CONFIGURATION				
No. of tanks	2	3	2	3
Length (ft)	80	80	80	80
Width (ft)	40	40	40	40
Bottom water level (ft)	14.0	14.0	14.0	14.0
Top water level (ft)	18	18	18	18
Cycle water level (ft)	16.0	16.0	14.7	16.0
No. Decanters/tank	1	1	1	1
Total Tankage Volume @ TWL(MG)	0.86	1.29	0.86	1.29
HRT (hrs)	41.36	47.72	18.46	21.25
CYCLE TIMES/CAPACITY CALCULATIONS				
Total decant volume (cubic feet)	25600	38400	25600	38400
Total decant volume (gallons)	191488	287232	191488	287232
Decant volume per tank (gallons)	95744	95744	95744	95744
Number of cycles per day/tank	2.6	2.3	5.8	5.1
Total time per cycle (minutes)	551	636	246	283
Fill time (minutes)	276	212	123	95
React Period (minutes)	136	104	22	47
Settle period (minutes)	45	45	45	45
Average decant rate (gpm/ft decanter)	100	100	100	100
Decanter length (feet)	24	24	24	24
Decanting time (minutes)	40	40	40	40
Decanting rate (gpm)	2400	2400	2400	2400
Peak decanting rate (gpm at start of decant)	2640	2640	2640	2640
Idle period time (minutes)	55	235	16	57
Maximum aeration period available (hours)	20.31	20.80	15.72	16.81
EQUIPMENT SELECTION				
Air flow per nozzle (scfm)	45	45	45	45
Number of nozzles required (per tank)	17.85	17.90	17.86	17.79
Number of nozzles provided (per tank)	18	18	18	18
Actual airflow per nozzle (scfm)	44.64	44.75	44.65	44.49
Blower capacity provided (scfm)	803	805	804	801

PROJECT: St. Helena, CA

POWER CONSUMPTION CALCULATIONS				
Pump efficiency	0.77	0.77	0.77	0.77
Blower efficiency	0.625	0.6	0.6	0.6
Pump horsepower, BHP/tank	20	20	20	20
Blower horsepower, BHP/tank	37	38	38	38
Total horsepower, BHP/tank	57	58	58	58
Total design equivalent horsepower, BHP	47	52	61	66
SLUDGE PRODUCTION				
Sludge Yield Factor	0.7	0.7	0.7	0.7
Net Sludge Yield (lbs/d)	1083	1070	1416	1426
Sludge Concentration (%) from SBR	0.75	0.7	0.7	0.7
Sludge Wasting Rate (gpd)	17308	18335	24256	24429
Waste Sludge /cycle (gal)	3314	2701	2074	1602
WAS Pumping Rate (gpm)	300	300	300	300
Waste Sludge Cycle Time (min)	11.0	9.0	6.9	5.3
MLSS (mg/l) @ TWL	2750	2750	2750	2750
Sludge inventory (lbs)	19763	29644	19763	29644
SRT (1/days)	18.25	27.69	13.96	20.79
F/M	0.09	0.07	0.12	0.08
SVI (ml/g)	200	200	200	200
Sludge blanket level (ft)	9.91	9.91	9.91	9.91
Organic loading (lbs BOD/1000 ft3)	15.88	11.30	20.01	14.24

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED

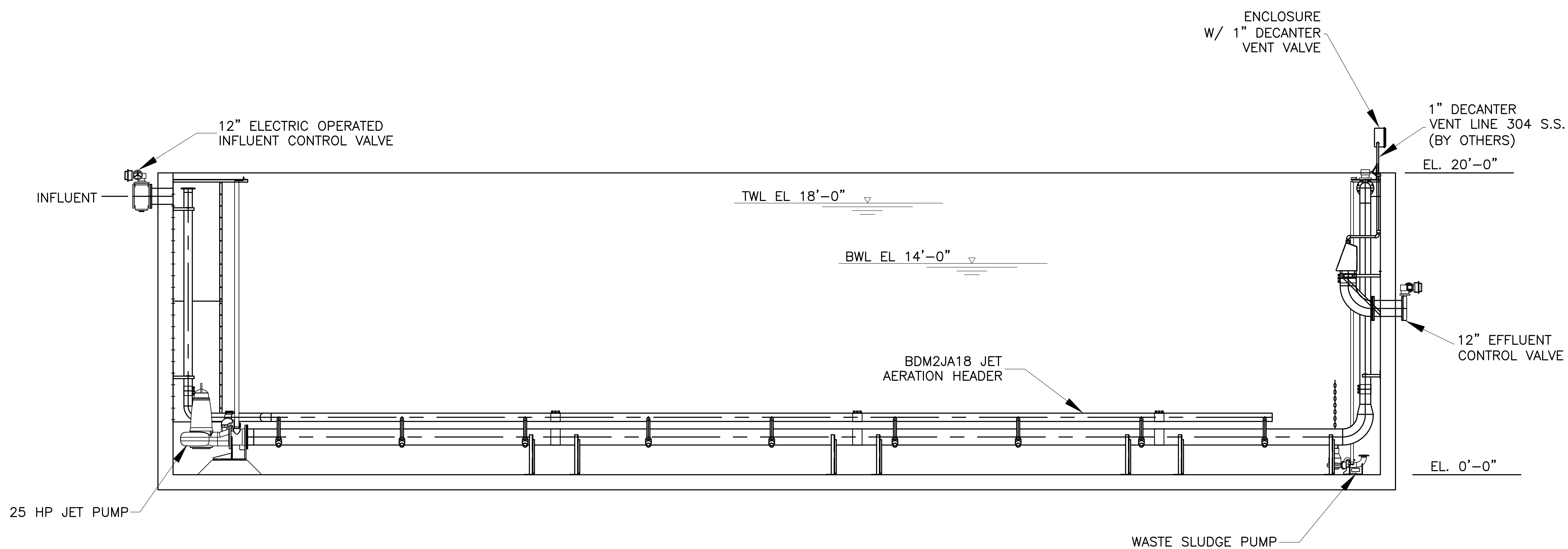


FLUIDYNE

ST. HELENA, CA – 1 – PLAN VIEW

DRAWN NWS	DATE 3/26/19	JOB #	CAD FILE St. Helena, CA – 1 – Plan View
CHECKED	DATE	SCALE	SHEET 1 OF 3

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED



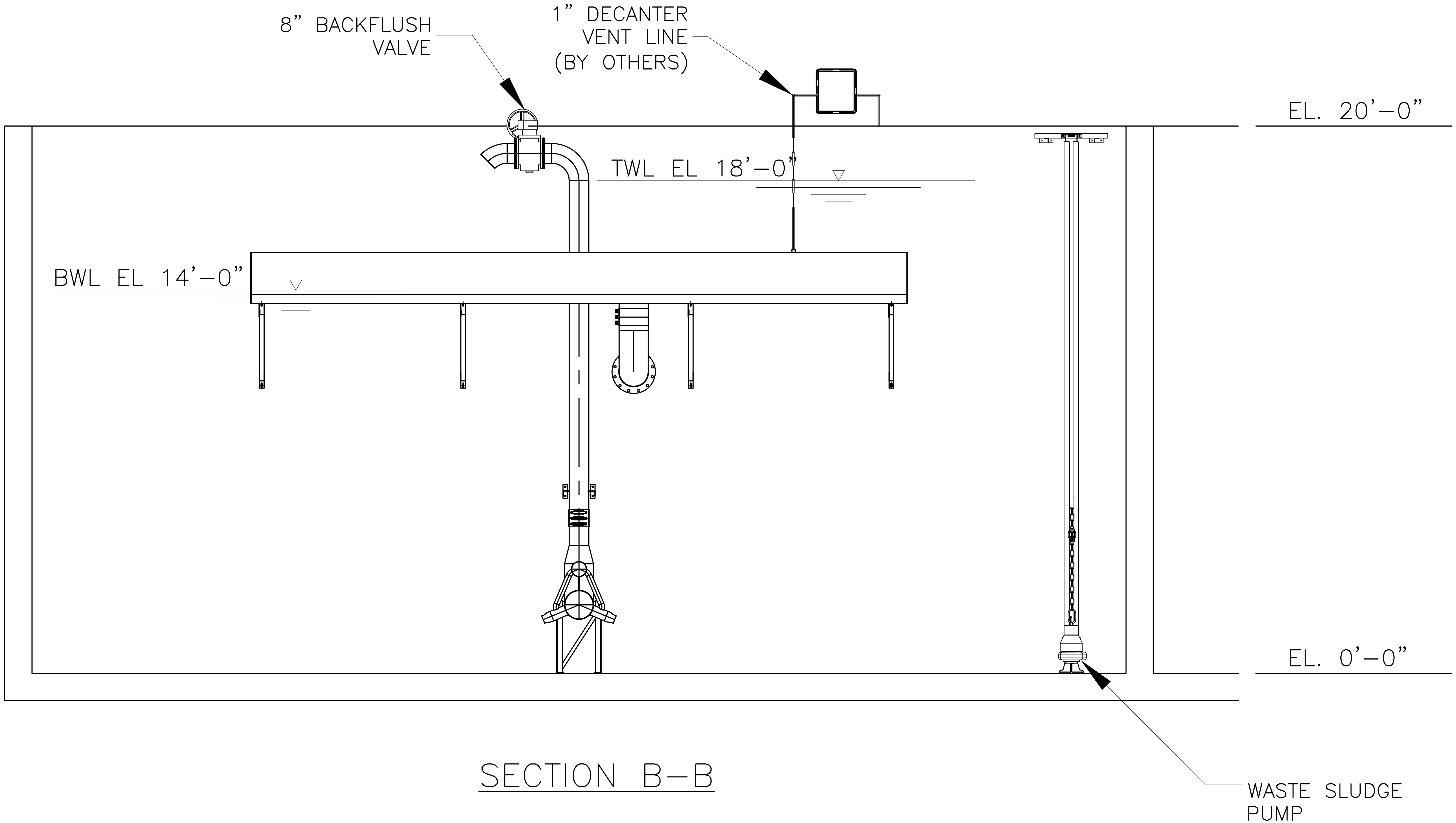
SECTION A-A

FLUIDYNE

ST. HELENA, CA - 2 - SECTION A-A

DRAWN NWS	DATE 3/26/19	CAD FILE St. Helena, CA - 2 - Section A-A	
CHECKED	DATE	SCALE	SHEET 2 OF 3

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED



SECTION B-B

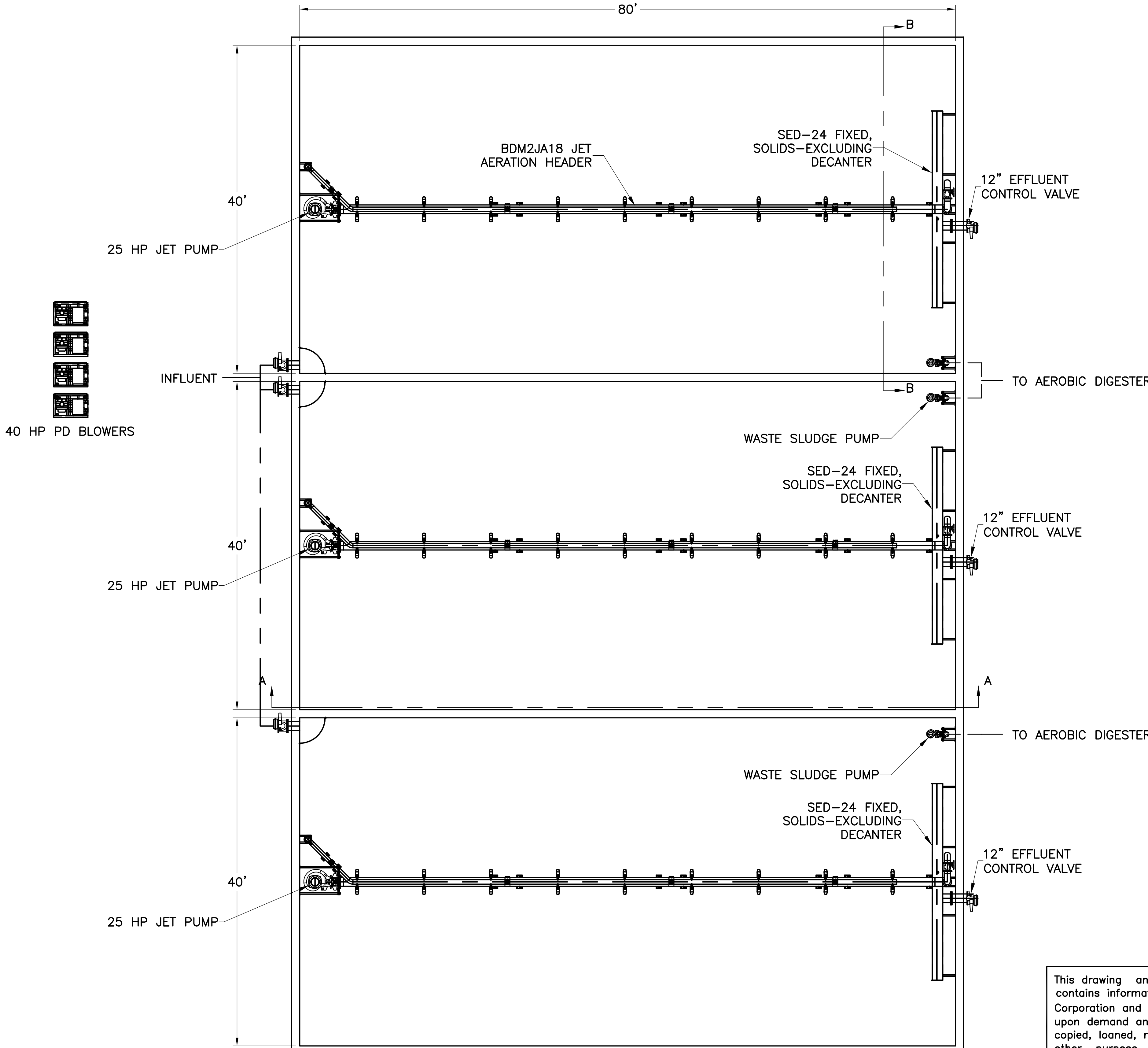
FLUIDYNE

ST. HELENA, CA – 3 – SECTION B-B

DRAWN NWS	DATE 3/26/19	CAD FILE St. Helena, CA – 3 – Section B-B
CHECKED	DATE	SCALE

SHEET 3 OF 3

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED



PHASE 2 - Add third SBR for future design and max month conditions

FLUIDYNE

ST. HELENA, CA – 1 – PLAN VIEW – PHASE 2

DRAWN NWS	DATE 3/26/19	JOB #	CAD FILE St. Helena, CA – 1 – Plan View–Phase 2
CHECKED	DATE	SCALE	SHEET 1 OF 1

FLUIDYNE SBR DESIGN DATA

PROJECT: St. Helena, CA	OPTION 2	OPTION 2
DATE : March 26, 2019	Two tank Future ADMMF	Two tank Current ADMMF
INFLUENT CONDITIONS		
Site Elevation (in feet)	610	610
Flow (mgd)	1.46	1.12
BOD (mg/l)	202	209
(lb/d)	2461	1953
TSS (mg/l)	173	211
(lb/d)	2104	1971
NH3-N (mg/l)	39	39
(lb/d)	473	363
EFFLUENT REQUIREMENTS (Monthly Average)		
BOD (mg/l)	15	15
TSS (mg/l)	15	15

Pound of Oxygen/ pound of BOD	1.4	1.4
Pound of Oxygen/pound of TKN	N/A	N/A
Oxygen credit for De-Nit	N/A	N/A
Actual Oxygen Demand (lb 02/d) Total	3445	2734
Alpha	0.85	0.85
Beta	0.95	0.95
Theta	1.024	1.024
Average Operating Dissolved oxygen (mg/l)	2	2
Clean Water oxygen sat. at op. temp (mg/l)	9.09	9.09
Clean Water oxygen sat. at std. temp (mg/l)	9.09	9.09
Clean water 02 sat, std temp,mid depth(mg/l)	11.50	11.50
Std. condition ambiant pressure (psia)	14.7	14.7
Oper. condition ambiant pressure (psia)	14.37	14.37
Wastewater temperature (c)	20	20
SOR/AOR ratio	1.56	1.56
Standard Oxygen Demand (lb 02/d) total	5371	4263
Standard Oxygen Demand (lb 02/hr/tank)	224	224
Specific oxygenation rate (mg/l-hr)	49	49
Pounds of oxygen/pound of air	0.23	0.23
Clean water efficency (%)	24	24
Pounds of air/cubic foot of air	0.075	0.075
Aeration hours per day	12.0	9.5
Air flow rate (scfm/tank)	901	903
Air pressure losses (lines and nozzle)	0.7	0.7
Maximum air pressure (psig)	7.6	7.6
Average air pressure (psig)	6.8	6.8

PROJECT: St. Helena, CA

SBR TANK CONFIGURATION		
No. of tanks	2	2
Length (ft)	90	90
Width (ft)	45	45
Bottom water level (ft)	14.0	14.0
Top water level (ft)	18	18
Cycle water level (ft)	15.0	15.0
No. Decanters/tank	1	1
Total Tankage Volume @ TWL(MG)	1.09	1.09
HRT (hrs)	17.93	23.37

CYCLE TIMES/CAPACITY CALCULATIONS		
Total decant volume (cubic feet)	32400	32400
Total decant volume (gallons)	242352	242352
Decant volume per tank (gallons)	121176	121176
Number of cycles per day/tank	6.0	4.6
Total time per cycle (minutes)	239	312
Fill time (minutes)	120	156
React Period (minutes)	30	39
Settle period (minutes)	45	45
Average decant rate (gpm/ft decanter)	100	100
Decanter length (feet)	40	40
Decanting time (minutes)	30	30
Decanting rate (gpm)	4000	4000
Peak decanting rate (gpm at start of decant)	4400	4400
Idle period time (minutes)	14	41
Maximum aeration period available (hours)	16.44	18.20

EQUIPMENT SELECTION		
Air flow per nozzle (scfm)	45	45
Number of nozzles required (per tank)	20.02	20.07
Number of nozzles provided (per tank)	18	18
Actual airflow per nozzle (scfm)	50.05	50.18
Blower capacity provided (scfm)	901	903

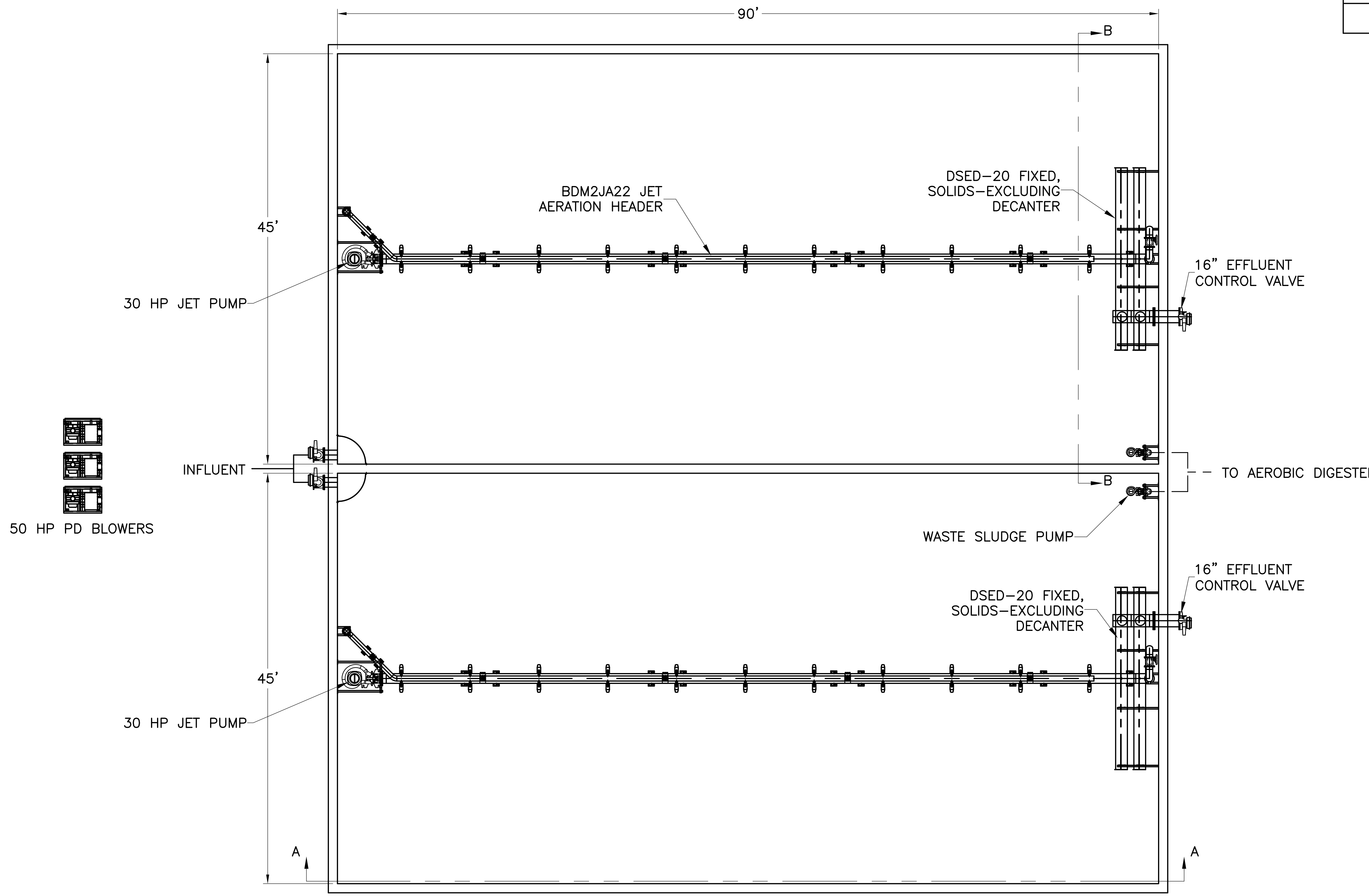
PROJECT: St. Helena, CA

POWER CONSUMPTION CALCULATIONS

Pump efficiency	0.77	0.77
Blower efficiency	0.6	0.6
Pump horsepower, BHP/tank	20	20
Blower horsepower, BHP/tank	43	43
Total horsepower, BHP/tank	63	63
Total design equivalent horsepower, BHP	63	50

SLUDGE PRODUCTION

Sludge Yield Factor	0.7	0.7
Net Sludge Yield (lbs/d)	1472	1117
Sludge Concentration (%) from SBR	0.7	0.7
Sludge Wasting Rate (gpd)	25222	19135
Waste Sludge /cycle (gal)	2093	2070
WAS Pumping Rate (gpm)	300	300
Waste Sludge Cycle Time (min)	7.0	6.9
MLSS (mg/l) @ TWL	2750	2750
Sludge inventory (lbs)	25013	25013
SRT (1/days)	16.99	22.39
F/M	0.10	0.08
SVI (ml/g)	200	200
Sludge blanket level (ft)	9.91	9.91
Organic loading (lbs BOD/1000 ft3)	16.88	13.40



REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED

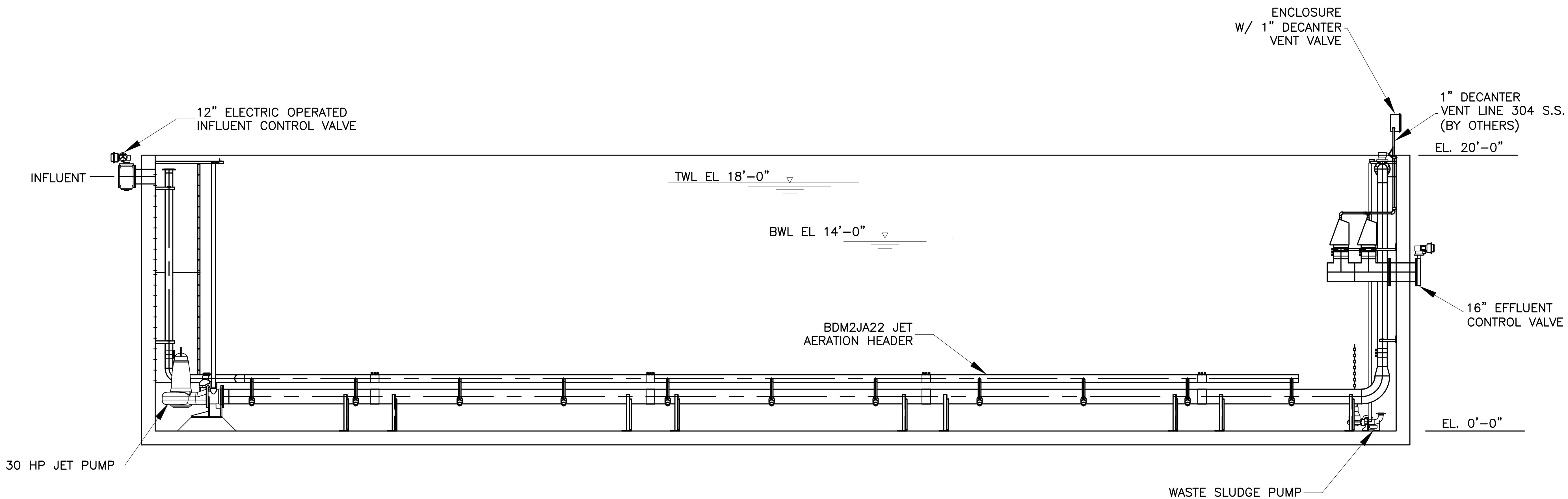
TWO TANK OPTION TO HANDLE ALL FLOWS NOW

FLUIDYNE

ST. HELENA, CA – 1 – PLAN VIEW

DRAWN NWS	DATE 3/26/19	JOB #	CAD FILE St. Helena, CA – 1 – Plan View
CHECKED	DATE	SCALE	SHEET 1 OF 3

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED



SECTION A–A

TWO TANK OPTION TO HANDLE ALL FLOWS NOW

FLUIDYNE

ST. HELENA, CA – 2 – SECTION A–A

DRAWN NWS	DATE 3/26/19	CAD FILE St. Helena, CA – 2 – Section A–A	
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REVISIONS			
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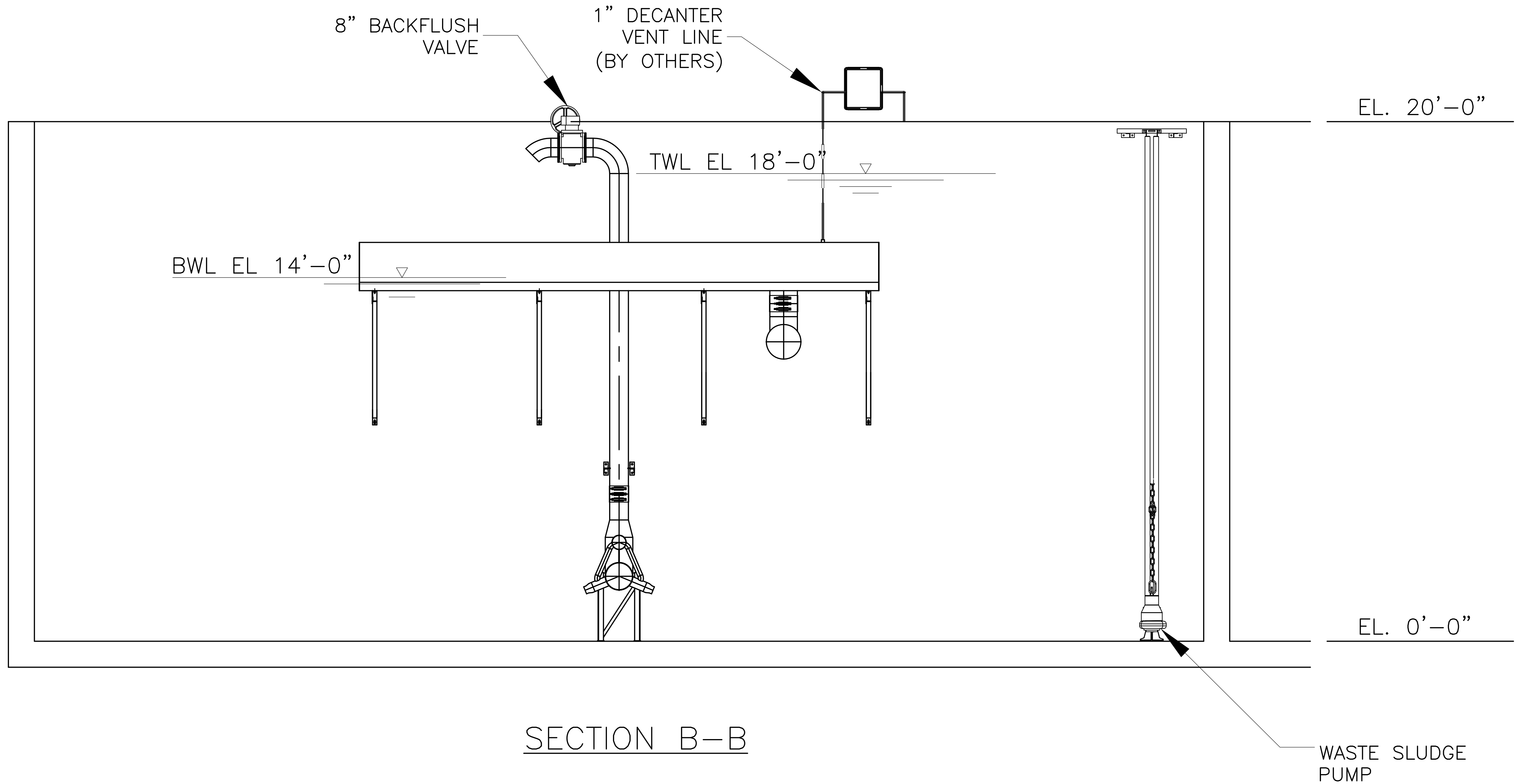

SECTION B–B

TWO TANK OPTION TO HANDLE ALL FLOWS NOW

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ST. HELENA, CA – 3 – SECTION B–B

DRAWN NWS	DATE 3/26/19	CAD FILE St. Helena, CA – 3 – Section B–B	
CHECKED	DATE	SCALE	SHEET 3 OF 3

FLUIDYNE CORPORATION

THE EXPERIENCED LEADER IN SEQUENCING BATCH REACTOR TECHNOLOGY

SBR

COMPLETE MIX
SEQUENCING BATCH REACTOR PROCESS

FLUIDYNE CORPORATION

THE EXPERIENCED LEADER IN SEQUENCING BATCH REACTOR TECHNOLOGY

TRUST FLUIDYNE'S EXPERIENCE

The Fluidyne Complete Mix Sequencing Batch Reactor (SBR) system incorporates the latest and most innovative technology and over thirty years of experience in providing the most reliable SBR systems producing the highest effluent quality. Fluidyne SBR systems are in operation around the world and have won numerous awards. Fluidyne SBRs consistently provide better than 10/10/5/1 (BOD_5/TSS/TN/TP) effluent quality. Fluidyne engineers have designed over 500 SBRs, and been granted over twenty patents.

SEQUENCING BATCH REACTORS

The Sequencing Batch Reactor, or SBR, is a fill and draw, non-steady state, periodic process. A periodic process is an activated sludge process that accomplishes in discrete time periods each of the process steps that a continuous flow activated sludge process accomplishes in dedicated tankage.

As shown in Figure 2, a sequencing batch reactor operates in a true batch mode; a specific volume of screened, raw wastewater is fed to the reactor during the "Fill" period; the influent flow is then diverted to the next reactor in sequence; the batch is then aerated in a "React" period. When aeration is discontinued, the mixed liquor is allowed to settle under perfect quiescent conditions. The treated effluent is then decanted from the upper portion of the reactor. The reactor is then idle while waiting for the next batch of influent.

SBRs have gained wide acceptance due to the many advantages the process offers when compared to a conventional activated sludge process:

- The process is very simple; no primary or secondary clarifiers are required, no sludge recycle system is required, and since the process is controlled by a microprocessor based controller, minimum operator attention is required.
- The lack of clarifiers and sludge recycle systems also reduces site size requirements, and construction costs.
- The process is very stable; since the biomass is acclimated to a wide range of dissolved oxygen and substrate concentrations, shock BOD loads have little, or no, effect on the process.
- The process is capable of meeting a wide range of advanced treatment standards; a typical municipal SBR produces an effluent having 5 mg/l BOD5, 5 mg/l TSS, 1 mg/l NH3-N, and 10 mg/l total N; additionally, biological phosphorous removal can be achieved, in some cases, without additional tankage or chemical addition.
- Denitrification that occurs during anoxic periods recovers both oxygen and alkalinity for the process, and since the D.O. is at zero at the beginning of the aeration period, the driving force is increased, reducing the standard oxygen requirement, and saving power.
- Since the SBR is a true batch process, short circuiting is impossible, and the process cannot be "washed out", even during storm flows of up to ten times design flow.

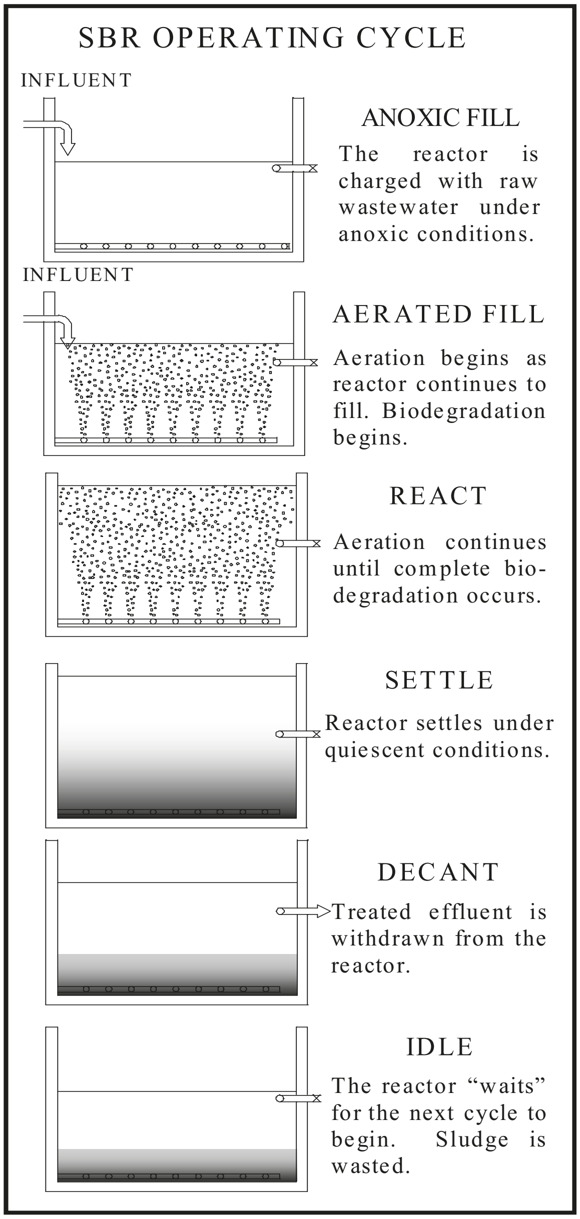

Figure 2 SBR operating cycle

- During periods of low flow, long idle periods result in reduced power consumption, and the lack of clarifier drives, and sludge recycle systems also reduces power requirements.

- Since the reactor is not fed during "Settle" periods, clarification occurs under perfect quiescent conditions; even at peak influent flow rates, optimum effluent quality is achieved.

NON STEADY STATE OPERATION

As previously stated, the SBR is a non-steady state process; at the beginning of the React periods the F:M (lb BOD/day/lb microorganisms) ratio can be as high as 1.50, and the oxygen uptake rate can exceed 125 mg/l/hr. At the end of the React periods, the F:M ratio should be near zero. In simple terms, the process subjects the biomass (microorganisms) to alternating periods of "feast" (when the F:M is high), and "famine" (when the F:M is low). These alternating periods place selective pressures on the biomass. The “feast” period inhibits the growth of slow growing filaments, and encourages the growth of floc forming organisms. The "famine" period inhibits the growth of fast growing filaments, and again, encourages the growth of desirable organisms. Each cycle of an SBR's operation will include one or more anoxic and/or anaerobic period. The wide swings in available oxygen inhibit the growth of obligate aerobes, and encourage the growth of facultative organisms.

COMPLETE MIX SBR

The majority of SBRs in this country are of the complete mix variety, and utilize either jet type aeration systems, or submerged diffusers and floating mixers. In a complete mix SBR, the influent is distributed or mixed throughout the entire reactor. In jet systems the motive liquid pumps are located at the influent end of the reactor. The influent line is near the pump suction so that the influent flow is pumped, as motive liquid, through the jets, and thus distributed throughout the reactor.

JET AERATION AND MIXING SYSTEMS

Jet aeration and mixing systems offer the ability to independently mix and aerate the mixed liquor. This ability to provide anoxic mixing is important in maintaining process stability, and consistent microorganism selection in a complete mix SBR process.

A jet aeration and mixing system offers several advantages compared to the diffuser/mixer system:

- Independent Control of Oxygen Transfer and Mixing. Air flow to the manifold can be varied from 20 SCFM per jet to 80 SCFM per jet without affecting mixing. Blowers can be turned off for anoxic mixing.

- A jet aerator has much higher alpha (the rate at which the wastewater uptakes oxygen divided by

Stainless steel jet aeration header

the rate at which clear water uptakes oxygen) values than a membrane diffuser system. Many studies in recent years have shown that membrane aeration systems operating in high F:M applications, such as the head of a plug flow basin, or an SBR have extremely low alpha values. Dirty water oxygen transfer tests have shown alpha values for a jet aerator to be approximately double those for a membrane system in a high load application. The result is smaller blowers, and therefore reduced power requirements.

- When operating as a mixer a jet system, imparts mixing energy at the bottom of the reactor basin. Settled solids are much more easily resuspended by a submerged mixer, than a surface mixer.

- Low Maintenance. Simple five minute backflush operation is the only required maintenance.

- A fiberglass or stainless steel jet aeration system has a life of at least 30 years. The membranes in a membrane diffuser system have a life of five years or less.

- A jet system with dry-pit pumps has no in-basin mechanical components.

COMPLETE MIX OPERATION

In the complete mix system, the "feast", "famine", anoxic, and aerobic conditions are created by discrete time periods. Typically, at least 50% of the total fill period is anoxic; the aerators are not operated. During the anoxic fill period, food is accumulated, raising the F:M ratio. When aeration is initiated, the "feast" condition is created. Additionally, nitrification occurs in the highly aerobic diffuser air "plume", and denitrification occurs in the surrounding anoxic mixed liquor. When the influent flow is diverted to the next reactor in sequence, aeration is continued in a React period, during which all of the available food is utilized, the D.O. rises, and the growth of nitrifying organisms is encouraged. Aeration is then discontinued, and the biomass is allowed to settle for predetermined period (usually 45 to 60 minutes). The treated effluent is decanted, and the reactor is idle.

AART CONTROL STRATEGY

In an SBR, all of the various cycle periods are controlled by timers or level controls. Most SBR suppliers use a timed operating strategy. That is, each SBR basin will complete exactly four or five timed cycles per day; allowing each basin to fill for 90 to 180 minutes depending on the supplier and/or number of basins. At less than design flows, timed operation results in the treatment of less than full batches. This means that the same reactor will receive flow at the

Three Basin Complete Mix SBR

same time every day; resulting in unbalanced loading, and less than optimum aerator performance due to decreased submergence.

Fluidyne's proprietary AART operating strategy is level controlled; each basin is allowed to fill completely in each cycle. This eliminates the [possibility of unbalanced loading, and ensures that the aeration system operates at optimum efficiency during the "react period.

During the "fill" cycle segment, "static fill," "anoxic mixed fill," and "aerated fill" sub-cycles are repeated. Duration of each sub-cycle is controlled by field adjustable timer, or automatic D.O. or ORP control. The alternating periods of anoxic and aerobic environments during the "fill" period allow a greater portion of influent soluble BOD to be utilized as a carbon source, assuring complete denitrification, and enhanced bio-phosphorous removal./

DECANTERS

Fluidyne's patented air-sealed fixed solids excluding decanter is the key component in withdrawing the highest quality effluent. The air sealed siphon type decanter uses a positive air seal to exclude solids during the aerated cycle segments. After the sludge has settled, an electric operated ball valve opens releasing air from the decanter. The decant valve is opened and effluent is withdrawn. As the decanting basin approaches BWL, a siphon is created, pulling effluent over the decant weir. Effluent is withdrawn until bottom water level (BWL) is reached, and the decant valve is closed. The vent valve is opened and air is allowed to enter decanter the draw tube breaking siphon. The vent valve is then closed, sealing the air in the draw tube. The decanter remains air-sealed until the next decant Effluent is withdrawn from beneath the mixed liquor at very low velocities, no scum or floatables can enter the decanter

FLUIDYNE
CORPORATION

THE EXPERIENCED LEADER IN SEQUENCING BATCH REACTOR TECHNOLOGY

Dual stainless steel fixed air-sealed decanters

There is widespread belief that a floating decanter offers some advantage over a fixed unit. The truth is that the average SVI for an SBR is less than 150. Experience in over 200 facilities has shown that the floating decanter offers no advantage over a fixed unit. A fixed air filled solids excluding decanter, however, offers the considerable advantage of having no in-basin moving parts.

ALSO FROM FLUIDYNE

ISAM™ Packaged Sequencing Batch Reactor

Hydro-Grit™ Vortex Grit Separation System

FFP™ Fixed Cloth Media Filter

Fluidyne Corporation
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Cedar Falls, Iowa 50613
Phone: (319) 266-9967
Fax: (319) 277-6034
E-Mail: www.FluidyneCorp.com

FLUIDYNE'S JET AERATION ™

Fluidyne's Jet Aeration provides an economical and effective approach to oxidizing and mixing wastewater. Jet Aeration Systems are ideal for both industrial and municipal activated sludge processes including SBRs, oxidation ditches, extended aeration and BNR. Due to their flexibility, large solids handling capability and efficiency, jets are also commonly used in aerobic digesters, sludge holding tanks, flow equalization basins and post aeration tanks.

FEATURES:

INNOVATIVE DESIGN

Jet mixing employs an arrangement of either jets or ejectors, each a jet nozzle, to entrain a large volume of liquid, using a small amount of pumped fluid or gas. This innovative systems produces extremely high mixing rates and strong fluid movement using very little energy.

COST EFFECTIVE & EASY TO MAINTAIN

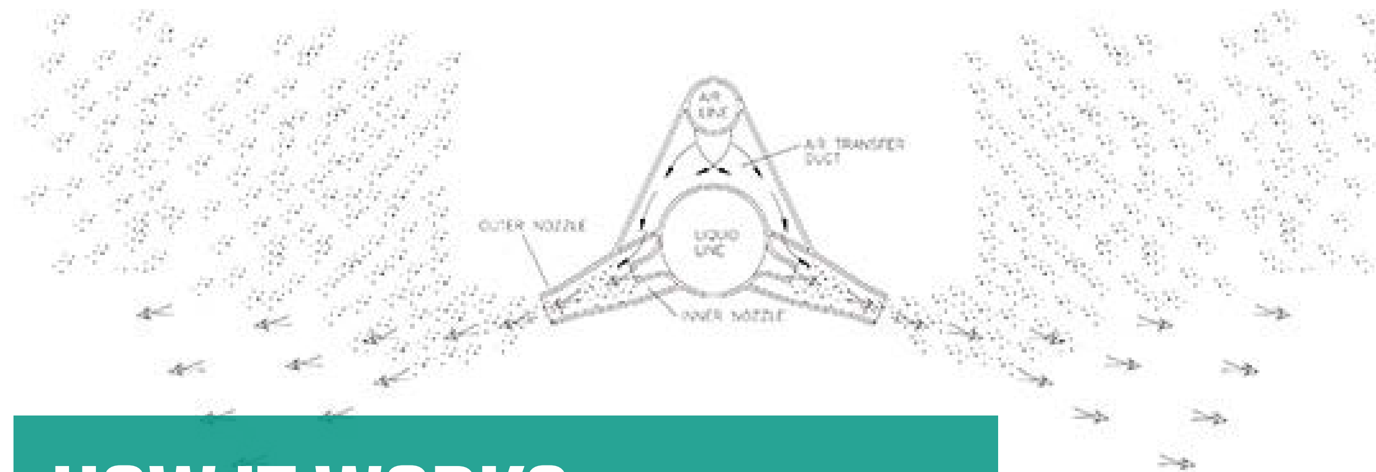
It's far simpler, far less costly and far easier to maintain than other aeration and mixing methods including fine bubble diffusers, coarse bubble diffusers and surface type aerators. In a Fluidyne jet aeration and mixing manifold, there are no moving parts, bearings or metal components submerged in the liquid. The only moving parts are the pump or compressor located outside the liquid tank or basin. A built-in back-flush assembly allows cleaning the manifold without entering the tank. The units are standard models backed by quickly available service.

WELL CONSTRUCTED

Submerged components of a Fluidyne system, the nozzle and piping, are built of corrosion and abrasion resistant stainless steel or fiberglass reinforced polyester.

BENEFITS:

- High Oxygen Transfer Efficiencies
- High Alpha Values
- Self-Cleaning Without Entering or Draining Tank
- No Icing, Fogging or Misting
- Ideal for Industrial Wastewater
- No In-Basin Moving Parts
- Low Operation Costs
- Long Life Cycle Compared to Coarse/Fine Bubble
- Large Solids Handling Capability
- FRP or Stainless Steel



HOW IT WORKS:

BIOLOGICAL REACTION

To provide the oxygen source for the biological reaction, a jet aeration manifold with multiple jet nozzle assemblies is connected to a pump and a blower. Each jet has a primary mixing nozzle and an outer secondary nozzle. The tank contents are re-circulated by the pump through the primary mixing nozzle. Low pressure air is mixed with the liquid in the outer secondary nozzle creating fine bubbles. By turning off the blower connected to the airline, anoxic mixing can be achieved with the same equipment to promote biological nutrient removal. No separate mixer is needed.

ENERGY EFFICIENT

Jets have high oxygen transfer and higher alpha values compared to other aeration devices. The design alpha for a Fluidyne jet system is 0.9 with hundreds of successful installations worldwide. Performance data has demonstrated alpha values above 1 in the use of some industrial wastewaters. Jet nozzle gassing rates can vary significantly without major changes in oxygen transfer efficiency. Jets also provide energy efficient off-bottom solids suspension.

HIGH VELOCITY

Tank liquid is pumped through the liquid line and through the inner nozzle. High velocity is created by the inner nozzle forming a jet plume. Compressed air is forced through the air line into the air transfer duct and then the outer nozzle. The high velocity jet plume from the inner nozzle shears the air in the outer nozzle creating fine bubbles. These bubbles are carried by the jet plume into the tank liquid. As the jet plume disperses and velocity slows. The buoyant force of the bubble causes the bubbles to rise.

FLUIDYNE'S JET ASPIRATION ™

Jet aspiration is a simple, efficient and cost effective solution to wastewater treatment and mixing problems. Liquid from the tank is pumped through a specially designed double nozzle assembly which aspirates air into the mixing section. The combined air/liquid plume is then discharged below the surface to provide high oxygen transfer and off-bottom solids suspension.

HOW IT WORKS:

The principle is simple, liquid from below the surface is pumped through a specially designed nozzle. In passing through the nozzle, the liquid flow increases in velocity. Air is drawn into the low pressure zone in the aspirator and mixes with the liquid in an outer nozzle, forcing oxygen to transfer into solution. The jet plume then discharges through the liquid into the basin and mixes the oxygenated liquid in the plume with the bulk of the basin liquid. The result is efficient oxygenated mixing at a reasonable cost, especially designed for small applications.

FEATURES:

FIXED ASPIRATORS

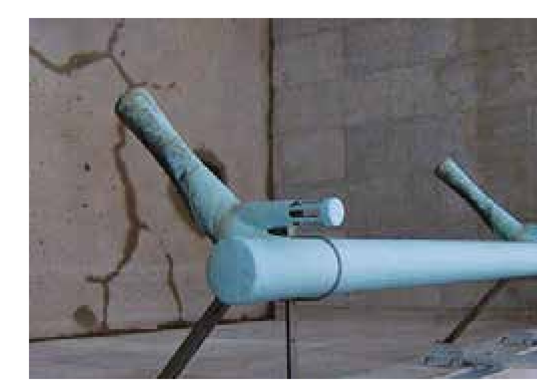
In the fixed units, the motive pump is submersible with an integrally mounted motor and is suitable for many different wastewater treatment and mixing applications. The jet aspirating nozzle assembly is mounted directly to the jet motive pump. The entire assembly is retrievable on guide rails for service and maintenance. The pump body is cast iron with a corrosion resistant coating. The jet aspirating nozzle assembly is fabricated out of stainless steel or corrosion resistant fiberglass.

PORTABLE ASPIRATORS

Portable aspirators are submerged units which are effective bottom mixing devices. The nozzle is close to the basin floor providing scouring velocities which lift solids from the floor toward the surface. Multiple units can also be positioned to create a circular mixing pattern which will make more efficient use of mixing energy input. These units are adapted to holding tanks, aerobic lagoons, aerobic digesters with secondary solids, small oxidation channels, SBRs, ISAM™ and equalization basins. These can also be adapted to temporary aeration applications.

BENEFITS:

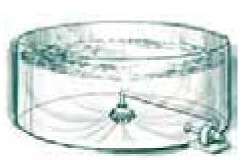
- Simple & low maintenance
- Quick and easy to install
- No additional piping required
- No compressed air required
- Efficient & low cost
- Constant pump power, not variation
- Complete system delivered & installed



FLUIDYNE'S JET MIXING ™

Fluidyne Jet mixers can be used in a wide variety of wastewater applications including flow equalization basins, CSO tanks, anoxic reactors, anaerobic digesters, SBRs, oxidation ditches and flash mix tanks. Fluidyne's jet mixing systems are simple, cost effective and available for new installations or for retrofit in existing tanks.

HOW IT WORKS:



Jet mixing employs a special dual nozzle assembly with entrainment ports. Tank liquid is pumped through a liquid line and then through the inner nozzle. High velocity is created by the inner nozzle forming a jet plume. This jet plume pulls tank liquid through the entrainment port and then discharges the liquid through the outer nozzle. Transfer of the high velocity stream to the surrounding liquid entrains additional flow increasing the pumping rate by as much as ten times the pumping capacity.

There are no moving parts within the jet mixing nozzle with several nozzles typically installed along a header system or radially around a central mounted cluster. Several different nozzle sizes are available depending on the particular application and type of mixing energy desired.

CUSTOM MIXING SYSTEMS

Our mixing systems are custom designed and sized based on the level of mixing required including solids suspension, stirring, blending, tank turnover or flash mixing. Depending on the makeup of the water, components can include special corrosion-resistant or chemical-resistant materials as needed.

FEATURES:

Each jet nozzle entrains a large volume of liquid, using a small amount of pumped fluid. This innovative system produces extremely high mixing rates and strong movement using very little energy.

Due to their flexibility, jet mixing systems can be used in many different tank geometries and depths including very shallow or deep tanks. It's simple, cost less and is easier to maintain than other traditional methods, particularly those employing rotating devices.

BENEFITS:

- Low installed cost
- Energy efficient
- Long life cycle (20 + years)
- Standard unit models backed by availability
- Nozzles and piping are built stainless steel or FRP

AQUA-AEROBIC SYSTEMS, INC.
A Metawater Company

Process Design Report

ST HELENA WWTP CA
Design# 156492
Option: Revised Preliminary SBR Design
(Phase II)

AquaSBR®
Sequencing Batch Reactor

May 29, 2019
Designed By: Sara Altimimi

6306 N. Alpine Rd Loves Park, IL 61111
(815) 654-2501 www.aqua-aerobic.com

Design Notes

Pre-SBR

- Elevated concentration of Hydrogen Sulfide can be detrimental to both civil and mechanical structures. If anaerobic conditions exist in the collection system, steps should be taken to eliminate Hydrogen Sulfide prior to the treatment system.

- Neutralization is recommended/required ahead of the SBR if the pH is expected to fall outside of 6.5-8.5 for significant durations.

- Coarse solids removal/reduction is recommended prior to the SBR.

SBR

- The decanter performance is based upon a free-air discharge following the valve and immediately adjacent to the basin. Actual decanter performance depends upon the complete installation including specific liquid and piping elevations and any associated field piping losses to the final point of discharge. Modification of the high water level, low water level, centerline of discharge, and / or cycle structure may be required to achieve discharge of full batch volume based on actual site installation specifics.

Aeration

- The aeration system has been designed to provide 1.25 lbs. O_2/lb. BOD_5 applied and 4.6 lbs. O_2/lb. TKN applied at the design average loading conditions.

- The maximum flow is organically loaded. An O_2 peaking factor of 1.12 was applied.

Process/Site

- The anticipated effluent NH_3-N requirement is predicated upon an influent waste temperature of 18° C or greater. While lower temperatures may be acceptable for a short-term duration, nitrification below 10° C can be unpredictable, requiring special operator attention.

- Sufficient alkalinity is required for nitrification, as approximately 7.1 mg alkalinity (as $CaCO_3$) is required for every mg of NH_3-N nitrified. If the raw water alkalinity cannot support this consumption, while maintaining a residual concentration of 50 mg/l, supplemental alkalinity shall be provided (by others).

Post-SBR

- Provisions should be made by others for a post-equalization basin overflow.

- Tertiary filtration follows the AquaSBR process.

- Duplex pumps feed filter. Pumps are recommended on VFDs (by others).

Filtration

- The filter influent should be free of algae and other solids that are not filterable through a nominal 10 micron pore size media. Provisions to treat algae and condition the solids to be filterable are the responsibility of others.

- For this application, pile filter cloth is recommended.

Equipment

- The basin dimensions reported on the design have been assumed based upon the required volumes and assumed basin geometry. Actual basin geometry may be circular, square, rectangular or sloped with construction materials including concrete, steel or earthen.

- Rectangular or sloped basin construction with length to width ratios greater than 1.5:1 may require alterations in the equipment recommendation.

- The basins are not included and shall be provided by others.

- Influent is assumed to enter the reactor above the waterline, located appropriately to avoid proximity to the decanter, splashing or direct discharge in the immediate vicinity of other equipment.

- If the influent is to be located submerged below the waterline, adequate hydraulic capacity shall be made in the headworks to prevent backflow from one reactor to the other during transition of influent.

- Equipment selection is based upon Aqua Aerobic Systems' standard materials of construction and electrical components.

- Aqua-Aerobic Systems, Inc. is familiar with various “Buy American” Acts (i.e. AIS, ARRA, Federal FAR 52.225, EXIM Bank, USAid, PA Steel Products Act, etc.). As the project develops Aqua-Aerobic Systems can work with you to ensure full compliance of our goods with various Buy American provisions if they are applicable/required for the project. When applicable, please provide us with the specifics of the project’s “Buy American” provisions.

- VFDs for all motors are to be provided by others. MCC to be provided by others.

AquaSBR - Sequencing Batch Reactor - Design Summary

DESIGN INFLUENT CONDITIONS

Avg. Design Flow	= 1.77 MGD	= 6700 m3/day
Max Design Flow	= 2 MGD	= 7571 m3/day

DESIGN PARAMETERS	Influent	mg/l	Effluent (After Filtration) Required	<= mg/l	Anticipated	<= mg/l
Bio/Chem Oxygen Demand:	BOD5	250	BOD5	15	BOD5	5
Total Suspended Solids:	TSS	200	TSS	15	TSS	5
Total Kjeldahl Nitrogen:	TKN	34	--	--	--	--
Ammonia Nitrogen:	--	--	NH3-N	16	NH3-N	1
Phosphorus:	Total P	8	--	--	--	--

SITE CONDITIONS	Maximum		Minimum		Design		Elevation (MSL)
Ambient Air Temperatures:	85 F	29.4 C	55 F	12.8 C	85 F	29.4 C	253 ft
Influent Waste Temperatures:	77 F	25.0 C	64.4 F	18.0 C	68 F	20.0 C	77.1 m

SBR BASIN DESIGN VALUES

			Water Depth			Basin Vol./Basin		
No./Basin Geometry:	= 3 Rectangular Basin(s)		**Min**	= 15.5 ft	= (4.7 m)	**Min**	= 0.376 MG	= (1,423.7 m³)
Freeboard:	= 2.0 ft	= (0.6 m)	**Avg**	= 20.4 ft	= (6.2 m)	**Avg**	= 0.494 MG	= (1,870.4 m³)
Length of Basin:	= 69.0 ft	= (21.0 m)	**Max**	= 21.0 ft	= (6.4 m)	**Max**	= 0.509 MG	= (1,928.5 m³)
Width of Basin:	= 47.0 ft	= (14.3 m)						

Number of Cycles:	= 5 per Day/Basin (advances cycles beyond MDF)	
Cycle Duration:	= 4.8 Hours/Cycle	
Food/Mass (F/M) ratio:	= 0.087 lbs. BOD5/lb. MLSS-Day	
MLSS Concentration:	= 4500 mg/l @ Min. Water Depth	
Hydraulic Retention Time:	= 0.837 Days @ Avg. Water Depth	
Solids Retention Time:	= 14.9 Days	
Est. Net Sludge Yield:	= 0.749 lbs. WAS/lb. BOD5	
Est. Dry Solids Produced:	= 2762.5 lbs. WAS/Day	= (1253.1 kg/Day)
Est. Solids Flow Rate:	= 200 GPM (33123 GAL/Day)	= (125.4 m³/Day)
Decant Flow Rate @ MDF:	= 2222.0 GPM (as avg. from high to low water level)	= (140.2 l/sec)
LWL to CenterLine Discharge:	= 1.2 ft	= (0.4 m)
Lbs. O2/lb. BOD5	= 1.25	
Lbs. O2/lb. TKN	= 4.60	
Peak O2 Factor:	= 1.12	
Actual Oxygen Required:	= 7752 lbs./Day	= (3516.5 kg/Day)
Air Flowrate/Basin:	= 1011 SCFM	= (28.6 Sm3/min)
Max. Discharge Pressure:	= 10.7 PSIG	= (74 KPA)
Avg. Power Required:	= 1545.1 KW-Hrs/Day	

Post-Equalization - Design Summary

POST-SBR EQUALIZATION DESIGN PARAMETERS

Avg. Daily Flow (ADF):	= 1.77 MGD	= (6,700 m^3/day)
Max. Daily Flow (MDF):	= 2 MGD	= (7,571 m^3/day)
Decant Flow Rate from (Qd):	= 2,222 gpm	= (8.4 m^3M)
Decant Duration (Td):	= 60 min	
Number Decants/Day:	= 15	
Time Between Start of Decants:	= 96 min	

POST-SBR EQUALIZATION VOLUME DETERMINATION

The volume required for equalization/storage shall be provided between the high and the low water levels of the basin(s). This Storage Volume (Vs) has been determined by the following:

Vs = [(Qd -(MDF x 694.4)] x Td = 49,987 gal = (6,682.7 ft^3) = (189.2 m^3)

The volumes determined in this summary reflect the minimum volumes necessary to achieve the desired results based upon the input provided to Aqua. If other hydraulic conditions exist that are not mentioned in this design summary or associated design notes, additional volume may be warranted.

Based upon liquid level inputs from each SBR reactor prior to decant, the rate of discharge from the Post-SBR Equalization basin shall be pre-determined to establish the proper number of pumps to be operated (or the correct valve position in the case of gravity flow). Level indication in the Post-SBR Equalization basin(s) shall override equipment operation.

POST-SBR EQUALIZATION BASIN DESIGN VALUES

No./Basin Geometry:	= 1 Rectangular Basin(s)				
Length of Basin:	= 47.0 ft	= (14.3 m)			
Width of Basin:	= 12.0 ft	= (3.7 m)			
Min. Water Depth:	= 1.5 ft	= (0.5 m)	**Min. Basin Vol. Basin:**	= 6,328.1 gal	= (24.0 m^3)
Max. Water Depth:	= 13.4 ft	= (4.1 m)	**Max. Basin Vol. Basin:**	= 56,314.8 gal	= (213.2 m^3)

POST-SBR EQUALIZATION EQUIPMENT CRITERIA

Mixing Energy with Diffusers:	= 15 SCFM/1000 ft^3	
SCFM Required to Mix:	= 113 SCFM/basin	= (192 Nm^3/hr/basin)
Max. Discharge Pressure:	= 6.4 PSIG	= (43.82 KPA)
Max. Flow Rate Required Basin:	= 1,389 gpm	= (5.258 m^3/min)
Avg. Power Required:	= 185.7 kW-hr/day	

AquaDISK Tertiary Filtration - Design Summary

DESIGN INFLUENT CONDITIONS

Pre-Filter Treatment:	AquaSBR		
Avg. Design Flow	= 1.77 MGD	= 1229.17 gpm	= 6700.18 m^3/day
Max Design Flow	= 2.00 MGD	= 1388.89 gpm	= 7570.82 m^3/day

The filtration system shall be designed based upon flow equalization after the SBR and prior to filtration.

AquaDISK FILTER RECOMMENDATION

Qty Of Filter Units Recommended	= 1
Number Of Disks Per Unit	= 6
Total Number Of Disks Recommended	= 6
Total Filter Area Provided	= 322.8 ft^2 = (29.99 m^2)
Filter Model Recommended	= AquaDisk Package: Model ADFSP-54 x 6E-PC
Filter Media Cloth Type	= OptiFiber PES-13

AquaDISK FILTER CALCULATIONS

Filter Type:

Vertically Mounted Cloth Media Disks featuring automatically operated vacuum backwash . Tank shall include a rounded bottom and solids removal system.

Average Flow Conditions:

Average Hydraulic Loading
= Avg. Design Flow (gpm) / Recommended Filter Area (ft^2)
= 1229.2 / 322.8 ft^2
= 3.81 gpm/ft^2 (9.31 m/hr) at Avg. Flow

Maximum Flow Conditions:

Maximum Hydraulic Loading
= Max. Design Flow (gpm) / Recommended Filter Area (ft^2)
= 1388.9 / 322.8 ft^2
= 4.30 gpm/ft^2 (10.52 m/hr) at Max. Flow

Solids Loading:

Solids Loading Rate
= (lbs TSS/day at max flow and max TSS loading) / Recommended Filter Area (ft^2)
= 250.2 lbs/day / 322.8 ft^2
= 0.78 lbs. TSS /day/ft^2 (3.78 kg. TSS/day/m^2)

AquaSBR

Influent Valves

3 Influent Valve(s) will be provided as follows:

- 12 inch electrically operated plug valve(s).

Mixers

3 AquaDDM Direct Drive Mixer(s) will be provided as follows:

- 15 HP Aqua-Aerobic Systems Endura Series Model FSS DDM Mixer(s).

Mixer Mooring

3 Mixer cable mooring system(s) consisting of:

- #10 AWG four-conductor electrical service cable(s).
- Aerial support tie(s).
- Electrical cable strain relief grip(s), 2 eye, wire mesh.
- 304 stainless steel mooring cable(s).
- Maintenance mooring cable loop(s).
- Stainless steel mooring spring(s).
- 1/2" stainless steel eyebolt assembly(s).
- 316 stainless steel wire rope thimble(s).
- 316 stainless steel quick disconnect snaphook(s).

Decanters

3 Decanter assembly(ies) consisting of:

- 8x7 Aqua-Aerobics decanter(s) with fiberglass float, 304 stainless steel weir, galvanized restrained mooring frame, and painted steel power section with #14-10 conductor power cable wired into a NEMA 4X stainless steel junction box with terminal strips for the single phase, 60 hertz actuator and limit switches.
- Decant pipe(s).
- 4" schedule 40 galvanized steel mooring post.
- Galvanized steel dewatering support post(s).
- 12 inch electrically operated butterfly valve(s) with actuator.

Transfer Pumps/Valves

3 Submersible pump assembly(ies) consisting of the following items:

- 2.7 HP Submersible Pump(s) with painted cast iron pump housing, discharge elbow, and multi-conductor electrical cable.
- Manual plug valve(s).
- 3 inch diameter swing check valve.
- Galvanized steel slide rail assembly(ies).

Retrievable Fine Bubble Diffusers

12 Retrievable Fine Bubble Diffuser Assembly(ies) consisting of:

- 25 diffuser tubes consisting of two flexible EPDM porous membrane sheaths mounted on a rigid support pipe with 304 stainless steel band clamps.
- 304 stainless steel manifold weldment.
- 304 stainless steel leveling angles.
- 304 stainless steel leveling studs.
- Galvanized vertical support beam.
- Galvanized vertical air column assembly.
- Galvanized upper vertical beam and pulley assembly.
- Galvanized top support bracket.
- 3" EPDM flexible air line with ny-glass quick disconnect end fittings.

- Galvanized threaded flange.
- 3" manual isolation butterfly valve with cast iron body, EPDM seat, aluminum bronze disk and one-piece steel shaft.
- Ny-glass quick disconnect cam lock adapter.
- 304 stainless steel adhesive anchors.
- Brace angles.

1 Diffuser Electric Winch(es) will be provided as follows:

- Portable electric winch.

Positive Displacement Blowers

5 Positive Displacement Blower Package(s), with each package consisting of:

- ROOTS 412 Positive Displacement Blower Package with common base, V-belt drive, enclosed drive guard, pressure gauge, pressure relief valve, and vibration pads.
- Stainless steel anchors.
- 50 HP motor with slide base.
- Inlet filter and inlet silencer.
- Discharge silencer, check valve, manual butterfly isolation valve, and flexible discharge connector.

Air Valves

4 Air Control Valve(s) will be provided as follows:

- 6 inch electrically operated butterfly valve(s) with actuator.

Level Sensor Assemblies

3 Pressure Transducer Assembly(ies) each consisting of:

- Submersible pressure transducer(s).
- Mounting bracket weldment(s).
- Transducer mounting pipe weldment(s).

3 Level Sensor Assembly(ies) will be provided as follows:

- Float switch(es).
- Float switch mounting bracket(s).
- Stainless steel anchors.

AquaSBR: Post-Equalization

Transfer Pumps/Valves

3 Submersible Pump Assembly(ies) consisting of the following items:

- 5 HP Submersible Pump(s) with painted cast iron pump housing, discharge elbow, and multi-conductor electrical cable.
- Manual plug valve(s).
- 6 inch diameter swing check valve.
- Galvanized steel slide rail assembly(ies).

Fixed Coarse Bubble Diffusers

1 Aqua-Aerobic's Fixed Coarse Bubble Diffuser System(s) consisting of the following components:

- PVC diffuser(s).
- Schedule 40 galvanized steel riser pipe(s).
- Schedule 40 PVC manifold piping.
- Stainless steel anchors.

Positive Displacement Blowers

1 Positive Displacement Blower Package(s), with each package consisting of:

- ROOTS 33 Positive Displacement Blower Package with common base, V-belt drive, enclosed drive guard, pressure gauge, pressure relief valve, and vibration pads.
- Stainless steel anchors.
- 7.5 HP motor with slide base.
- Inlet filter and inlet silencer.
- Discharge silencer, check valve, manual butterfly isolation valve, and flexible discharge connector.

Level Sensor Assemblies

1 Sensor installation(s) consisting of:

- Submersible pressure transducer(s).
- Stainless steel sensor guide rail weldment(s).
- PVC sensor mounting pipe(s).
- Top support(s).

1 Level Sensor Assembly(ies) will be provided as follows:

- Float switch(es).
- Float switch mounting bracket(s).
- Stainless steel anchors.

Controls

Controls wo/Starters

1 Controls Package(s) will be provided as follows:

- NEMA 12 panel enclosure suitable for indoor installation and constructed of painted steel.
- Fuse(s) and fuse block(s).
- Compactlogix Processor.
- Operator interface(s).
- Remote Access Ethernet Modem.

Cloth Media Filters

AquaDisk Tanks/Basins

1 AquaDisk Model # ADFSP-54x6E-PC Package Filter Painted Steel Tank(s) consisting of:

- 6 Disk painted steel tank(s).
- 3" ball valve(s).

AquaDisk Centertube Assemblies

1 Centertube(s) consisting of:

- 304 stainless steel centertube weldment(s).
- Centertube driven sprocket(s).
- Dual wheel assembly(ies).
- Rider wheel bracket assembly(ies).
- Effluent seal plate.
- Centertube bearing kit(s).
- Effluent centertube lip seal(s).
- Pile cloth media and non-corrosive support frame assemblies.
- Disk segment 304 stainless steel support rods.
- Neoprene media sealing gaskets.

1 Cloth set(s) will have the following feature:

- Cloth will be chlorine resistant.

AquaDisk Drive Assemblies

1 Drive System(s) consisting of:

- Gearbox with motor.
- Drive sprocket(s).
- Drive chain(s) with pins.
- Stationary drive bracket weldment(s).
- Adjustable drive bracket weldment(s).
- Chain guard weldment(s).
- Warning label(s).

AquaDisk Backwash/Sludge Assemblies

1 Backwash System(s) consisting of:

- Backwash shoe assemblies.
- Backwash shoe support weldment(s).
- 1 1/2" flexible hose.
- Stainless steel backwash shoe springs.
- Hose clamps.

1 Backwash/Solids Waste Pump(s) consisting of:

- Backwash/waste pump(s).
- Stainless steel anchors.
- 0 to 15 psi pressure gauge(s).
- 0 to 30 inches mercury vacuum gauge(s).
- Throttling gate valve(s).
- 2" bronze 3 way ball valve(s).

AquaDisk Instrumentation

1 Pressure Transmitter(s) consisting of:

- Level transmitter(s).

1 Float Switch(es) consisting of:

- Float switch(es).

1 Vacuum Transmitter(s) consisting of:

- Vacuum transmitter(s).

AquaDisk Valves

1 Set(s) of Backwash Valves consisting of:

- 2" full port, three piece, stainless steel body ball valve(s), grooved end connections with single phase electric actuator(s). Valve / actuator combination shall be TCI / RCI (RCI, a division of Rotork), Nibco, or equal.
- 2" flexible hose.
- Victaulic coupler(s).

1 Solids Waste Valve(s) consisting of:

- 2" full port, three piece, stainless steel body ball valve(s), grooved end connections with single phase electric actuator(s). Valve / actuator combination shall be TCI / RCI (RCI, a division of Rotork), Nibco, or equal.
- 2" flexible hose.
- Victaulic coupler(s).

AquaDisk Controls w/Starters

1 Conduit Installation(s) consisting of:

- PVC conduit and fittings.

1 Control Panel(s) consisting of:

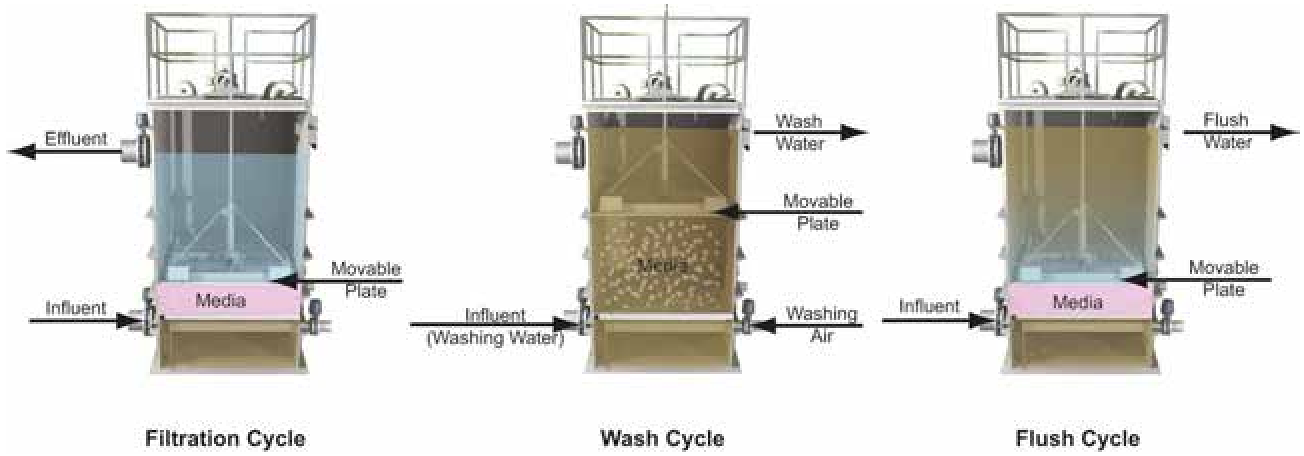
- Nema 4X 304 stainless steel enclosure(s)
- Air conditioner(s)
- Operator interface sun shield(s)
- Control panel sun shield
- Circuit breaker with handle
- Transformer(s)
- Fuses and fuse blocks
- Line filter(s)
- GFI convenience outlet(s)
- Control relay(s)
- Selector switch(es)
- Indicating pilot light(s)
- MicroLogix 1400 PLC(s)
- Ethernet switch(es)
- Operator interface(s)
- Power supply(ies)
- Motor starter(s)
- Terminal blocks
- UL label(s)

Compressible Media Filter

A unique innovative system for filtration rates of 40 gpm/ft^2 and up.

The Schreiber Fuzzy Filter is an innovative and cost effective compressible media filter for water and wastewater treatment systems. The Fuzzy Filter system is compact, modular, and easily adaptable for numerous applications. The Fuzzy Filter, operating in an upflow design, achieves an exceptionally high rate of solids removal through the use of compressible synthetic fiber spheres. The low density and high porosity of the media result in more solids captured per volume of media. Because the filter media is compressible, the porosity of the filter bed can be altered to suit influent characteristics. The filter media also represents a departure from conventional filter media in that the fluids to be filtered flow through the media as opposed to flowing around the media as in sand and anthracite filters. These innovative features permit dramatically higher hydraulic loadings of 40 GPM/ft^2 and greater. Other filtration systems are typically limited to loadings of only 2 to 6 GPM/ft^2.

The Fuzzy Filter utilizes air scouring during the wash cycle to clean the media. Influent continues to enter the filter (filtered water is not necessary for washing) while an external blower supplies air to the diffusers located in the bottom of the filter to violently agitate the media. The media, which is retained between two perforated plates, is subjected to vigorous air scouring to free captured solids. Liberated solids continuously exit the filter with the wash water passing through the vessel. After the washing cycle, the media is returned to its compressed state and filtration is resumed.



PILOT TESTING

Schreiber maintains Fuzzy Filter pilot units for testing and demonstration purposes. All units are trailer mounted with complete automatic controls and data logging capability.

VALIDATION

Accepted for California Water Recycling Criteria (Title 22).

SIZES

The Fuzzy Filter is available in 18", 2', 3', 4', 5', 6', 7', & 8' square units. Correspondingly, the Fuzzy Filter handles flows ranging from 0.13 MGD (18" filter) to 3.69 MGD (8' filter) at a loading rate of 40 GPM/ft^2. In addition to upflow filters, the Fuzzy Filter is also available in downflow configurations, in both gravity and pressure operation.

FEATURES

- High flow rate (40 GPM/ft^2 and greater)
- Low operating costs
- Ease of installation
- Dramatic space savings
- Completely enclosed structure
- Low wash water usage (1-2%)
- High solids storage capacity
- Flexibility through media bed compression
- No media loss
- Media life in excess of 10 years

APPLICATIONS

- Tertiary treatment
- Pre-filtration for reverse osmosis
- Cooling tower water
- Water reclamation/reuse
- Reclaimed water from food processing
- Pulp and paper process water
- Wet weather flows (CSO/SSO)
- Membrane Backwash Water

TITLE 22 ACCEPTED REUSE

10 state standards

100 SCHREIBER DRIVE | TRUSSVILLE, AL 35173 | T 205 655 7466 | F 205 655 7669 | SCHREIBERWATER.COM

APPENDIX B

AIR QUALITY AND GHG MODEL RUNS

St. Helena WWTP Upgrades

Napa County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	55,000.00	User Defined Unit	1.50	55,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.6	**Precipitation Freq (Days)**	64
Climate Zone	4			**Operational Year**	2022
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Based on site plan figure.

Construction Phase - Based on construction timeline.

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Off-road Equipment - Based on expected construction equpment.

Trips and VMT - ISMND

Grading - Based on estimated 63,00 sq ft of paving.

Stationary Sources - Emergency Generators and Fire Pumps -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	200.00	110.00
tblConstructionPhase	NumDays	4.00	44.00
tblConstructionPhase	NumDays	2.00	44.00
tblGrading	AcresOfGrading	16.50	1.50
tblGrading	AcresOfGrading	22.00	1.00
tblLandUse	LandUseSquareFeet	0.00	55,000.00
tblLandUse	LotAcreage	0.00	1.50
tblStationaryGeneratorsPumpsEF	CH4_EF	0.07	0.07
tblStationaryGeneratorsPumpsEF	ROG_EF	2.2480e-003	2.2477e-003
tblStationaryGeneratorsPumpsUse	HorsePowerValue	0.00	1,000.00
tblStationaryGeneratorsPumpsUse	HoursPerYear	0.00	30.00
tblStationaryGeneratorsPumpsUse	NumberOfEquipment	0.00	1.00
tblTripsAndVMT	HaulingTripNumber	0.00	4.00
tblTripsAndVMT	VendorTripNumber	9.00	0.00
tblTripsAndVMT	WorkerTripNumber	8.00	10.00
tblTripsAndVMT	WorkerTripNumber	8.00	10.00
tblTripsAndVMT	WorkerTripNumber	23.00	50.00
tblTripsAndVMT	WorkerTripNumber	5.00	6.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.1727	1.4501	1.0918	2.1200e-003	0.2417	0.0683	0.3100	0.1252	0.0646	0.1897	0.0000	180.4517	180.4517	0.0378	0.0000	181.3963
2022	0.0252	0.2264	0.1806	2.5000e-004	1.7600e-003	0.0159	0.0176	4.7000e-004	0.0146	0.0151	0.0000	21.5850	21.5850	6.4300e-003	0.0000	21.7457
Maximum	**0.1727**	**1.4501**	**1.0918**	**2.1200e-003**	**0.2417**	**0.0683**	**0.3100**	**0.1252**	**0.0646**	**0.1897**	**0.0000**	**180.4517**	**180.4517**	**0.0378**	**0.0000**	**181.3963**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.1727	1.4501	1.0918	2.1200e-003	0.2417	0.0683	0.3100	0.1252	0.0646	0.1897	0.0000	180.4515	180.4515	0.0378	0.0000	181.3961
2022	0.0252	0.2264	0.1806	2.5000e-004	1.7600e-003	0.0159	0.0176	4.7000e-004	0.0146	0.0151	0.0000	21.5850	21.5850	6.4300e-003	0.0000	21.7457
Maximum	**0.1727**	**1.4501**	**1.0918**	**2.1200e-003**	**0.2417**	**0.0683**	**0.3100**	**0.1252**	**0.0646**	**0.1897**	**0.0000**	**180.4515**	**180.4515**	**0.0378**	**0.0000**	**181.3961**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	4-1-2021	6-30-2021	0.5839	0.5839
2	7-1-2021	9-30-2021	0.5168	0.5168
3	10-1-2021	12-31-2021	0.5190	0.5190
4	1-1-2022	3-31-2022	0.2493	0.2493
5	4-1-2022	6-30-2022	0.0107	0.0107
		Highest	0.5839	0.5839

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.2906	4.6200e-003	0.5062	4.0000e-005		1.8100e-003	1.8100e-003		1.8100e-003	1.8100e-003	0.0000	0.9828	0.9828	2.5900e-003	0.0000	1.0476
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Stationary	0.0246	0.1101	0.0628	1.2000e-004		3.6200e-003	3.6200e-003		3.6200e-003	3.6200e-003	0.0000	11.4239	11.4239	1.6000e-003	0.0000	11.4640
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.3152**	**0.1147**	**0.5690**	**1.6000e-004**	**0.0000**	**5.4300e-003**	**5.4300e-003**	**0.0000**	**5.4300e-003**	**5.4300e-003**	**0.0000**	**12.4067**	**12.4067**	**4.1900e-003**	**0.0000**	**12.5115**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.2906	4.6200e-003	0.5062	4.0000e-005		1.8100e-003	1.8100e-003		1.8100e-003	1.8100e-003	0.0000	0.9828	0.9828	2.5900e-003	0.0000	1.0476
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Stationary	0.0246	0.1101	0.0628	1.2000e-004		3.6200e-003	3.6200e-003		3.6200e-003	3.6200e-003	0.0000	11.4239	11.4239	1.6000e-003	0.0000	11.4640
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.3152**	**0.1147**	**0.5690**	**1.6000e-004**	**0.0000**	**5.4300e-003**	**5.4300e-003**	**0.0000**	**5.4300e-003**	**5.4300e-003**	**0.0000**	**12.4067**	**12.4067**	**4.1900e-003**	**0.0000**	**12.5115**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	4/1/2021	6/1/2021	5	44	
2	Grading	Grading	6/2/2021	8/2/2021	5	44	
3	Building Construction	Building Construction	8/3/2021	1/3/2022	5	110	
4	Trenching	Trenching	1/4/2022	4/4/2022	5	65	

Acres of Grading (Site Preparation Phase): 1

Acres of Grading (Grading Phase): 1.5

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Graders	1	8.00	187	0.41
Site Preparation	Rubber Tired Dozers	1	7.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Graders	1	6.00	187	0.41
Grading	Rubber Tired Dozers	1	6.00	247	0.40
Grading	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Building Construction	Cranes	1	6.00	231	0.29
Building Construction	Forklifts	1	6.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Welders	3	8.00	46	0.45
Trenching	Trenchers	2	8.00	78	0.50

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	3	10.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	3	10.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	7	50.00	0.00	4.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Trenching	2	6.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1165	0.0000	0.1165	0.0638	0.0000	0.0638	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0342	0.3833	0.1663	3.8000e-004		0.0168	0.0168		0.0155	0.0155	0.0000	33.2605	33.2605	0.0108	0.0000	33.5294
Total	**0.0342**	**0.3833**	**0.1663**	**3.8000e-004**	**0.1165**	**0.0168**	**0.1333**	**0.0638**	**0.0155**	**0.0793**	**0.0000**	**33.2605**	**33.2605**	**0.0108**	**0.0000**	**33.5294**

3.2 Site Preparation - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.9000e-004	5.5000e-004	5.7700e-003	2.0000e-005	1.7400e-003	1.0000e-005	1.7500e-003	4.6000e-004	1.0000e-005	4.7000e-004	0.0000	1.4496	1.4496	4.0000e-005	0.0000	1.4506
Total	**7.9000e-004**	**5.5000e-004**	**5.7700e-003**	**2.0000e-005**	**1.7400e-003**	**1.0000e-005**	**1.7500e-003**	**4.6000e-004**	**1.0000e-005**	**4.7000e-004**	**0.0000**	**1.4496**	**1.4496**	**4.0000e-005**	**0.0000**	**1.4506**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1165	0.0000	0.1165	0.0638	0.0000	0.0638	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0342	0.3833	0.1663	3.8000e-004		0.0168	0.0168		0.0155	0.0155	0.0000	33.2604	33.2604	0.0108	0.0000	33.5294
Total	**0.0342**	**0.3833**	**0.1663**	**3.8000e-004**	**0.1165**	**0.0168**	**0.1333**	**0.0638**	**0.0155**	**0.0793**	**0.0000**	**33.2604**	**33.2604**	**0.0108**	**0.0000**	**33.5294**

3.2 Site Preparation - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.9000e-004	5.5000e-004	5.7700e-003	2.0000e-005	1.7400e-003	1.0000e-005	1.7500e-003	4.6000e-004	1.0000e-005	4.7000e-004	0.0000	1.4496	1.4496	4.0000e-005	0.0000	1.4506
Total	**7.9000e-004**	**5.5000e-004**	**5.7700e-003**	**2.0000e-005**	**1.7400e-003**	**1.0000e-005**	**1.7500e-003**	**4.6000e-004**	**1.0000e-005**	**4.7000e-004**	**0.0000**	**1.4496**	**1.4496**	**4.0000e-005**	**0.0000**	**1.4506**

3.3 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1002	0.0000	0.1002	0.0547	0.0000	0.0547	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0283	0.3153	0.1393	3.1000e-004		0.0140	0.0140		0.0129	0.0129	0.0000	27.2441	27.2441	8.8100e-003	0.0000	27.4643
Total	**0.0283**	**0.3153**	**0.1393**	**3.1000e-004**	**0.1002**	**0.0140**	**0.1142**	**0.0547**	**0.0129**	**0.0676**	**0.0000**	**27.2441**	**27.2441**	**8.8100e-003**	**0.0000**	**27.4643**

3.3 Grading - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.9000e-004	5.5000e-004	5.7700e-003	2.0000e-005	1.7400e-003	1.0000e-005	1.7500e-003	4.6000e-004	1.0000e-005	4.7000e-004	0.0000	1.4496	1.4496	4.0000e-005	0.0000	1.4506
Total	**7.9000e-004**	**5.5000e-004**	**5.7700e-003**	**2.0000e-005**	**1.7400e-003**	**1.0000e-005**	**1.7500e-003**	**4.6000e-004**	**1.0000e-005**	**4.7000e-004**	**0.0000**	**1.4496**	**1.4496**	**4.0000e-005**	**0.0000**	**1.4506**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1002	0.0000	0.1002	0.0547	0.0000	0.0547	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0283	0.3153	0.1393	3.1000e-004		0.0140	0.0140		0.0129	0.0129	0.0000	27.2440	27.2440	8.8100e-003	0.0000	27.4643
Total	**0.0283**	**0.3153**	**0.1393**	**3.1000e-004**	**0.1002**	**0.0140**	**0.1142**	**0.0547**	**0.0129**	**0.0676**	**0.0000**	**27.2440**	**27.2440**	**8.8100e-003**	**0.0000**	**27.4643**

3.3 Grading - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.9000e-004	5.5000e-004	5.7700e-003	2.0000e-005	1.7400e-003	1.0000e-005	1.7500e-003	4.6000e-004	1.0000e-005	4.7000e-004	0.0000	1.4496	1.4496	4.0000e-005	0.0000	1.4506
Total	**7.9000e-004**	**5.5000e-004**	**5.7700e-003**	**2.0000e-005**	**1.7400e-003**	**1.0000e-005**	**1.7500e-003**	**4.6000e-004**	**1.0000e-005**	**4.7000e-004**	**0.0000**	**1.4496**	**1.4496**	**4.0000e-005**	**0.0000**	**1.4506**

3.4 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0988	0.7432	0.7030	1.2000e-003		0.0373	0.0373		0.0360	0.0360	0.0000	98.9435	98.9435	0.0177	0.0000	99.3851
Total	**0.0988**	**0.7432**	**0.7030**	**1.2000e-003**		**0.0373**	**0.0373**		**0.0360**	**0.0360**	**0.0000**	**98.9435**	**98.9435**	**0.0177**	**0.0000**	**99.3851**

3.4 Building Construction - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.0000e-005	5.5000e-004	1.1000e-004	0.0000	3.0000e-005	0.0000	4.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.1492	0.1492	1.0000e-005	0.0000	0.1494
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.7500e-003	6.8100e-003	0.0715	2.0000e-004	0.0215	1.5000e-004	0.0217	5.7300e-003	1.3000e-004	5.8600e-003	0.0000	17.9553	17.9553	4.7000e-004	0.0000	17.9670
Total	**9.7700e-003**	**7.3600e-003**	**0.0716**	**2.0000e-004**	**0.0216**	**1.5000e-004**	**0.0217**	**5.7400e-003**	**1.3000e-004**	**5.8700e-003**	**0.0000**	**18.1045**	**18.1045**	**4.8000e-004**	**0.0000**	**18.1164**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0988	0.7432	0.7030	1.2000e-003		0.0373	0.0373		0.0360	0.0360	0.0000	98.9433	98.9433	0.0177	0.0000	99.3849
Total	**0.0988**	**0.7432**	**0.7030**	**1.2000e-003**		**0.0373**	**0.0373**		**0.0360**	**0.0360**	**0.0000**	**98.9433**	**98.9433**	**0.0177**	**0.0000**	**99.3849**

3.4 Building Construction - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.0000e-005	5.5000e-004	1.1000e-004	0.0000	3.0000e-005	0.0000	4.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.1492	0.1492	1.0000e-005	0.0000	0.1494
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.7500e-003	6.8100e-003	0.0715	2.0000e-004	0.0215	1.5000e-004	0.0217	5.7300e-003	1.3000e-004	5.8600e-003	0.0000	17.9553	17.9553	4.7000e-004	0.0000	17.9670
Total	**9.7700e-003**	**7.3600e-003**	**0.0716**	**2.0000e-004**	**0.0216**	**1.5000e-004**	**0.0217**	**5.7400e-003**	**1.3000e-004**	**5.8700e-003**	**0.0000**	**18.1045**	**18.1045**	**4.8000e-004**	**0.0000**	**18.1164**

3.4 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	8.2000e-004	6.2500e-003	6.3600e-003	1.0000e-005		2.9000e-004	2.9000e-004		2.8000e-004	2.8000e-004	0.0000	0.9079	0.9079	1.6000e-004	0.0000	0.9118
Total	**8.2000e-004**	**6.2500e-003**	**6.3600e-003**	**1.0000e-005**		**2.9000e-004**	**2.9000e-004**		**2.8000e-004**	**2.8000e-004**	**0.0000**	**0.9079**	**0.9079**	**1.6000e-004**	**0.0000**	**0.9118**

3.4 Building Construction - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	3.0000e-005	0.0000	3.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	1.3500e-003	1.3500e-003	0.0000	0.0000	1.3500e-003
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.0000e-005	6.0000e-005	6.0000e-004	0.0000	2.0000e-004	0.0000	2.0000e-004	5.0000e-005	0.0000	5.0000e-005	0.0000	0.1587	0.1587	0.0000	0.0000	0.1588
Total	**8.0000e-005**	**6.0000e-005**	**6.0000e-004**	**0.0000**	**2.3000e-004**	**0.0000**	**2.3000e-004**	**6.0000e-005**	**0.0000**	**6.0000e-005**	**0.0000**	**0.1601**	**0.1601**	**0.0000**	**0.0000**	**0.1602**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	8.2000e-004	6.2500e-003	6.3600e-003	1.0000e-005		2.9000e-004	2.9000e-004		2.8000e-004	2.8000e-004	0.0000	0.9079	0.9079	1.6000e-004	0.0000	0.9118
Total	**8.2000e-004**	**6.2500e-003**	**6.3600e-003**	**1.0000e-005**		**2.9000e-004**	**2.9000e-004**		**2.8000e-004**	**2.8000e-004**	**0.0000**	**0.9079**	**0.9079**	**1.6000e-004**	**0.0000**	**0.9118**

3.4 Building Construction - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	3.0000e-005	0.0000	3.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	1.3500e-003	1.3500e-003	0.0000	0.0000	1.3500e-003
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.0000e-005	6.0000e-005	6.0000e-004	0.0000	2.0000e-004	0.0000	2.0000e-004	5.0000e-005	0.0000	5.0000e-005	0.0000	0.1587	0.1587	0.0000	0.0000	0.1588
Total	**8.0000e-005**	**6.0000e-005**	**6.0000e-004**	**0.0000**	**2.3000e-004**	**0.0000**	**2.3000e-004**	**6.0000e-005**	**0.0000**	**6.0000e-005**	**0.0000**	**0.1601**	**0.1601**	**0.0000**	**0.0000**	**0.1602**

3.5 Trenching - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0237	0.2197	0.1689	2.2000e-004		0.0156	0.0156		0.0143	0.0143	0.0000	19.2792	19.2792	6.2400e-003	0.0000	19.4351
Total	**0.0237**	**0.2197**	**0.1689**	**2.2000e-004**		**0.0156**	**0.0156**		**0.0143**	**0.0143**	**0.0000**	**19.2792**	**19.2792**	**6.2400e-003**	**0.0000**	**19.4351**

3.5 Trenching - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.5000e-004	4.4000e-004	4.6700e-003	1.0000e-005	1.5400e-003	1.0000e-005	1.5500e-003	4.1000e-004	1.0000e-005	4.2000e-004	0.0000	1.2379	1.2379	3.0000e-005	0.0000	1.2386
Total	**6.5000e-004**	**4.4000e-004**	**4.6700e-003**	**1.0000e-005**	**1.5400e-003**	**1.0000e-005**	**1.5500e-003**	**4.1000e-004**	**1.0000e-005**	**4.2000e-004**	**0.0000**	**1.2379**	**1.2379**	**3.0000e-005**	**0.0000**	**1.2386**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0237	0.2197	0.1689	2.2000e-004		0.0156	0.0156		0.0143	0.0143	0.0000	19.2792	19.2792	6.2400e-003	0.0000	19.4351
Total	**0.0237**	**0.2197**	**0.1689**	**2.2000e-004**		**0.0156**	**0.0156**		**0.0143**	**0.0143**	**0.0000**	**19.2792**	**19.2792**	**6.2400e-003**	**0.0000**	**19.4351**

3.5 Trenching - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.5000e-004	4.4000e-004	4.6700e-003	1.0000e-005	1.5400e-003	1.0000e-005	1.5500e-003	4.1000e-004	1.0000e-005	4.2000e-004	0.0000	1.2379	1.2379	3.0000e-005	0.0000	1.2386
Total	**6.5000e-004**	**4.4000e-004**	**4.6700e-003**	**1.0000e-005**	**1.5400e-003**	**1.0000e-005**	**1.5500e-003**	**4.1000e-004**	**1.0000e-005**	**4.2000e-004**	**0.0000**	**1.2379**	**1.2379**	**3.0000e-005**	**0.0000**	**1.2386**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Industrial	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Industrial	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
User Defined Industrial	0.586522	0.036345	0.168625	0.112459	0.022729	0.006000	0.017299	0.036828	0.003880	0.001801	0.005497	0.001027	0.000988

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.2906	4.6200e-003	0.5062	4.0000e-005		1.8100e-003	1.8100e-003		1.8100e-003	1.8100e-003	0.0000	0.9828	0.9828	2.5900e-003	0.0000	1.0476
Unmitigated	0.2906	4.6200e-003	0.5062	4.0000e-005		1.8100e-003	1.8100e-003		1.8100e-003	1.8100e-003	0.0000	0.9828	0.9828	2.5900e-003	0.0000	1.0476

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0287					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.2148					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0471	4.6200e-003	0.5062	4.0000e-005		1.8100e-003	1.8100e-003		1.8100e-003	1.8100e-003	0.0000	0.9828	0.9828	2.5900e-003	0.0000	1.0476
Total	**0.2906**	**4.6200e-003**	**0.5062**	**4.0000e-005**		**1.8100e-003**	**1.8100e-003**		**1.8100e-003**	**1.8100e-003**	**0.0000**	**0.9828**	**0.9828**	**2.5900e-003**	**0.0000**	**1.0476**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0287					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.2148					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0471	4.6200e-003	0.5062	4.0000e-005		1.8100e-003	1.8100e-003		1.8100e-003	1.8100e-003	0.0000	0.9828	0.9828	2.5900e-003	0.0000	1.0476
Total	**0.2906**	**4.6200e-003**	**0.5062**	**4.0000e-005**		**1.8100e-003**	**1.8100e-003**		**1.8100e-003**	**1.8100e-003**	**0.0000**	**0.9828**	**0.9828**	**2.5900e-003**	**0.0000**	**1.0476**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Industrial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Industrial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type
Emergency Generator	1	0	30	1000	0.73	Diesel

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

10.1 Stationary Sources

Unmitigated/Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Equipment Type	tons/yr										MT/yr					
Emergency Generator - Diesel (750 - 9999 HP)	0.0246	0.1101	0.0628	1.2000e-004		3.6200e-003	3.6200e-003		3.6200e-003	3.6200e-003	0.0000	11.4239	11.4239	1.6000e-003	0.0000	11.4640
Total	**0.0246**	**0.1101**	**0.0628**	**1.2000e-004**		**3.6200e-003**	**3.6200e-003**		**3.6200e-003**	**3.6200e-003**	**0.0000**	**11.4239**	**11.4239**	**1.6000e-003**	**0.0000**	**11.4640**

11.0 Vegetation

APPENDIX C

BIOLOGICAL RESOURCES ASSESSMENT

BIOLOGICAL RESOURCES ASSESSMENT

CITY OF ST. HELENA

WWTRP PHASE I UPGRADES PROJECT

SEPTEMBER 2020

PREPARED FOR:

City of St. Helena
1572 Railroad Avenue
St. Helena, CA 94574

PREPARED BY:

Analytical Environmental Services
1801 7th Street, Suite 100
Sacramento, CA 95811
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TABLE OF CONTENTS

BIOLOGICAL RESOURCES ASSESSMENT
ST. HELENA WASTE WATER TREATMENT PLANT PROJECT

1.0 INTRODUCTION 1

2.0 PROJECT DESCRIPTION 1

2.1 Installation of Packaged MBR Treatment System 1
2.2 Construction of New Influent Lift Station 1
2.3 Treatment Pond Retrofit 6
2.4 Distribution Box Retrofit 6
2.5 Construction of Sludge Dewatering and Disposal System 6
2.6 Operation and Maintenance Activities 7

3.0 METHODOLOGY 7

4.0 ENVIRONMENTAL SETTING 7

4.1 Soil Types 7
4.2 Habitat Types 8
4.3 Special Status Species 10
4.4 Wildlife Movement 10
4.5 Critical Habitat 10
4.6 Invasive Species 10

5.0 RESULTS & RECOMMENDED MITIGATION 17

5.1 General Fish, Wildlife, and Vegetation Issues 17
5.2 Nesting Migratory Birds. 17
5.3 Special-Status Species 18
5.4 Invasive Species 19

6.0 CONCLUSION 19

7.0 REFERENCES 20

FIGURES

Figure 1 Regional Location 2
Figure 2 Site and Vicinity 3
Figure 3 Aerial Photograph 4
Figure 4 Site Plan 5
Figure 5 Habitat Types 9

TABLES

Table 1 Regionally-occurring Special-Status Species 11

ATTACHMENTS

Attachment 1 CNDDB, CNPS, and USFWS Database Queries
Attachment 2 NRCS Soils Report

1.0 INTRODUCTION

This Biological Resources Assessment (BRA) has been prepared for the St. Helena Wastewater Treatment and Reclamation Plant (WWTRP) Phase 1 Upgrade (Proposed Project) located in St Helena, CA on an approximate 124-acre property (Project Site). The Proposed Project consists of facility upgrades to the City's wastewater treatment plant to comply with the Cease and Desist Order (CDO) No. R2-2016-0004 from the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB) and the 2016 National Pollutant Discharge Elimination System (NPDES) Permit No. CA0038016 (Order No. R2-2016-0003; 2016 Permit). The Project Site is partially located within a regulatory floodway designated as Flood Zone AE, 0.2 percent Annual Chance Flood Zone X, and Flood Zone X (FEMA, 2020). The Napa River occurs to the east, and the Project Site is within the USGS 7.5-minute St. Helena and Rutherford quadrangles (**Figures 1, 2,** and **3**). On-site elevations range from 56 to 64 meters above mean sea level. The purpose of this assessment is to identify sensitive biological resources that could occur within the area of impact (Development Footprint) and be affected by the Proposed Project.

2.0 PROJECT DESCRIPTION

The Proposed Project involves improvements to the WWTRP. Major improvements include: 1) installation of a packaged Membrane Bioreactor (MBR) system; 2) construction of a new influent lift station; 3) treatment pond retrofit; 4) distribution box retrofit and coarse screening installation; and 5) the construction of a sludge dewatering and disposal system (**Figure 4**). These improvements are discussed further below. Overall, the Proposed Project would allow the WWTRP to comply with the CDO from the San Francisco Bay Regional Water Quality Control Board and the 2016 NPDES Permit.

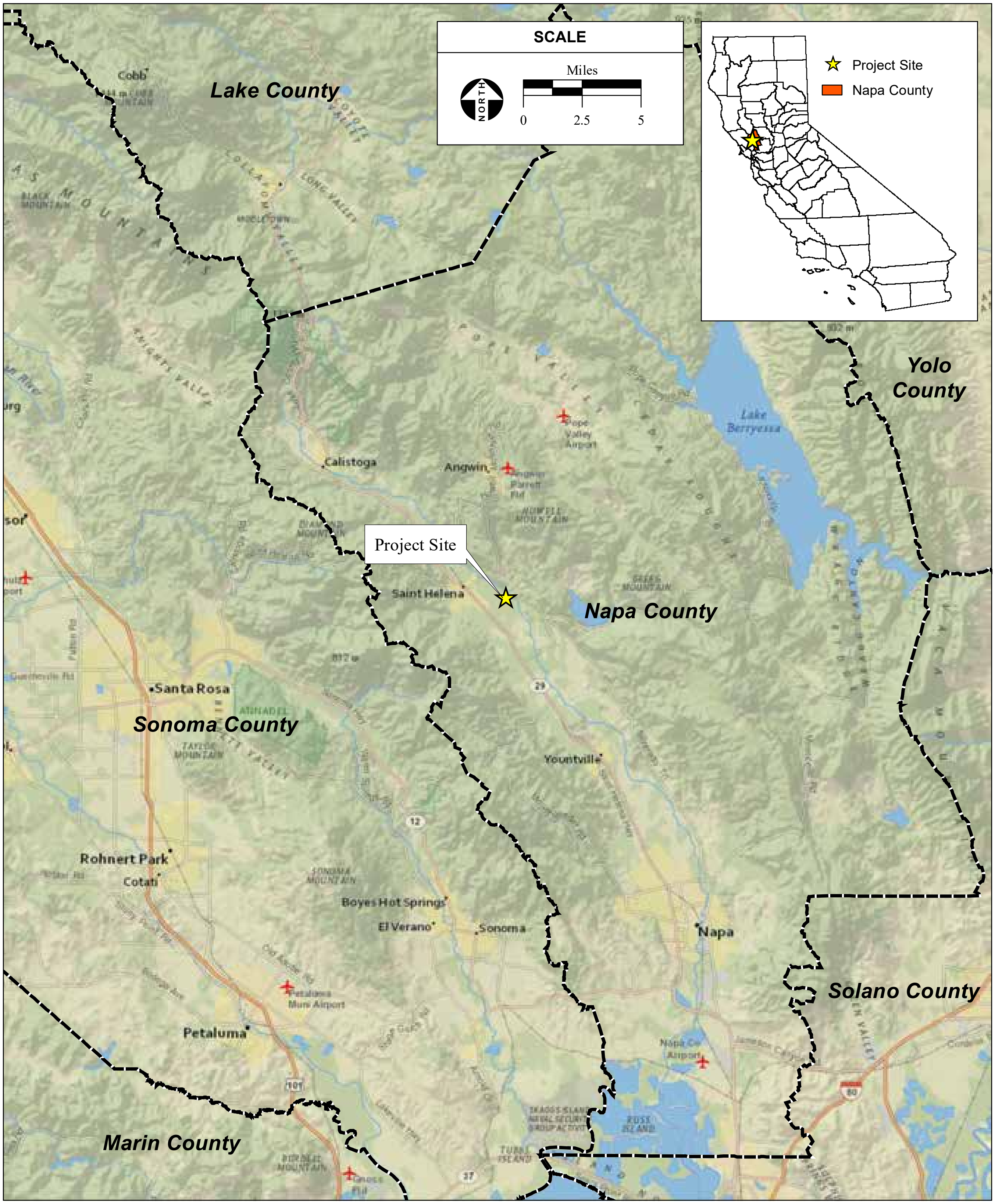
2.1 INSTALLATION OF A PACKAGED MBR TREATMENT SYSTEM

The proposed MBR system would provide primary, secondary, and tertiary treatment through a combination of anoxic and aerobic biological reactors and the use of submerged membranes. After wastewater is processed in the MBR, it would be distributed to an above ground 20,000-gallon effluent storage tank, and then disinfected through a closed-vessel UV disinfection system before being discharged. Tertiary treated effluent would be discharged to either the existing Napa River outfall in accordance with the 2016 Permit, or to the irrigation spray fields.

The current outfall location to the Napa River would not change in the Proposed Project. The MBR system is proposed to be installed in a graded area of the WWTRP that houses the existing chlorine storage and control buildings. The MBR system would primarily be located in above grade stainless steel structures constructed on a concrete slab and would be approximately 18-feet in height at the tallest point of the facility. The construction staging area for installation of the MBR treatment system and associated upgrades would be located on the laydown yard (**Figure 4**). The storage laydown yard is infrequently used and would not need to be relocated as part of the Proposed Project.

2.2 CONSTRUCTION OF A NEW INFLUENT LIFT STATION

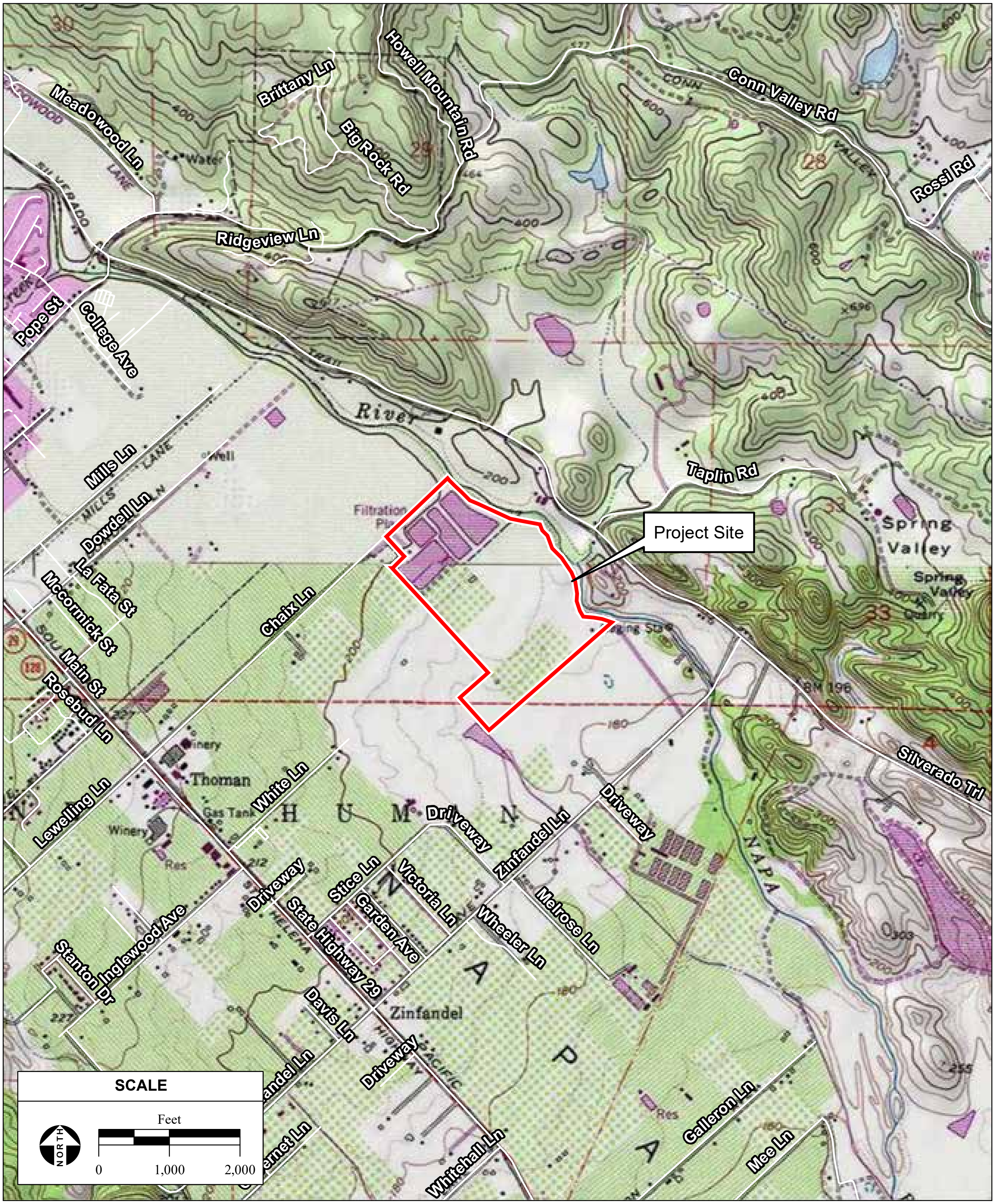
The existing WWTRP headworks facility and control building is a two-story structure that combines the influent headworks, primary influent pump station, office, operations building, electrical rooms, and laboratory facilities. As part of the Proposed Project, the WWTRP headworks facility would remain as constructed; however, a new influent lift station would be constructed. Existing Ponds 1A through 4 would be converted to influent equalization and emergency storage and the new Influent Lift Station would pump water out of these ponds, directly to the proposed MBR system. Proposed upgrades necessary for the construction of the new influent lift station include the following improvements:



SOURCE: NatGeo 2020; AES, 8/19/2020

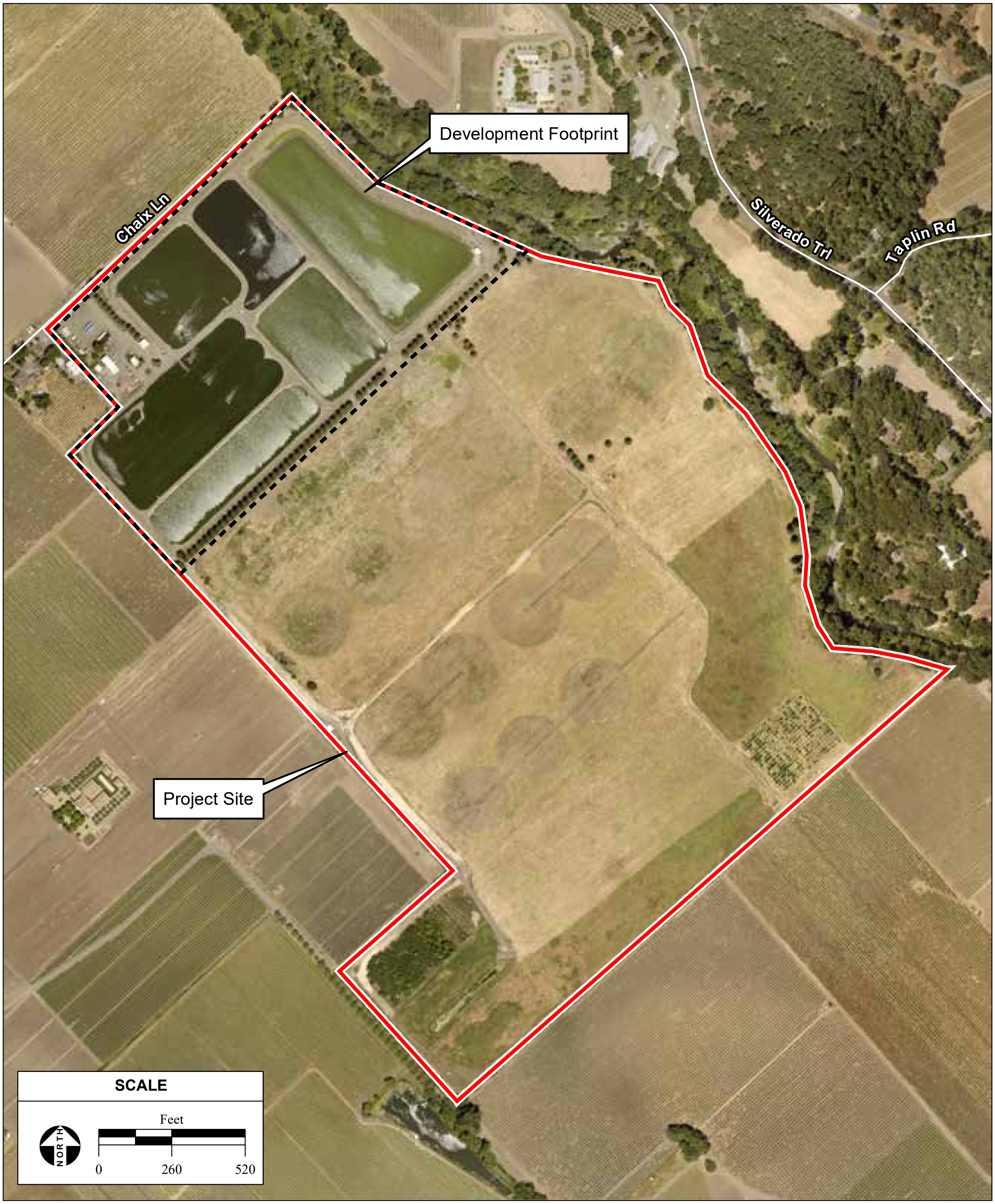
St. Helena WWTRP Phase I Upgrades Project BRA / 220522 ■

Figure 1
Regional Location



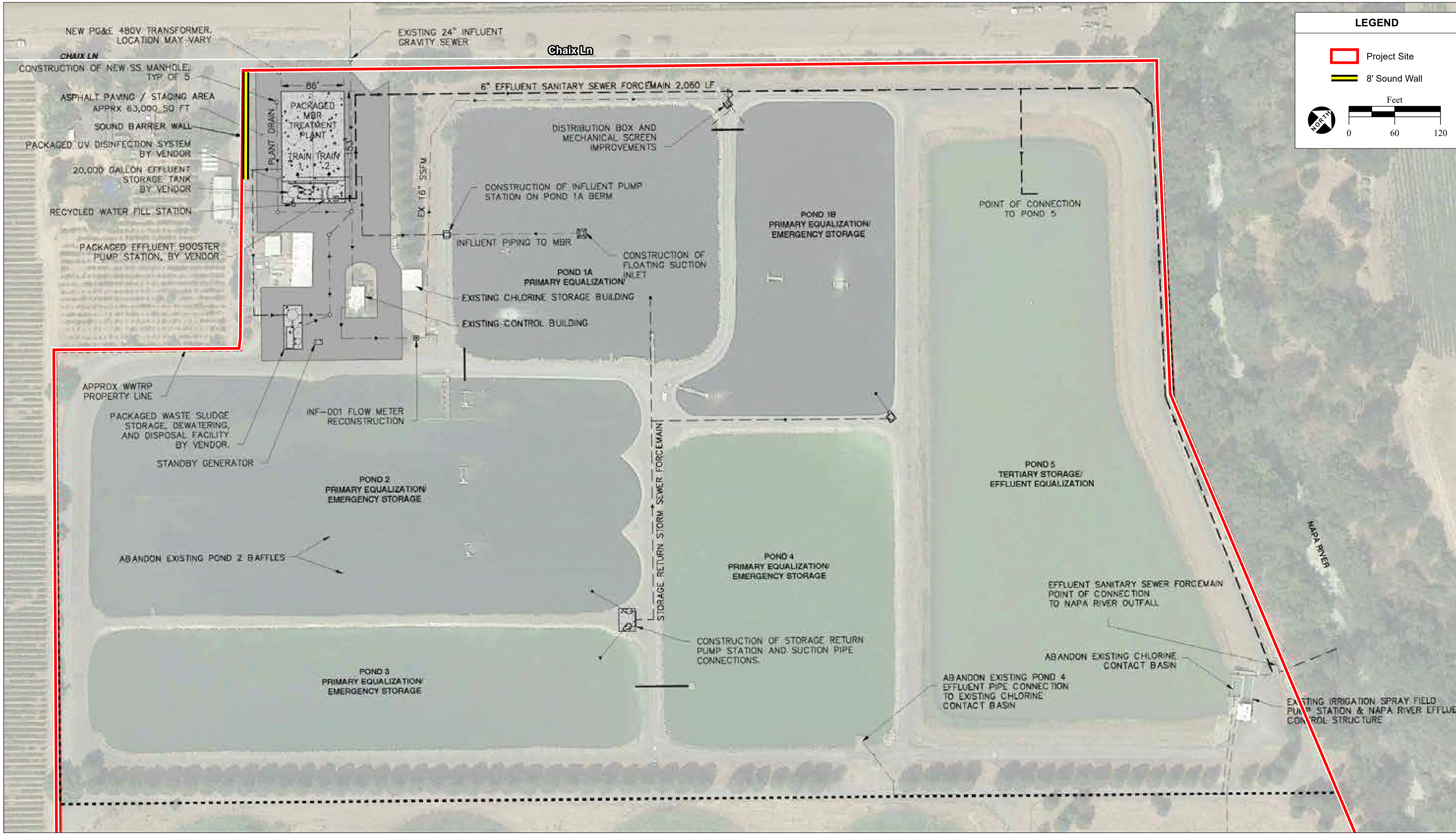
SOURCE: "St. Helena, CA" and "Rutherford, CA" USGS 7.5 MinuteTopographic Quadrangles, T4N, R4W, Unsectioned Area of Carne Humana, Mt. Diablo Baseline & Meridian; AES, 8/19/2020

Figure 2
Site and Vicinity



SOURCE: "Napa County aerial photograph, 6/19/; AES, 8/21/2020

Figure 3
Aerial Photograph



SOURCE: HydroScience Engineers, 10/2019; Napa County aerial photograph, 6/19; AES, 9/4/2020

Figure 4
Proposed WWTRP Facility Layout

- Construction of a slab on grade along the southwest dike of Pond 1A;
- Construction of a 1.5 million gallons per day influent horizontal self-priming centrifugal pump station pumping from the pond to the MBR system; and
- Construction of an adjustable suction pipeline along bottom of Pond 1A with floating suction intake mechanical assembly.

2.3 Treatment Pond Retrofit

Replacement of the pond treatment system with a MBR system would result in the removal of Ponds 2, 3, and 4 from the treatment process. These ponds would be repurposed for flow equalization and emergency storage. The existing ponds are hydraulically connected via overflow structures and open channel pipes and would be designed to overflow in series. The emergency storage ponds would be allowed to fill sequentially from Ponds 1A/1B to Pond 3 as primary influent flow exceeds the capacity of the Phase 1 WWTRP improvements. Pond 5, which is currently designated for effluent storage and disposal equalization, would continue to operate as storage for disposal to the spray fields. The existing pipe connection between Pond 4 and 5 will be abandoned and the existing chlorine contact basin will be demobilized. Proposed upgrades necessary for the treatment pond retrofit include:

- Construction of a pumping station to pump from Ponds 2, 3, and 4 to Pond 1A;
- Construction of concrete pads between Ponds 2 & 3; and
- Hydraulic isolation of Pond 5.

2.4 Distribution Box Retrofit and Coarse Screening Installation

The existing point of entry to the current pond system is from an above grade concrete structure that distributes primary influent flow between Ponds 1A and 1B. This box structure was constructed in 1993 and is located in the northern portions of Pond 1A and 1B (**Figure 4**). The existing structure will be reconfigured to accommodate a coarse screening system to remove large diameter solids from the primary waste stream. The coarse screening system will also include individual washer compactors and a rotary screw press conveyor to deliver screenings off the structure and into a dumpster for disposal.

Proposed upgrades to retrofit the existing distribution box and install the coarse screening system are expected to include:

- Installation of a temporary bypass pumping system;
- Cast-in-place concrete channel extensions;
- Installation of coarse screening equipment;
- Retrofit of existing hand railing and ladders;
- Installation of elastomeric polyurethane coating system to protect existing/new concrete;
- Cast-in-place concrete pad for dumpster; and
- Installation of protective bollards.

2.5 Construction of a Sludge Dewatering and Disposal System

A dewatering and solids handling process would be introduced to sufficiently dispose of waste sludge from the new MBR system. The volute sludge dewatering press would be located directly south of the existing shop (**Figure 4**). Phase I upgrades necessary for the construction of a sludge dewatering and disposal system include:

- Construction of a volute sludge dewatering packaged system;
- Construction of a polymer feed system and waste activated sludge (WAS) pumping system; and
- Construction of a WAS storage tank and pumping facility

2.6 Operation and Maintenance Activities

Periodic maintenance of the WWTRP components, storage tanks, pumps, and appurtenant structures would be required after the Proposed Project is operational. Pumps, piping, valves, and appurtenant structures would be checked and maintained regularly, and replaced as necessary. The membranes would need to be periodically backwashed with chemicals that require on-site storage and containment. City staff would inspect components of the Proposed Project regularly and replace equipment that reaches the end of its lifetime or fails during use.

3.0 METHODOLOGY

The following information was obtained and reviewed:

- Aerial photographs of the Project Site and surrounding area;
- U.S. Fish and Wildlife Service (USFWS) Information for Planning and Conservation (IPaC) list of species listed or proposed for listing under FESA that occur in the vicinity of the Project Site, updated July 10, 2020 (**Attachment A**);
- California Natural Diversity Database (CNDDB) list of species that have been observed in the vicinity of the Project Site, updated July 10, 2020 (**Attachment A**);
- California Native Plant Society (CNPS) list of plants that have been observed in the vicinity of the project site, updated July 10, 2020 (**Attachment A**);
- USFWS National Wetlands Inventory (NWI) map of wetland features, updated May 1, 2020 (USFWS, 2020); and
- Natural Resources Conservation Service (NRCS) custom soils report, updated July 10, 2020 (**Attachment B**).

A biological resources survey was conducted on the Project Site on July 21, 2020. Survey goals consisted of identifying habitat types, sensitive habitats, wetlands and waters of the U.S, and special status species. The survey was conducted by walking throughout the entirety of the Project Site. Binoculars were used to assist in survey efforts, such as identifying birds in flight. Additional focus was applied to the Development Footprint where work will commence, as well as sensitive habitat areas such as the riparian corridor. Sensitive habitats include those that are designated as sensitive by CDFW, considered by local experts to be communities of limited distribution, or likely to be waters of the U.S. or State by the appropriate regulatory agencies. Data was collected via a Trimble Geo XH hand-held GPS receiver. Habitat requirements of special status species were compared to habitats on the Project Site.

4.0 ENVIRONMENTAL SETTING

4.1 Soil Types

The Project Site is comprised of Pleasanton loam on 0 to 2 percent slopes and Yolo loam on 0 to 10 slopes. Pleasanton loam is well drained and does not experience flooding. Perkins loam is well drained and rarely experiences flooding. A custom soils report for the Project Site is included in **Attachment B**. The Project Site is considered Urban and Built-Up land by the California Department of Conservation (CDC, 2020). The spray fields to the south are listed as Prime Farmland (CDC, 2020).

4.2 HABITAT TYPES

Habitat types identified on the Project Site are shown in **Figure 5**. Riparian habitat occurs along the Napa River, which flows off-site of the Project Site adjacent to the northeastern boundary. The NWI classifies the Napa River as palustrine, forested, shrub-scrub, and seasonally flooded (USFWS, 2020).

The Project Site also occurs within a regulatory floodway, cited as floodzone AE as defined by the 100 year floodplain, and floodzone X, which is within the 0.2-percent-annual-chance flood X (FEMA, 2020). A "Regulatory Floodway" is defined by FEMA as the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height (FEMA, 2019). Communities must regulate development in these floodways to ensure that there are no increases in upstream flood elevations (FEMA, 2019). Habitat types on the Project Site are further discussed below.

Annual Grassland

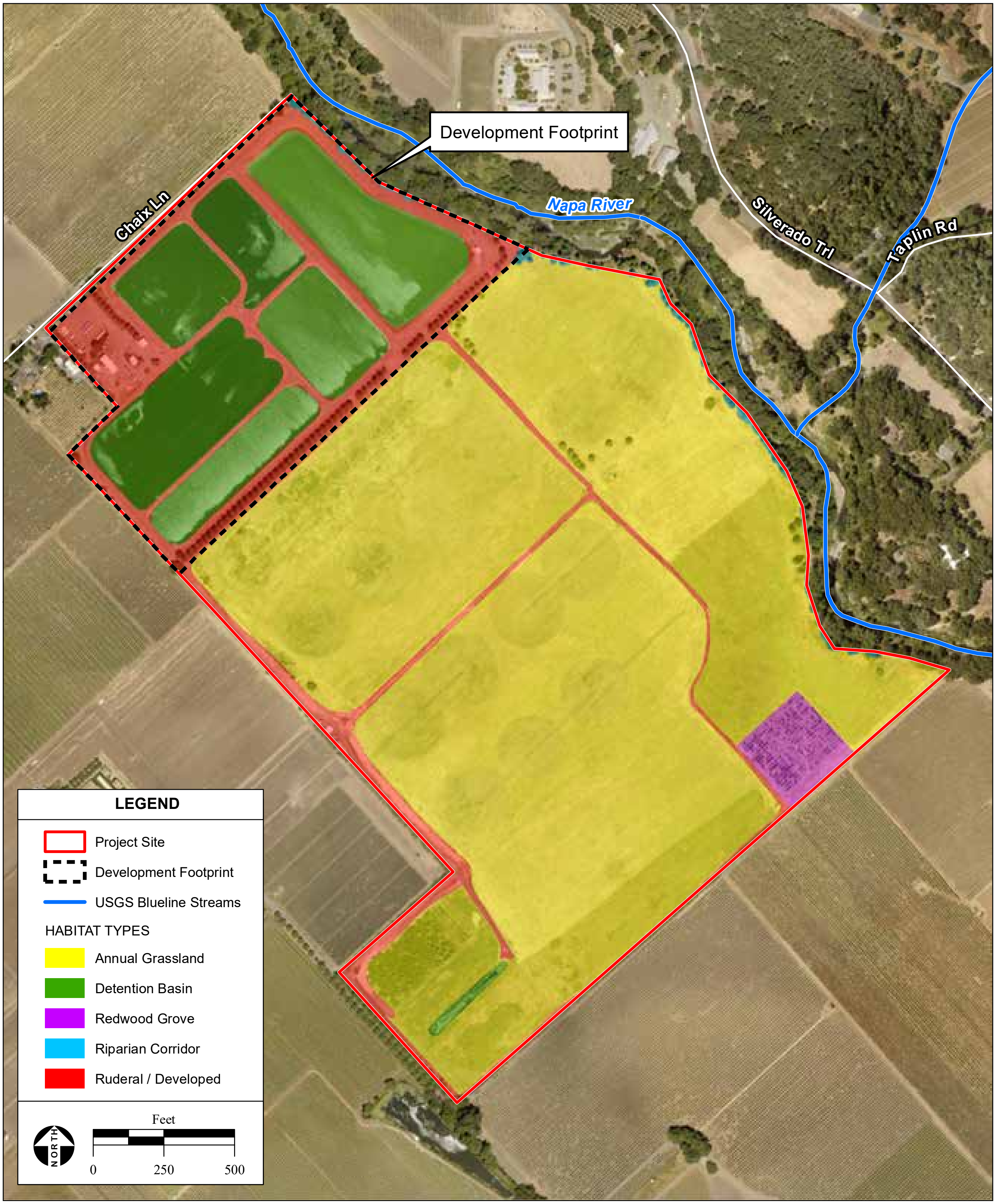
This habitat type occurs within the south and eastern portion of the Project Site and consists of the spray fields of the WWTRP. This area is regularly mowed and managed. Vegetation is relatively low growing and consists primarily of grass and forb species. Dominant plant species observed include bristly ox-tongue (*Helminthotheca echioides*), poison hemlock (*Conium maculatum*), fennel (*Foeniculum vulgare*), wild carrot (*Daucus carrota*), cheeseweed mallow (*Malva parviflora*), English plantain (*Plantago lanceolata*), wild radish (*Raphanus sativus*), Indian tobacco (*Nicotiana quadrivalvis*), field bindweed (*Convolvulus arvensis*), ripgut brome (*Bromus diandrus*), and moth mullein (*Verbascum blattaria*). Hydric vegetation including curly dock (*Rumex crispus*) and flat-top sedge (*Cyperus eragrostis*) were scattered throughout this habitat. A 0.31-mile row of coast redwoods (*Sequoia sempervirens*) separate the spray fields from the man-made detention basins used for the WWTRP.

Ruderal/Developed

This habitat type occurs throughout the Project Site and includes the WWTRP and service roadways. The overall nature of the Project Site is heavily disturbed with networks of service roads along detention basins and between facility buildings (**Figure 3**). Dominant vegetation within this habitat type consists of bristly oxtongue, prickly lettuce (*Lactuca serriola*), ripgut brome, wild carrot, bull thistle (*Cirsium vulgare*), redstem storks-bill (*erodium cicutarium*), wall barley (*Hordeum mirinum*), and bindweed. Domesticated olive trees (*Olea europa*) line the entrance to the facility and coast redwoods separate the parking area of the WWTRP from the detention basin to the northeast.

Riparian

The Napa River runs adjacent to the northeastern boundary of the Project Site. Portions of the river bank have been eroded from flood events within the past three years. Riparian vegetation occurs along the bank of the Napa River. The riparian habitat on the Project Site contains willow (*Salix* sp.), blue oak (*Quercus douglasii*), black oak (*Quercus kelloggii*), coast live oak (*Quercus agrifolia*), redwood, fennel, lotus (*Acmispon sp.*), flat top sedge, short-pod mustard (*Hirschfeldia incana*), chicory (*Cichorium intybus*), annual beard grass (*Polypogon monspeliensis*), wild oats (*Avena fatua*), white sweetclover (*Melilotus albus*), and California grape (*Vitis californica*).



SOURCE: "Napa County aerial photograph, 6/19/; AES, 8/21/2020

St. Helena WWTRP Phase I Upgrades Project BRA / 220522

Figure 5
Habitat Types

Man-made basin

Six man-made basins occur within the northwestern portion of the Project Site. These basins total approximately 22.3 acres. The basins are impounded by a system of levees and are used for the operation of the WWTRP. The margins of the basins were dominated by smartweed (*Persecaria spp*.), duckweed (*Lemna spp*.), and pennyroyal (*Mentha pulegium*). An additional pond is located on the southeast boundary of the Project Site and is used for mosquito fish rearing and vector control.

Redwood stand

A redwood stand is present in a southeast portion of the Project Site. This stand is approximately 1.7 acres. These trees were planted as part of a separate mitigation effort coordinated with the City.

4.3 Special status Species

Data review and special status species searches list 20 special status plant species and 17 special status wildlife species with the potential to occur in the region of the Project Site (**Attachment A**). The name, regulatory status, distribution, habitat requirements, period of identification, and potential to occur on the Project Site for each species are listed in **Table 1**.

As shown in **Table 1**, the Project Site contains suitable habitat to potentially support two special status plant species (Napa bluecurls and Baker's navarretia) and foraging and nesting habitat for two special status animal species (purple martin and Swainson's hawk). Species with no potential to occur were ruled out based on lack of suitable habitat, soils, elevation, necessary substrate, and negative results during the survey if it coincided with the identifiable bloom period for plant species. Special status species were not observed during the survey.

4.4 Wildlife Movement

Wildlife movement is not directly restricted through the Project Site. The Project Site occurs along the Napa River, which may foster wildlife movement along the riparian fringes of the river. The Napa River abuts the Project Site to the east. Expansive agricultural land occurs to the north, south, and west of the Project Site and may also allow for wildlife movement.

4.5 Critical Habitat

No designated Critical Habitat occurs on the Project Site (**Attachment A**). However, the adjacent Napa River is designated Critical Habitat for a distinct population segment (DPS) for the Central California Coast (CCC) steelhead (NOAA, 2016). It is also essential fish habitat for coho and Chinook salmon (NOAA, 2016).

4.6 Invasive Species

The California Invasive Plant Council (Cal-IPC) is an organization that lists known invasive plants throughout California and designates each species with a invasiveness rating of "high", "moderate", or "limited" (Cal-IPC 2017). No invasive species have been discovered on the Project Site that have been rated has "high" for their invasive quality. Five "moderate" species were identified on the Project Site and include; wild oats, ripgut brome, poison hemlock, fennel, and short-pod mustard. Six "limited" species were identified on the Project Site and include; redstem storks-bill, bristly ox-tongue, English plantain, annual beardgrass, wild radish, and curly dock.

TABLE 1 - REGIONALLY OCCURRING SPECIAL STATUS SPECIES

SCIENTIFIC NAME COMMON NAME	FEDERAL/ STATE/CNPS STATUS	DISTRIBUTION	HABITAT REQUIREMENTS	IDENTIFICATION PERIOD	POTENTIAL TO OCCUR ON PROJECT SITE
Plants					
Eryngium jepsonii Jepson's coyote-thistle	--/--/1B.2	Known to occur in Alameda, Contra Costa, Napa, San Mateo, Solano, and Yolo counties.	A perennial herb found in clay vernal pools, and valley and foothill grasslands. Elevation range 3-300 m.	April-August	**No.** Suitable habitat does not occur on the Project Site.
Erigeron Greenei Greene's narrow-leaved daisy	--/--/1B.2	Known to occur in Colusa, Lake, Napa, and Sonoma counties.	Found in chaparral, woodland, or conifer forest habitats on serpentine, volcanic soils, sometimes rocky alluvium. Elevations range from 80-1600 m.	May-September	**No.** The Project Site is outside the elevation range for the species.
Layia septentrionalis Colusa layia	--/--/1B.2	Known to occur in Butte, Colusa, Glenn, Lake, Mendocino, Napa, Sonoma, Sutter, Tehama, and Yolo counties.	Annual herb found in chaparral, cismontane woodland, valley and foothill grassland habitats. Occurs on serpentine or sandy soils. Elevations range from 100-1095 m.	April-June	**No.** The Project Site is outside the elevation range for the species.
Amsinckia lunaris Bent-flowered fiddleneck	--/--/1B.2	Known to occur in Alameda, Contra Costa, Colusa, Lake, Marin, Napa, San Benito, Santa Clara, Santa Cruz, San Mateo, Sonoma, Sutter and Yolo counties	Annual herb that grows on gravelly slopes or serpentine. Found in coastal bluff scrub, openings in cismontane woodland, valley and foothill grassland. Elevations range from 3-800 m.	March-June	**No.** Suitable habitat does not occur on the Project Site.
Streptanthus hesperidis green jewel-flower	--/--/1B.2	Known from Glenn, Lake, Napa, and Sonoma counties.	Occurs on serpentine, rocky substrates. Found in chaparral (openings), cypress woodland, and cismontane woodland habitats. Elevations range from 130 to 760 m.	May-July	**No.** The Project Site is outside the elevation range for the species.
Arctostaphylos stanfordiana ssp. decumbens Rincon Ridge manzanita	--/--/1B.1	Know to occur in Napa and Sonoma counties.	A perennial evergreen shrub found in chaparral (rhyolitic) and cismontane woodland. Elevations; 75-370 m.	February-April (May)	**No.** The Project Site is outside the elevation range for the species.
Amorpha californica car. Napensis Napa false indigo	--/--/1B.2	Know to occur in Lake, Monterey, Marin, Napa, and Sonoma counties.	Found in broad-leafed upland forest (openings), chaparral, and cismontane woodland habitats. Elevations range from 0-2000 m.	April-July	**No.** Suitable habitat does not occur on the Project Site.
Astragulus claranus Clara Hunt's milk-vetch	FE/CT/1B.1	Known to occur in Napa and Sonoma counties.	Annual herb found in chaparral (openings), cismontane woodland, and valley and foothill grassland habitats. Found in serpentine or volcanic, rocky, and clay soils. Elevations range from 75-275 m.	March-May	**No.** The Project Site is outside the elevation range for the species.

SCIENTIFIC NAME COMMON NAME	FEDERAL/ STATE/CNPS STATUS	DISTRIBUTION	HABITAT REQUIREMENTS	IDENTIFICATION PERIOD	POTENTIAL TO OCCUR ON PROJECT SITE
Lupinus sericatus Cobb Mountain lupine	--/--/1B.2	Known to occur in Colusa, Lake, Napa, and Sonoma counties.	Perennial herb found on slopes with open broad-leafed upland forest, chaparral, cismontane woodland, and lower montane coniferous forest. Elevations range from 275-1,525 m.	March-June	**No.** The Project Site is outside the elevation range for the species.
Trichostema ruygtii Napa bluecurls	--/--/1B.2	Known to occur in Lake, Napa, and Solano counties.	Found in chaparral, cismontane woodland, lower montane coniferous forest, valley and foothill grassland. Often in seasonally saturated vernal pools with thin clay soils. Elevations range from 30-680 m.	June-October	**Yes.** Suitable habitat occurs on the Project Site. This species was not observed during the site visit.
Hesperolinon bicarpetellatum two-carpellate western flax	--/--/1B.2	Known to occur in Lake, Napa, and Sonoma counties.	Annual herb found in chaparral habitats and serpentine soils. Elevations range from 60-1005 m.	May-July	**No.** The Project Site lacks serpentine soils.
Hesperolinon sharmithiae Sharsmith's western flax	--/--/1B.2	Known to occur in Lake and Napa counties.	Annual herb found in chaparral habitats on serpentine substrate. Elevations range from 270-300 m.	May-July	**No.** The Project Site is outside the elevation range for the species.
Sidalcea oregana ssp. hydrophila marsh cherckerbloom	--/--/1B.2	Known to occur in Colusa, Glenn, Lake, Mendocino, and Napa counties.	A perennial herb found in mesic habitats, wet soil of streambanks, meadows, seeps and riparian forest. Elevations range from 440-2300 m.	(June)July-September	**No.** The Project Site is outside the elevation range for the species.
Leptosiphon jepsonii Jepson's leptosiphon	--/--/1B.2	Known to occur in Lake, Napa, and Sonoma counties.	Found in chaparral and cismontane woodland (usually volcanic), and open or partially shaded grassy slopes. Elevations range from 100-500 m.	March-May	**No.** The Project Site is outside the elevation range for the species.
Navarretia leucocephala ssp. bakeri Baker's navarretia	--/--/1B.1	Known to occur in Colusa, Glenn, Lake, Lassen, Mendocino, Marin, Napa, Solano, Sonoma, Sutter, Tehama, and Yolo counties.	Annual herb found in mesic conditions within cismontane woodland, lower montane coniferous forest, meadows and seeps, valley and foothill grassland, and vernal pools habitats. Elevations range from 5-1740 m.	April-July	**Yes.** Suitable habitat occurs on the Project Site. This species was not observed during the site visit.
Ceanothus confuses Rincon Ridge ceanothus	--/--/1B.1	Known to occur in Lake, Mendocino, Napa, and Sonoma counties.	Found in closed-cone coniferous forest, chaparral, and cismontane woodland habitats. Found in volcanic or serpentine soils. Elevations range from 75-1065 m.	February-June	**No.** The Project Site is outside the elevation range for the species.
Ceanothus divergens Calistoga ceanothus	--/--/1B.2	Known to occur in Lake, Napa, and Sonoma Counties.	Found in chaparral and serpentine or volcanic rocky soils. Elevations range from 150-950 m.	February-April	**No.** The Project Site is outside the elevation range for the species.

SCIENTIFIC NAME COMMON NAME	FEDERAL/ STATE/CNPS STATUS	DISTRIBUTION	HABITAT REQUIREMENTS	IDENTIFICATION PERIOD	POTENTIAL TO OCCUR ON PROJECT SITE
Ceanothus sonomensis Sonoma ceanothus	--/--/1B.2	Known to occur in Napa and Sonoma counties.	Chaparral (sandy, serpentine, or volcanic soils). Elevations from 215-800 m.	February-April	**No.** The Project Site is outside the elevation range for the species.
Penstemon newberryi var. sonomensis Sonoma beardtongue	--/--/1B.3	Known to occur in Lake, Napa, and Sonoma counties.	A perennial herb found on outcrops, talus, or rocky substrates within chaparral habitat. Elevations; 500-2400 m.	April-August	**No.** The Project Site is outside the elevation range for the species.
Brodiaea leptandra narrow-anthered brodiaea	--/--/1B.2	Known to occur in Lake, Napa and Sonoma counties.	A perennial bulbiferous herb found in mixed-evergreen forest, broad-leafed upland forest, chaparral, cismontane woodland, lower montane coniferous forest, and valley and foothill grassland habitats. Usually on gravelly soils. Elevations range from 110-915 m.	May-July	**No.** The Project Site is outside the elevation range for the species.
Animals					
Fish					
Oncorhynchus mykiss irideus pop. 8 [Steelhead-Central California coast DPS]	FT/--/--	Spawn in the Sacramento and San Joaquin rivers and tributaries before migrating to the Delta and Bay Area.	Found in cool, clear, fast-flowing permanent streams and rivers with riffles and ample cover from riparian vegetation or overhanging banks. Spawning: streams with pool and riffle complexes. For successful breeding, require cold water and gravelly streambed.	Consult Agency	**No.** The Project Site does not contain suitable habitat. However the Napa River is adjacent to the Project Site and is designated as Critical Habitat for the species.
Hypomesus transpacificus Delta smelt	FT/CE/--	Occurs almost exclusively in the Sacramento-San Joaquin estuary, from the Suisun Bay upstream through the Delta in Contra Costa, Sacramento, San Joaquin, Solano, and Yolo counties. May also occur in the San Francisco Bay.	Estuarine waters. Majority of life span is spent within the freshwater outskirts of the mixing zone (saltwater-freshwater interface) within the Delta.	Consult Agency	**No.** The Project Site and adjacent Napa River do not contain suitable habitat for the species.
Amphibians					
Taricha rivularis Red-bellied newt	--/CSC/--	Known to occur in the Coast Range from Mendocino County to San Diego County. Also known in the Peninsular Ranges, south of Boulder Creek, and in the southern Sierra Nevada foothills.	Occurs primarily in valley-foothill hardwood, hardwood-conifer, coastal scrub, and mixed chaparral but may occur in annual grassland and mixed conifer forests. Elevation ranges from sea level to 1,830 m.	Fall-Late Spring	**No.** The Project Site is outside the known range for this species.

SCIENTIFIC NAME COMMON NAME	FEDERAL/ STATE/CNPS STATUS	DISTRIBUTION	HABITAT REQUIREMENTS	IDENTIFICATION PERIOD	POTENTIAL TO OCCUR ON PROJECT SITE
Rana draytonii California red-legged frog	FT/CSC/--	Known to occur along the coast from Mendocino County to Baja and inland through the northern Sacramento Valley to the Sierra Nevada foothills, south to eastern Tulare County, and possibly eastern Kern County. Excludes the Central Valley.	Occurs in permanent and temporary pools of streams, marshes, and ponds with dense grassy and/or shrubby vegetation. Elevations range from 0-1160 m.	November – March (breeding) June - August (non-breeding)	**No.** The Project Site does not contain suitable habitat. However the Napa River is adjacent to the Project Site and contains suitable habitat for the species.
Rana boylii Foothill yellow-legged frog	--/CCT, CSC/--	Known from California and Oregon.	Require shallow, flowing water in moderate sized streams with some cobble substrate.	November- March (breeding) June-August (non-breeding)	**No.** The Project Site does not contain suitable habitat. However the Napa River is adjacent to the Project Site and contains suitable habitat for the species.
Dicamptodon ensatus California giant salamander	--/CSC/--	Known to occur in Mendocino, Lake, Glenn, Sonoma, Marin, San Mateo, Santa Cruz and historically Monterey counties.	Occurs in wet coastal forests near streams and seepages.	N/A	**No.** The Project Site does not contain suitable habitat.
Birds					
Haliaeetus leucocephalus Bald eagle	FD/CE, FP/--	The State's breeding territories are in northern California, but eagles also nest in scattered locations in the central and southern Sierra Nevada mountains and foothills, in several locations from the central coast range to inland southern California, and on several California islands. Winters throughout most of California.	Found in mountain and foothill forests and woodlands near ocean shorelines, lakes, reservoirs, river systems, and coastal wetlands. Usually less than 2 km to water. Suitable foraging habitat consists of large bodies of water or rivers with abundant fish and adjacent perching sites such as snags or large trees.	Year-round	**No.** The Project Site is outside of known nesting territory for the species.
Buteo swainsoni Swainson's hawk	--/CT/--	In California, breeds in the Central Valley, Klamath Basin, Northeastern Plateau, Lassen County, and Mojave Desert. Limited breeding reported from Lanfair Valley, Owens Valley, Fish Lake Valley, Antelope Valley, and in eastern San Luis Obispo County.	Breeds in stands with few trees in juniper-sage flats, riparian areas, and in oak savannah. Requires adjacent suitable foraging areas such as grasslands, alfalfa, or grain fields supporting rodent populations.	March – October	**Yes.** Suitable breeding habitat occurs along the riparian corridor. Suitable foraging habitat occurs within the annual grassland.

SCIENTIFIC NAME **COMMON NAME**	**FEDERAL/ STATE/CNPS STATUS**	**DISTRIBUTION**	**HABITAT REQUIREMENTS**	**IDENTIFICATION PERIOD**	**POTENTIAL TO OCCUR ON PROJECT SITE**
Cypseloides niger Black swift	--/CSC/--	Breeds in the central and southern Sierra, the coastal cliffs and mountains of San Mateo, Santa Cruz, and Monterey counties, San Gabriel, San Bernardino, and San Jacinto mountains of southern California, and within a small region of the Cascade Range.	Steep cliffs or ocean bluffs with ledges, cavities or cracks for nesting along ocean shore, inland deep canyons and often behind waterfalls. Forages in a wide variety of habitats including forests, canyons, valleys, and plains. Breeding elevations range from 0-2285 m.	May-July	**No.** The Project Site does not contain suitable habitat.
Progne subis purple martin	--/CSC/--	Local summer resident in wooded low-elevation habitats throughout California; rare migrant in spring and fall, absent in winter. In the south, now only a rare and local breeder on the coast and in interior mountain ranges.	Inhabits open forests, woodlands, and riparian areas in breeding season. Found in a variety of open habitats during migration, including grassland, wet meadows, and fresh emergent wetland, usually near water. Nests in conifer stands often in woodpecker holes. Uses valley foothill and montane hardwood, conifer and riparian habitats.	March-August	**Yes.** Suitable habitat occurs along the riparian corridor and annual grassland.
Strix occidentalis caurina northern spotted owl	FT/CT; CSC/--	Geographic range extends from British Colombia to northwestern California south to San Francisco. The breeding range includes the Cascade Range, North Coast Ranges, and the Sierra Nevada. Some breeding populations also occur in the Transverse Ranges and Peninsular Ranges.	Resides in mixed conifer, redwood, and Douglas-fir habitat from sea level to approximately 2,300m. Prefer old-growth forests, but use of managed (previously logged) land is not uncommon. Do not use logged habitat until approximately 60 years after logging unless large trees or snags remain. Nesting habitat is a tree, snag, or broken top of a large tree. Foraging habitat consists of forests with sufficient prey. Needs nearby permanent water.	Year-round	**No.** The Project Site does not contain suitable habitat.
Reptiles					
Emys marmorata western pond turtle	--/CSC/--	Distribution ranges from Washington to northern Baja California.	Inhabit rivers, streams, lakes, ponds, reservoirs, stock ponds, and permanent wetland habitats with basking sites.	Year-round	**No.** The Project Site does not contain suitable habitat. However the adjacent Napa River contains suitable habitat for the species.
Chelonia mydas green sea turtle	FT/--/--	Globally distributed in tropical/subtropical waters along continental coasts and islands between 30° North and 30° South. In the eastern North Pacific, occurs from Baja California to southern Alaska.	Nests on oceanic beaches, feeds in benthic grounds in coastal areas, and frequents convergence zones in the open ocean.	Consult Agency	**No.** The Project Site does not contain suitable habitat for the species.

SCIENTIFIC NAME COMMON NAME	FEDERAL/ STATE/CNPS STATUS	DISTRIBUTION	HABITAT REQUIREMENTS	IDENTIFICATION PERIOD	POTENTIAL TO OCCUR ON PROJECT SITE
Invertebrates					
Bombus caliginosus obscure bumble bee	--/CSC/--	Known to occur in Mediterranean California, parts of the Central Valley, and the Pacific Coast from southern California to southern British Columbia. Rare in San Francisco but relatively stable on San Bruno Mountain.	Open grassy coastal prairies and Coast Range meadows. Nesting occurs underground or in abandoned bird nests. Food plants are *Ceanothus, Cirsium, Clarkia, Keckiella, Lathyrus, Lotus, Lupinus, Rhododendron, Rubus, Trifolium,* and *Vaccinium*.	Unknown	**No.** The Project Site does not contain suitable habitat for the species.
Syncaris pacifica California freshwater shrimp	FE/CE/--	Known only throughout Marin, Napa, and Sonoma counties.	Small, low-gradient, perennial coastal streams. Prefers shallow streams with depths of 12-36 inches, exposed live roots of trees such as alder and willow, undercut banks greater than 6 inches, overhanging woody debris or stream vegetation and vines. Elevations range from 0-116 m.	Consult Agency	**No.** The Project Site does not contain suitable habitat. However the adjacent Napa River contains suitable habitat for the species.
Mammals					
Corynorhinus townsendii Townsend's big-eared bat	--/CSC/--	Known to occur throughout California, excluding subalpine and alpine habitats. Its range extends through Mexico to British Columbia and the Rocky Mountain states. Also occurs in several regions of the central Appalachians.	Requires caves, mines, tunnels, buildings, or other cave analog structures such as hallowed out redwoods for roosting. Hibernation sites must be cold, but above freezing.	Year-round	**No.** The Project Site does not contain suitable habitat for the species.
Antrozous pallidus Pallid bat	--/CSC/--	Occurs throughout California except for the high Sierra Nevada from Shasta to Kern counties, and the northwestern corner of the state from Del Norte and western Siskiyou counties to northern Mendocino county.	The species is most common in open, dry habitats with rocky areas for roosting. Roosts also include cliffs, abandoned buildings, bird boxes, under exfoliating bark, and under bridges.	Year-round	**No.** The Project Site does not contain suitable habitat for the species.

SOURCE: **Attachment A**

STATUS CODES

Federal: U.S. Fish and Wildlife Service
FE Federally Endangered
FT Federally Threatened
FC Candidate for Federal Listing

State: California Department of Fish and Game
CE California Listed Endangered
CT California Listed Threatened
CSC California Species of Special Concern

CNPS: California Native Plant Society
1A Plants Presumed Extinct in California
1B Plants Rare, Threatened, or Endangered in California and Elsewhere
2B Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere

CNPS Threat Ranks:
0.1 – Seriously Threatened in California
0.2 – Fairly Threatened in California

5.0 RESULTS AND RECOMENDATIONS

5.1 GENERAL FISH, WILDLIFE, AND VEGETATION ISSUES

Habitat types within the Project Site include annual grassland, ruderal/developed, riparian corridor, man-made basins used in the treatment facility, a man-made pond, and a redwood stand. The Project Site is considered Urban and Built-Up land by the California Department of Conservation (CDC 2020).

The Development Footprint consists of ruderal/developed habitat and the man-made basins. Habitats within the Development Footprint are not considered sensitive and provide low quality habitat to wildlife due to disturbance and development. Minimal vegetation clearing of ruderal species, if any, would occur during construction.

Riparian habitat occurs adjacent to the Development Footprint along the edge of the Napa River. The Napa River flows adjacent to the Project Site and supports fish species and is designated as Critical Habitat for steelhead and Essential Fish Habitat for coho and Chinook salmon (NOAA 2016). Implementation of **Mitigation Measure 1** would protect the adjacent riparian corridor and Napa River from potential indirect impacts (spills, etc.) associated with construction of the Proposed Project. With implementation of **Mitigation Measure 1** during construction, the Proposed Project would not adversely affect general fish, wildlife, or vegetation.

Measure 1

- A hazardous materials containment and spill response plan shall be employed by the construction contractor to prevent the accidental release of fuel, oil, lubricant, or other hazardous materials associated with construction activities into the Napa River. The plan shall include the appropriate steps to take in the event of an accidental spill.
- Construction equipment shall not be staged within 100 feet of the Napa River.
- A Stormwater Pollution Prevention Plan (SWPPP), as required by the NPDES permit for the Proposed Project, shall be implemented prior to ground disturbance. The SWPPP shall contain best management practices and perimeter control methods such that water runoff from the Project Site does not exceed water quality thresholds.

5.2 NESTING MIGRATORY BIRDS

Migratory birds and their nests are protected from "take" by the Migratory Bird Treaty Act (16 U.SC. 703-711), which makes it unlawful to "…pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess or any part, nest, or egg of any such bird…" (50 CFR 10). Nesting birds could be affected if vegetation removal or loud noise-producing activities associated with construction commence during the general nesting season (February 15 through September 15). Suitable habitat for bald and golden eagles does not occur on or within 500 feet of the Development Footprint. While suitable nesting habitat generally does not occur within the Development Footprint, Suitable habitat for nesting migratory birds and raptors, including Swainson's hawk and purple martin, occur within the riparian habitat less than 500 feet from the Development Footprint. **Mitigation Measure 2** is recommended to reduce potential impacts to nesting migratory birds and raptors.

Additionally, the Audubon Society has designated 145 sites as "Important Bird Areas" within California to protect biologically diverse areas that support sensitive bird populations, and the Western Shorebird Reserve Network (WSHRN) has mapped critical habitats for preserving the ecological integrity of shorebirds throughout the country. The Development Footprint is outside the Audubon Society's designated Important Bird Areas and WSHRN designated Critical Habitats (Audubon Society, 2020; WSHRN, 2020).

With implementation of **Mitigation Measure 2,** the Proposed Project would not adversely affect nesting migratory birds or raptors.

Measure 2

- If construction activities (e.g., building, grading, ground disturbance, removal of vegetation) are scheduled to occur during the general nesting season (February 15 - September 15), a preconstruction nesting bird survey shall be conducted by a qualified biologist throughout accessible areas of suitable habitat within 500 feet of proposed construction activity. The survey shall occur no more than 7 days prior to the scheduled onset of construction. If construction is delayed or halted for more than 7 days, another preconstruction survey for nesting bird species shall be conducted. If no nesting birds are detected during the preconstruction survey, no additional surveys or mitigation measures are required.
- If nesting bird species are observed within 500 feet of construction areas during the survey, appropriate "no construction" buffers shall be established. The size and scale of nesting bird buffers shall be determined by a qualified biologist and shall be dependent upon the species observed and the location of the nest. Buffers shall be established around active nest locations. The nesting bird buffers shall be completely avoided during construction activities. The buffers may be removed when the qualified wildlife biologist confirms that the nest(s) is/are no longer occupied and all birds have fledged.

5.3 SPECIAL STATUS SPECIES

The Project Site contains suitable habitat to potentially support two special status plant species (Napa bluecurls and Baker's navarretia) and foraging habitat to potentially support two special status animal species (purple martin and Swainson's hawk)(**Table 1**). However, the Development Footprint does not contain suitable habitat to support special status species. Therefore, the Proposed Project would not impact special-status plants or special-status bird foraging habitat.

Additionally, the adjacent off-site Napa River is designated Critical Habitat for steelhead (NOAA, 2016) and is Essential Fish Habitat for coho and Chinook salmon (NOAA, 2016), and provides suitable habitat for California red-legged frog and foothill yellow-legged frog. Riparian habitat adjacent to the Development Footprint also provides suitable habitat for the special status Swainson's hawk and purple martin. No direct impacts to the riparian habitat or the Napa River would occur as a result of the Proposed Project. No earthmoving activities would occur within these areas, and the use of the existing Napa River outfall would not change. The Proposed Project would additionally be subject to a Stormwater Pollution Prevention Plan throughout construction to ensure that ground disturbance would not result in impaired runoff entering the Napa River. Implementation of the Proposed Project is designed to improve the quality of water compared to the current discharge into the Napa River.

Implementation of **Mitigation Measures 1** and **2** during construction would reduce potential indirect impacts to special-status species resulting from degradation of the Napa River and sensory disturbance to nesting birds. With implementation of **Mitigation Measures 1** and **2,** the Proposed Project would not adversely affect special status species.

5.4 INVASIVE SPECIES

Invasive plant species in the ruderal/developed and riparian habitat within the Development Footprint have been naturalized in the wild. Four “moderate” species were identified on the Development Footprint and include; wild oats, ripgut brome, fennel, and short-pod mustard. Two “limited” species were identified on the Development Footprint: redstem storks-bill and bristly ox-tongue. The Proposed Project would not introduce or spread invasive species. The Proposed Project would not result in adverse effects associated with invasive species.

6.0 CONCLUSION

The Development Footprint consists of ruderal/developed habitat, and does not contain suitable habitat to support special status species. The adjacent riparian habitat and off-site Napa River provides suitable habitat for special status fish and wildlife species, but would not be adversely impacted by the Proposed Project. Protected migratory birds and raptors have the potential to nest within 500 feet of the Development Footprint, but would be protected via the appropriate nest buffer. With implementation of **Mitigation Measures 1** and **2,** the Proposed Project would not adversely affect biological resources.

7.0 REFERENCES

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ATTACHMENT A

SPECIAL-STATUS SPECIES SEARCHES

Selected Elements by Element Code

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (Rutherford (3812244) OR St. Helena (3812254))

Element Code	Species	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
AAAAF02020	***Taricha rivularis*** red-bellied newt	None	None	G4	S2	SSC
AAAAH01020	***Dicamptodon ensatus*** California giant salamander	None	None	G3	S2S3	SSC
AAABH01022	***Rana draytonii*** California red-legged frog	Threatened	None	G2G3	S2S3	SSC
AAABH01050	***Rana boylii*** foothill yellow-legged frog	None	Endangered	G3	S3	SSC
ABNKC10010	***Haliaeetus leucocephalus*** bald eagle	Delisted	Endangered	G5	S3	FP
ABNKC19070	***Buteo swainsoni*** Swainson's hawk	None	Threatened	G5	S3	
ABNUA01010	***Cypseloides niger*** black swift	None	None	G4	S2	SSC
ABPAU01010	***Progne subis*** purple martin	None	None	G5	S3	SSC
AFCHA0209G	***Oncorhynchus mykiss irideus pop. 8*** steelhead - central California coast DPS	Threatened	None	G5T2T3Q	S2S3	
AMACC08010	***Corynorhinus townsendii*** Townsend's big-eared bat	None	None	G3G4	S2	SSC
AMACC10010	***Antrozous pallidus*** pallid bat	None	None	G5	S3	SSC
AMAFJ01010	***Erethizon dorsatum*** North American porcupine	None	None	G5	S3	
ARAAD02030	***Emys marmorata*** western pond turtle	None	None	G3G4	S3	SSC
CTT44100CA	***Northern Vernal Pool*** Northern Vernal Pool	None	None	G2	S2.1	
IIHYM24380	***Bombus caliginosus*** obscure bumble bee	None	None	G4?	S1S2	
PDAPI0Z130	***Eryngium jepsonii*** Jepson's coyote-thistle	None	None	G2	S2	1B.2
PDAST3M5G0	***Erigeron greenei*** Greene's narrow-leaved daisy	None	None	G3	S3	1B.2
PDAST5N0F0	***Layia septentrionalis*** Colusa layia	None	None	G2	S2	1B.2
PDBOR01070	***Amsinckia lunaris*** bent-flowered fiddleneck	None	None	G3	S3	1B.2
PDBRA2G510	***Streptanthus hesperidis*** green jewelflower	None	None	G2	S2	1B.2

Element Code	Species	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
PDERI041G4	***Arctostaphylos stanfordiana ssp. decumbens*** Rincon Ridge manzanita	None	None	G3T1	S1	1B.1
PDFAB08012	***Amorpha californica var. napensis*** Napa false indigo	None	None	G4T2	S2	1B.2
PDFAB0F240	***Astragalus claranus*** Clara Hunt's milk-vetch	Endangered	Threatened	G1	S1	1B.1
PDFAB2B3J0	***Lupinus sericatus*** Cobb Mountain lupine	None	None	G2?	S2?	1B.2
PDLAM220H0	***Trichostema ruygtii*** Napa bluecurls	None	None	G1G2	S1S2	1B.2
PDLIN010E0	***Hesperolinon sharsmithiae*** Sharsmith's western flax	None	None	G2Q	S2	1B.2
PDMAL110K2	***Sidalcea oregana ssp. hydrophila*** marsh checkerbloom	None	None	G5T2	S2	1B.2
PDPLM09140	***Leptosiphon jepsonii*** Jepson's leptosiphon	None	None	G2G3	S2S3	1B.2
PDPLM0C0E1	***Navarretia leucocephala ssp. bakeri*** Baker's navarretia	None	None	G4T2	S2	1B.1
PDRHA04160	***Ceanothus purpureus*** holly-leaved ceanothus	None	None	G2	S2	1B.2
PDRHA04220	***Ceanothus confusus*** Rincon Ridge ceanothus	None	None	G1	S1	1B.1
PDRHA04240	***Ceanothus divergens*** Calistoga ceanothus	None	None	G2	S2	1B.2
PDRHA04420	***Ceanothus sonomensis*** Sonoma ceanothus	None	None	G2	S2	1B.2
PDSCR1L483	***Penstemon newberryi var. sonomensis*** Sonoma beardtongue	None	None	G4T3	S3	1B.3
PMLIL0C022	***Brodiaea leptandra*** narrow-anthered brodiaea	None	None	G3?	S3?	1B.2

Record Count: 35

CNPS California Native Plant Society

Inventory of Rare and Endangered Plants

*The database used to provide updates to the Online Inventory is under construction. View updates and changes made since May 2019 here.

Plant List

37 matches found. *Click on scientific name for details*

Search Criteria

Found in Quads 3812244 and 3812254;

Modify Search Criteria Export to Excel Modify Columns Modify Sort Display Photos

Scientific Name	Common Name	Family	Lifeform	Blooming Period	CA Rare Plant Rank	State Rank	Global Rank
Amorpha californica var. napensis	Napa false indigo	Fabaceae	perennial deciduous shrub	Apr-Jul	1B.2	S2	G4T2
Amsinckia lunaris	bent-flowered fiddleneck	Boraginaceae	annual herb	Mar-Jun	1B.2	S3	G3
Arctostaphylos stanfordiana ssp. decumbens	Rincon Ridge manzanita	Ericaceae	perennial evergreen shrub	Feb-Apr(May)	1B.1	S1	G3T1
Astragalus breweri	Brewer's milk-vetch	Fabaceae	annual herb	Apr-Jun	4.2	S3	G3
Astragalus claranus	Clara Hunt's milk-vetch	Fabaceae	annual herb	Mar-May	1B.1	S1	G1
Astragalus clevelandii	Cleveland's milk-vetch	Fabaceae	perennial herb	Jun-Sep	4.3	S4	G4
Brodiaea leptandra	narrow-anthered brodiaea	Themidaceae	perennial bulbiferous herb	May-Jul	1B.2	S3?	G3?
Calamagrostis ophitidis	serpentine reed grass	Poaceae	perennial herb	Apr-Jul	4.3	S3	G3
Castilleja ambigua var. ambigua	johnny-nip	Orobanchaceae	annual herb (hemiparasitic)	Mar-Aug	4.2	S3S4	G4T4
Ceanothus confusus	Rincon Ridge ceanothus	Rhamnaceae	perennial evergreen shrub	Feb-Jun	1B.1	S1	G1
Ceanothus divergens	Calistoga ceanothus	Rhamnaceae	perennial evergreen shrub	Feb-Apr	1B.2	S2	G2
Ceanothus purpureus	holly-leaved ceanothus	Rhamnaceae	perennial evergreen shrub	Feb-Jun	1B.2	S2	G2
Ceanothus sonomensis	Sonoma ceanothus	Rhamnaceae	perennial evergreen shrub	Feb-Apr	1B.2	S2	G2
Clarkia breweri	Brewer's clarkia	Onagraceae	annual herb	Apr-Jun	4.2	S4	G4
Clarkia gracilis ssp. tracyi	Tracy's clarkia	Onagraceae	annual herb	Apr-Jul	4.2	S3	G5T3
Collomia diversifolia	serpentine collomia	Polemoniaceae	annual herb	May-Jun	4.3	S4	G4
Cordylanthus tenuis ssp. brunneus	serpentine bird's-beak	Orobanchaceae	annual herb (hemiparasitic)	Jul-Aug	4.3	S3	G4G5T3

Delphinium uliginosum	swamp larkspur	Ranunculaceae	perennial herb	May-Jun	4.2	S3	G3
Erigeron biolettii	streamside daisy	Asteraceae	perennial herb	Jun-Oct	3	S3?	G3?
Erigeron greenei	Greene's narrow-leaved daisy	Asteraceae	perennial herb	May-Sep	1B.2	S3	G3
Harmonia nutans	nodding harmonia	Asteraceae	annual herb	Mar-May	4.3	S3	G3
Hesperolinon bicarpellatum	two-carpellate western flax	Linaceae	annual herb	May-Jul	1B.2	S2	G2
Hesperolinon sharsmithiae	Sharsmith's western flax	Linaceae	annual herb	May-Jul	1B.2	S2	G2Q
Layia septentrionalis	Colusa layia	Asteraceae	annual herb	Apr-May	1B.2	S2	G2
Leptosiphon jepsonii	Jepson's leptosiphon	Polemoniaceae	annual herb	Mar-May	1B.2	S2S3	G2G3
Lomatium repostum	Napa lomatium	Apiaceae	perennial herb	Mar-Jun	4.3	S3	G3
Lupinus sericatus	Cobb Mountain lupine	Fabaceae	perennial herb	Mar-Jun	1B.2	S2?	G2?
Micropus amphibolus	Mt. Diablo cottonweed	Asteraceae	annual herb	Mar-May	3.2	S3S4	G3G4
Navarretia cotulifolia	cotula navarretia	Polemoniaceae	annual herb	May-Jun	4.2	S4	G4
Navarretia leucocephala ssp. bakeri	Baker's navarretia	Polemoniaceae	annual herb	Apr-Jul	1B.1	S2	G4T2
Penstemon newberryi var. sonomensis	Sonoma beardtongue	Plantaginaceae	perennial herb	Apr-Aug	1B.3	S2	G4T2
Ranunculus lobbii	Lobb's aquatic buttercup	Ranunculaceae	annual herb (aquatic)	Feb-May	4.2	S3	G4
Senecio clevelandii var. clevelandii	Cleveland's ragwort	Asteraceae	perennial herb	Jun-Jul	4.3	S3	G4?T3Q
Sidalcea oregana ssp. hydrophila	marsh checkerbloom	Malvaceae	perennial herb	(Jun)Jul-Aug	1B.2	S2	G5T2
Streptanthus hesperidis	green jewelflower	Brassicaceae	annual herb	May-Jul	1B.2	S2	G2
Toxicoscordion fontanum	marsh zigadenus	Melanthiaceae	perennial bulbiferous herb	Apr-Jul	4.2	S3	G3
Trichostema ruygtii	Napa bluecurls	Lamiaceae	annual herb	Jun-Oct	1B.2	S1S2	G1G2

Suggested Citation

California Native Plant Society, Rare Plant Program. 2020. Inventory of Rare and Endangered Plants of California (online edition, v8-03 0.39). Website http://www.rareplants.cnps.org [accessed 10 July 2020].

Search the Inventory

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Glossary

Information

About the Inventory
About the Rare Plant Program
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Contributors

The Calflora Database
The California Lichen Society
California Natural Diversity Database
The Jepson Flora Project
The Consortium of California Herbaria
CalPhotos

Questions and Comments

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
Phone: (916) 414-6600 Fax: (916) 414-6713

In Reply Refer To: July 10, 2020
Consultation Code: 08ESMF00-2020-SLI-2343
Event Code: 08ESMF00-2020-E-07237
Project Name: St Helena WWTP

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, under the jurisdiction of the U.S. Fish and Wildlife Service (Service) that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the Service under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

Please follow the link below to see if your proposed project has the potential to affect other species or their habitats under the jurisdiction of the National Marine Fisheries Service:

http://www.nwr.noaa.gov/protected_species/species_list/species_lists.html

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
(916) 414-6600

Project Summary

Consultation Code: 08ESMF00-2020-SLI-2343

Event Code: 08ESMF00-2020-E-07237

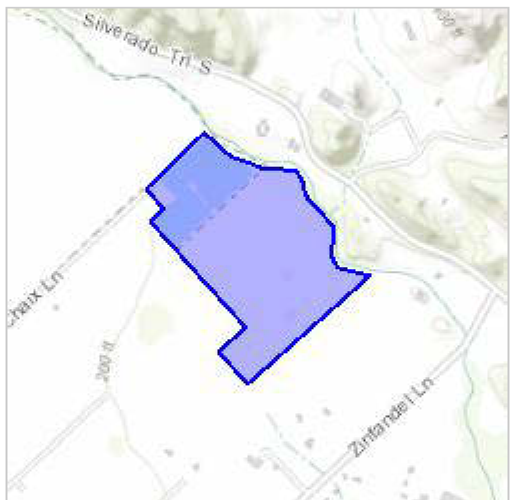
Project Name: St Helena WWTP

Project Type: Guidance

Project Description: St Helena, California

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/38.49828110405272N122.43625812648342W



Counties: Napa, CA

Endangered Species Act Species

There is a total of 6 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Birds

NAME	STATUS
Northern Spotted Owl *Strix occidentalis caurina* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/1123	Threatened

Reptiles

NAME	STATUS
Green Sea Turtle *Chelonia mydas* Population: East Pacific DPS No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6199	Threatened

Amphibians

NAME	STATUS
California Red-legged Frog *Rana draytonii* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2891 Species survey guidelines: https://ecos.fws.gov/ipac/guideline/survey/population/205/office/11420.pdf	Threatened

Fishes

NAME	STATUS
Delta Smelt *Hypomesus transpacificus* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/321	Threatened

Crustaceans

NAME	STATUS
California Freshwater Shrimp *Syncaris pacifica* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7903	Endangered

Flowering Plants

NAME	STATUS
Clara Hunt's Milk-vetch *Astragalus clarianus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/3300	Endangered

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

ATTACHMENT B

NRCS SOIL REPORT

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

Napa County, California

August 6, 2020

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Preface.......... 2
How Soil Surveys Are Made.......... 5
Soil Map.......... 8
Soil Map.......... 9
Legend.......... 10
Map Unit Legend.......... 11
Map Unit Descriptions.......... 11
Napa County, California.......... 13
170—Pleasanton loam, 0 to 2 percent slopes, MLRA 14.......... 13
181—Yolo loam, 0 to 10 percent slopes, moist, MLRA 14.......... 14
References.......... 16

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

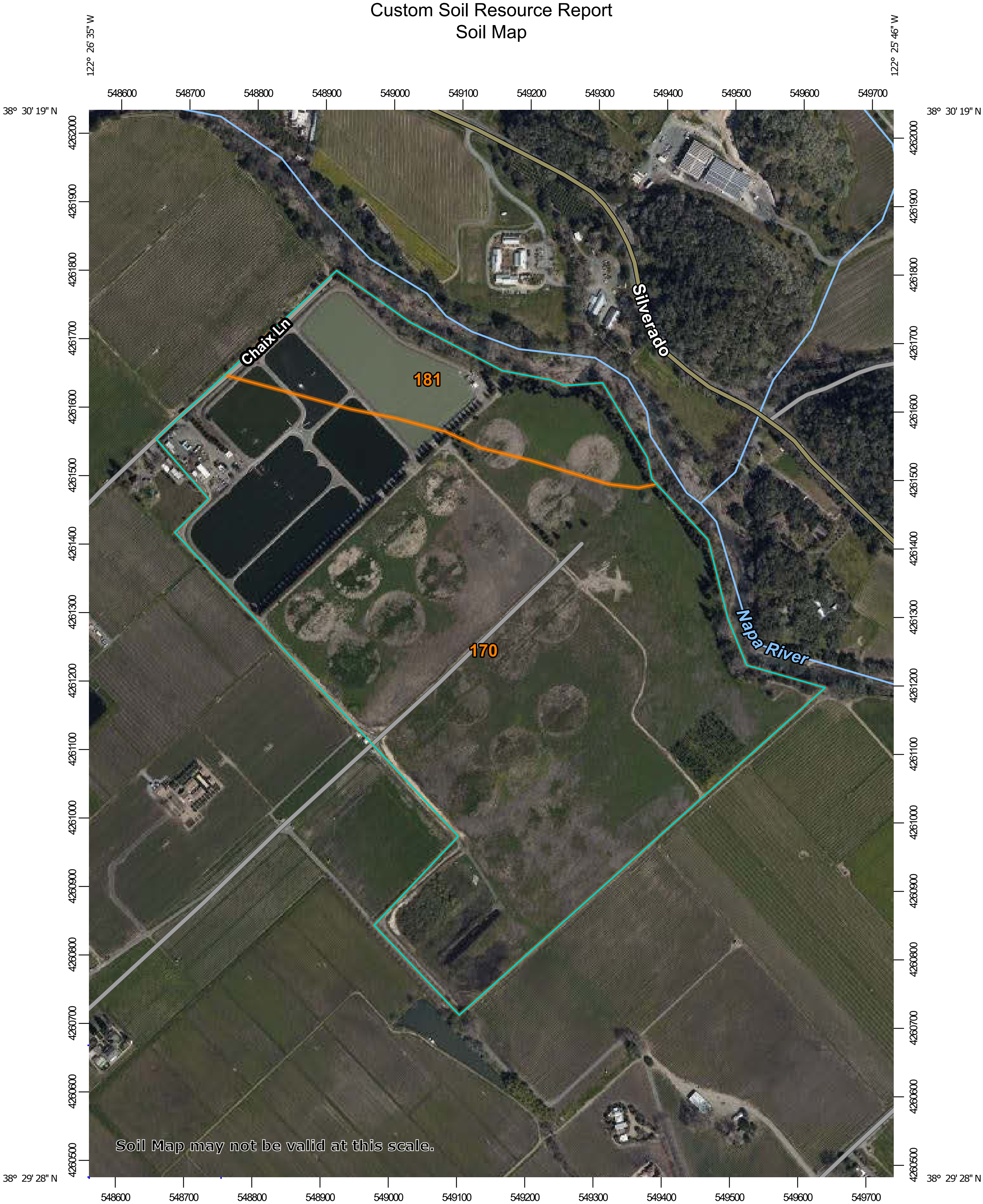
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

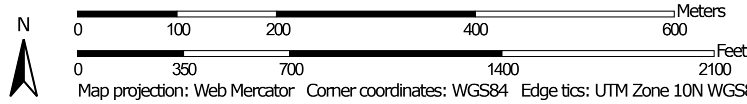
Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map



Map Scale: 1:7,600 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Napa County, California
Survey Area Data: Version 13, May 29, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 15, 2019—Apr 10, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
170	Pleasanton loam, 0 to 2 percent slopes, MLRA 14	107.7	84.8%
181	Yolo loam, 0 to 10 percent slopes, moist, MLRA 14	19.3	15.2%
Totals for Area of Interest		**127.0**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Napa County, California

170—Pleasanton loam, 0 to 2 percent slopes, MLRA 14

Map Unit Setting

National map unit symbol: 2x52s
Elevation: 60 to 2,070 feet
Mean annual precipitation: 19 to 44 inches
Mean annual air temperature: 58 to 60 degrees F
Frost-free period: 240 to 320 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Pleasanton and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pleasanton

Setting

Landform: Alluvial fans
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from sedimentary rock

Typical profile

Ap - 0 to 5 inches: loam
A - 5 to 18 inches: loam
Bt1 - 18 to 23 inches: clay loam
Bt2 - 23 to 44 inches: fine gravelly clay loam
Bt3 - 44 to 66 inches: fine gravelly sandy clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water capacity: High (about 9.1 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Yolo

Percent of map unit: 3 percent

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Hillgate
Percent of map unit: 3 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Cortina
Percent of map unit: 3 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

San ysidro
Percent of map unit: 3 percent
Landform: Terraces, alluvial fans, valley floors
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Arbuckle
Percent of map unit: 3 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

181—Yolo loam, 0 to 10 percent slopes, moist, MLRA 14

Map Unit Setting
National map unit symbol: 2w89n
Elevation: 10 to 850 feet
Mean annual precipitation: 25 to 57 inches
Mean annual air temperature: 57 to 63 degrees F
Frost-free period: 220 to 260 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition
Yolo, moist, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Yolo, Moist

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous, metamorphic and sedimentary rock

Typical profile

Ap - 0 to 6 inches: loam
A - 6 to 24 inches: silt loam
C1 - 24 to 45 inches: silt loam
C2 - 45 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 10 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Maximum salinity: Nonsaline (0.3 to 0.5 mmhos/cm)
Available water capacity: Very high (about 12.4 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Bale

Percent of map unit: 5 percent

Cortina

Percent of map unit: 5 percent

Cole

Percent of map unit: 5 percent

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APPENDIX D

HISTORICAL RESOURCES SURVEY REPORT

Confidential Appendix

APPENDIX E

ENVIRONMENTAL NOISE ASSESSMENT

Environmental Noise Assessment

St. Helena Wastewater Treatment Plant

City of St. Helena, California

September 3, 2020

Project #200707

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Table of Contents

INTRODUCTION 3
ENVIRONMENTAL SETTING 3
Background Information on Noise 3
EXISTING AND FUTURE NOISE AND VIBRATION ENVIRONMENTS 8
Existing Noise Receptors 8
Existing General Ambient Noise Levels 8
EXISTING WASTEWATER TREATMENT PLANT OPERATIONAL NOISE 9
EVALUATION OF FUTURE OPERATIONAL NOISE AT RESIDENTIAL RECEPTORS 11
CONSTRUCTION NOISE ENVIRONMENT 13
CONSTRUCTION VIBRATION ENVIRONMENT 14
REGULATORY CONTEXT 15
Federal 15
State 15
Local 15
IMPACTS AND MITIGATION MEASURES 17
Thresholds of Significance 18
Project-Specific Impacts and Mitigation Measures 19
REFERENCES 23

Appendices

Appendix A: Acoustical Terminology
Appendix B: Field Noise Measurement Data

List of Figures

Figure 1: Site Plan.. 4
Figure 2: Noise Measurement Sites and Receptor Locations 5
Figure 3: Existing Operational Noise Contours 10
Figure 4: Operational Noise Contours 12
Figure 5: Sound Wall Location 21

List of Tables

Table 1: Typical Noise Levels... 6
Table 2: Summary of Existing Background Noise Measurement Data 9
Table 3: Construction Equipment Noise 13
Table 4: Vibration Levels for Various Construction Equipment.. 14
Table 5: Napa County Exterior Noise Standards... 16
Table 6: Napa County Noise Limits for Construction Activities 17

INTRODUCTION

The St. Helena Wastewater Treatment Plant (WWTP) is located along Chaix Lane in the City of St. Helena, California. The existing wastewater treatment process will be replaced by the construction of a new wastewater treatment system in order to comply with more stringent effluent regulations. The preferred WWTP upgrade alternative is a packaged Membrane Bioreactor (MBR) treatment system. Alternative treatment systems include conventional MBR and Sequencing Batch Reactor (SBR) systems. This analysis assumes the project will include a packaged MBR treatment system. The packaged MBR unit will be located on the northwest corner of the project site. The existing ponds used for current wastewater treatment processes will be converted to storage ponds for the new MBR processing plant.

Figure 1 shows the location of the proposed packaged MBR treatment system. **Figure 2** shows an aerial photo of the project site and noise measurement locations.

ENVIRONMENTAL SETTING

BACKGROUND INFORMATION ON NOISE

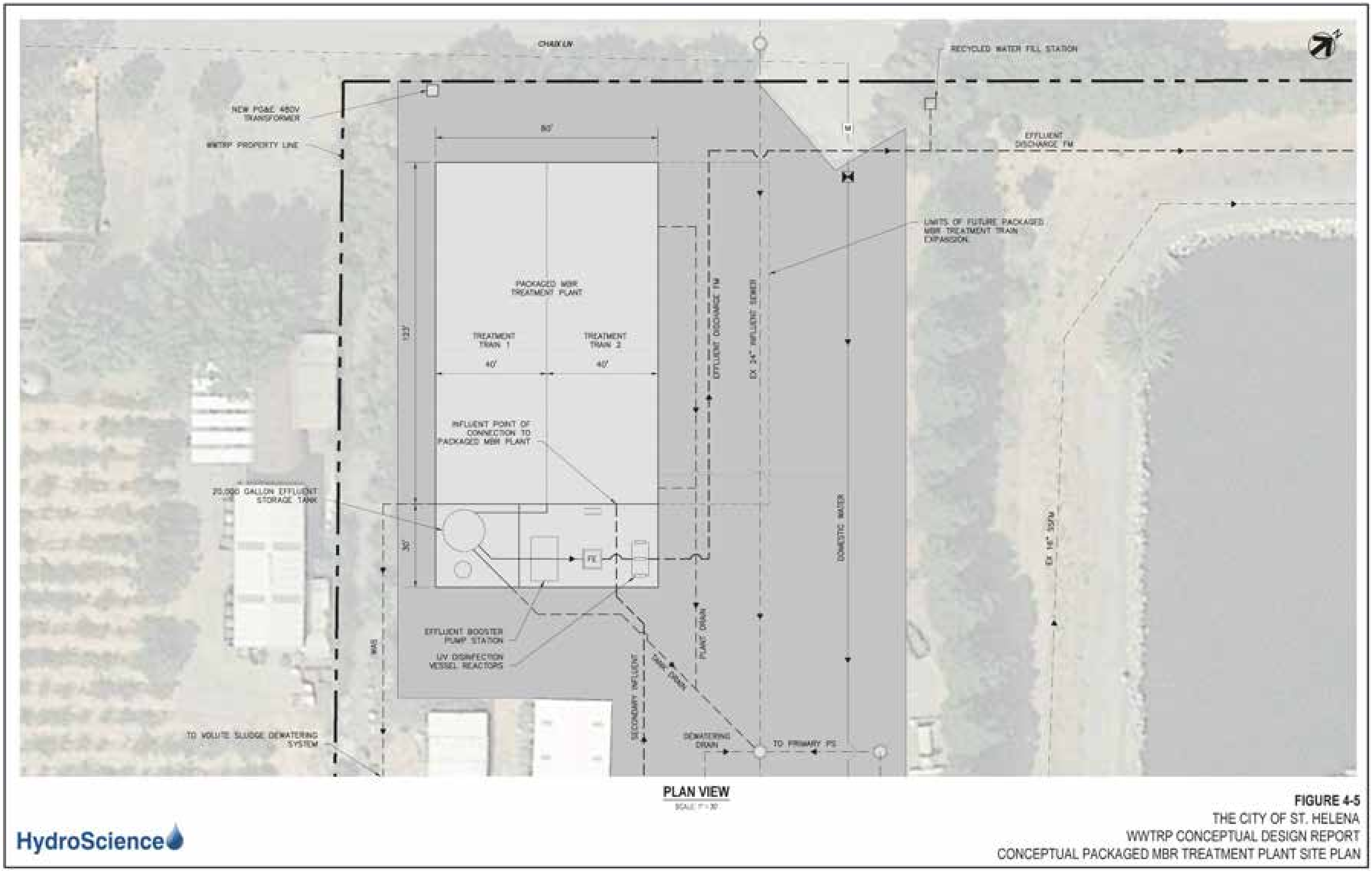
Fundamentals of Acoustics

Acoustics is the science of sound. Sound may be thought of as mechanical energy of a vibrating object transmitted by pressure waves through a medium to human (or animal) ears. If the pressure variations occur frequently enough (at least 20 times per second), then they can be heard and are called sound. The number of pressure variations per second is called the frequency of sound and is expressed as cycles per second or Hertz (Hz).

Noise is a subjective reaction to different types of sounds. Noise is typically defined as (airborne) sound that is loud, unpleasant, unexpected or undesired, and may therefore be classified as a more specific group of sounds. Perceptions of sound and noise are highly subjective from person to person.

Measuring sound directly in terms of pressure would require a very large and awkward range of numbers. To avoid this, the decibel scale was devised. The decibel scale uses the hearing threshold (20 micropascals), as a point of reference, defined as 0 dB. Other sound pressures are then compared to this reference pressure, and the logarithm is taken to keep the numbers in a practical range. The decibel scale allows a million-fold increase in pressure to be expressed as 120 dB, and changes in levels (dB) correspond closely to human perception of relative loudness.

The perceived loudness of sounds is dependent upon many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable, and can be approximated by A-weighted sound levels. There is a strong correlation between A-weighted sound levels (expressed as dBA) and the way the human ear perceives sound. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment.

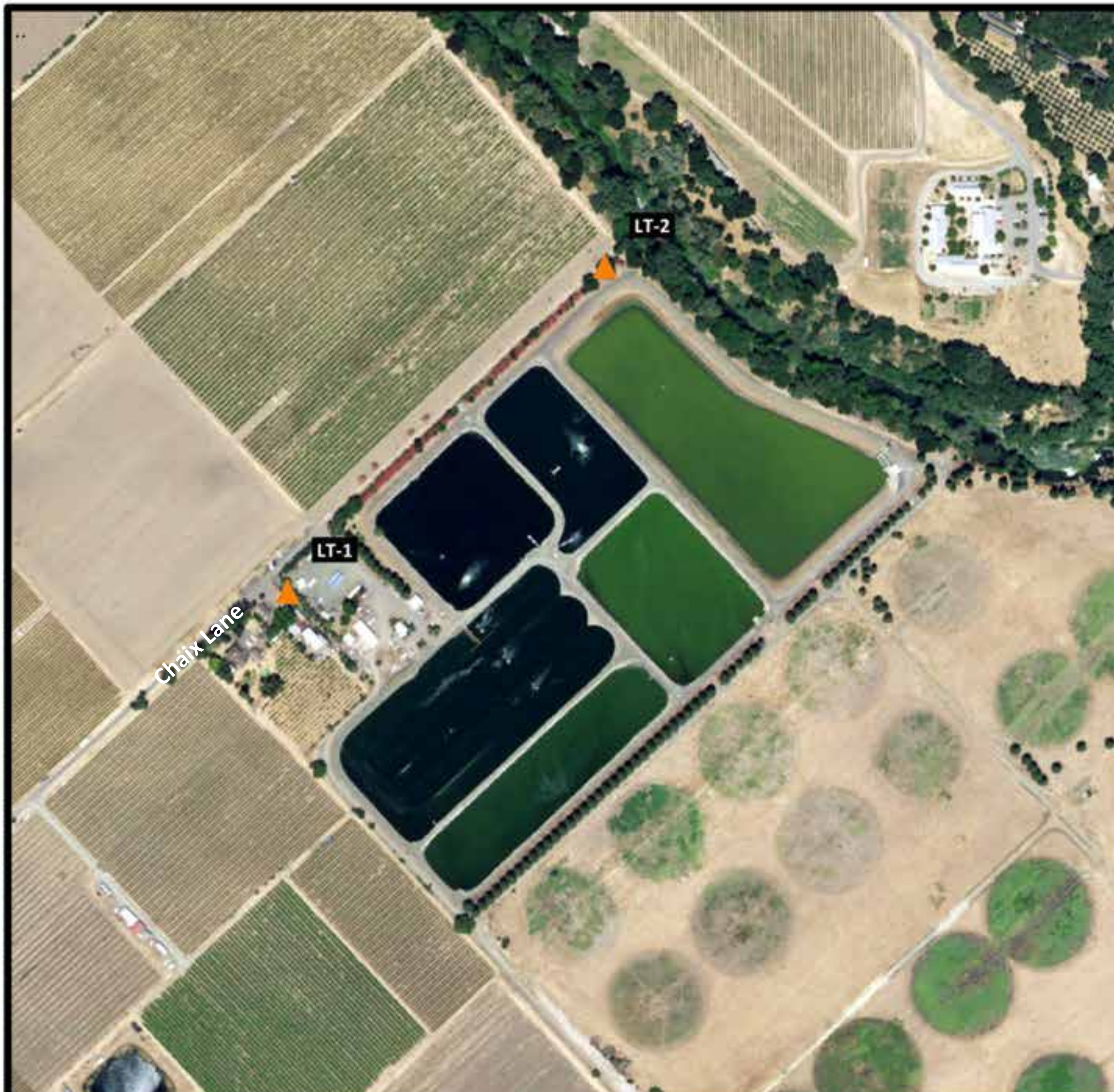


St. Helena Wastewater Treatment Plant

City of St. Helena, California

Figure 1

Project Site Plan – Packaged MBR Treatment Plant



St. Helena Wastewater Treatment Plant

City of St. Helena, California

Figure 2

Noise Measurement Sites

Legend

Noise Measurement - Long Term

125 ft
375 ft
625 ft

Projection: State Plane (California Zone 2) / NAD83 / meters
Rev. Date: 07/22/2020

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Acoustics · Noise · Vibration

The decibel scale is logarithmic, not linear. In other words, two sound levels 10-dB apart differ in acoustic energy by a factor of 10. When the standard logarithmic decibel is A-weighted, an increase of 10-dBA is generally perceived as a doubling in loudness. For example, a 70-dBA sound is half as loud as an 80-dBA sound, and twice as loud as a 60 dBA sound.

Community noise is commonly described in terms of the ambient noise level, which is defined as the all-encompassing noise level associated with a given environment. A common statistical tool is the average, or equivalent, sound level (L_{eq}), which corresponds to a steady-state A weighted sound level containing the same total energy as a time varying signal over a given time period (usually one hour). The L_{eq} is the foundation of the composite noise descriptor, L_{dn}, and shows very good correlation with community response to noise.

The day/night average level (DNL or L_{dn}) is based upon the average noise level over a 24-hour day, with a +10-decibel weighing applied to noise occurring during nighttime (10:00 p.m. to 7:00 a.m.) hours. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures. Because L_{dn} represents a 24-hour average, it tends to disguise short-term variations in the noise environment.

Table 1 lists several examples of the noise levels associated with common situations. **Appendix A** provides a summary of acoustical terms used in this report.

TABLE 1: TYPICAL NOISE LEVELS

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	--110--	Rock Band
Jet Fly-over at 300 m (1,000 ft.)	--100--	
Gas Lawn Mower at 1 m (3 ft.)	--90--	
Diesel Truck at 15 m (50 ft.), at 80 km/hr. (50 mph)	--80--	Food Blender at 1 m (3 ft.) Garbage Disposal at 1 m (3 ft.)
Noisy Urban Area, Daytime Gas Lawn Mower, 30 m (100 ft.)	--70--	Vacuum Cleaner at 3 m (10 ft.)
Commercial Area Heavy Traffic at 90 m (300 ft.)	--60--	Normal Speech at 1 m (3 ft.)
Quiet Urban Daytime	--50--	Large Business Office Dishwasher in Next Room
Quiet Urban Nighttime	--40--	Theater, Large Conference Room (Background)
Quiet Suburban Nighttime	--30--	Library
Quiet Rural Nighttime	--20--	Bedroom at Night, Concert Hall (Background)
	--10--	Broadcast/Recording Studio
Lowest Threshold of Human Hearing	--0--	Lowest Threshold of Human Hearing

Source: Caltrans, Technical Noise Supplement, Traffic Noise Analysis Protocol. September, 2013.

EFFECTS OF NOISE ON PEOPLE

The effects of noise on people can be placed in three categories:

- Subjective effects of annoyance, nuisance, and dissatisfaction
- Interference with activities such as speech, sleep, and learning
- Physiological effects such as hearing loss or sudden startling

Environmental noise typically produces effects in the first two categories. Workers in industrial plants can experience noise in the last category. There is no completely satisfactory way to measure the subjective effects of noise or the corresponding reactions of annoyance and dissatisfaction. A wide variation in individual thresholds of annoyance exists and different tolerances to noise tend to develop based on an individual's past experiences with noise.

Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted: the so-called ambient noise level. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by those hearing it.

With regard to increases in A-weighted noise level, the following relationships occur:

- Except in carefully controlled laboratory experiments, a change of 1-dBA cannot be perceived;
- Outside of the laboratory, a 3-dBA change is considered a just-perceivable difference;
- A change in level of at least 5-dBA is required before any noticeable change in human response would be expected; and
- A 10-dBA change is subjectively heard as approximately a doubling in loudness, and can cause an adverse response.

Stationary point sources of noise – including stationary mobile sources such as idling vehicles – attenuate (lessen) at a rate of approximately 6-dB per doubling of distance from the source, depending on environmental conditions (i.e. atmospheric conditions and either vegetative or manufactured noise barriers, etc.). Widely distributed noises, such as a large industrial facility spread over many acres, or a street with moving vehicles, would typically attenuate at a lower rate.

EXISTING AND FUTURE NOISE AND VIBRATION ENVIRONMENTS

EXISTING NOISE RECEPTORS

Some land uses are considered more sensitive to noise than others. Land uses often associated with sensitive receptors generally include residences, schools, libraries, hospitals, and passive recreational areas. Sensitive noise receptors may also include threatened or endangered noise sensitive biological species, although many jurisdictions have not adopted noise standards for wildlife areas. Noise sensitive land uses are typically given special attention in order to achieve protection from excessive noise.

Near the project site, sensitive land uses include an existing single-family residential use located in Napa County, on an agriculturally zoned property. The existing single-family home is located on Chaix Lane, approximately 200 feet southwest from the proposed MBR plant. Other sensitive uses in the vicinity of the treatment plant include the River Ranch Farm Workers Housing located approximately 500 feet east from the existing treatment plant ponds, east side of the Napa River, and additional single-family uses located east and south of the existing treatment plant spray fields. These uses are located approximately 500 feet to 1,000 feet from the existing treatment plant spray fields. With the exception of the existing single-family use located on Chaix Lane, all other receptors are located 1,500 feet, or more, from the noise-generating components of the proposed project. This additional distance will provide natural sound attenuation of more than 17 dBA at these receptors located further from the proposed project. Therefore, this analysis will focus primarily on the Chaix Lane receptor located approximately 200 feet from the proposed MBR plant.

EXISTING GENERAL AMBIENT NOISE LEVELS

The existing ambient noise environment in the project vicinity is primarily defined by operational noise emanating from existing agricultural activities, the existing treatment plant, and natural sounds such as birds, insects, and wind.

To quantify the existing ambient noise environment in the project vicinity, Saxelby Acoustics conducted continuous (24-hr.) noise level measurements at two locations on the project site. Noise measurement locations are shown on **Figure 2**. A summary of the noise level measurement survey results is provided in **Table 2**. **Appendix B** contains the complete results of the noise monitoring.

The sound level meters were programmed to record the maximum, median, and average noise levels at each site during the survey. The maximum value, denoted L_{max}, represents the highest noise level measured. The average value, denoted L_{eq}, represents the energy average of all of the noise received by the sound level meter microphone during the monitoring period. The median value, denoted L_{50}, represents the sound level exceeded 50 percent of the time during the monitoring period.

Larson Davis Laboratories (LDL) model 812, 820, and 831 precision integrating sound level meters were used for the ambient noise level measurement survey. The meters were calibrated before and after use with a B&K Model 4230 acoustical calibrator to ensure the accuracy of the measurements. The equipment used meets all pertinent specifications of the American National Standards Institute for Type 1 sound level meters (ANSI S1.4).

TABLE 2: SUMMARY OF EXISTING BACKGROUND NOISE MEASUREMENT DATA

Site	Location	Date	L_{dn}	Daytime L_{eq}	Daytime L_{50}	Daytime L_{max}	Nighttime L_{eq}	Nighttime L_{50}	Nighttime L_{max}
LT-1	Northwestern Corner of Project Site	7/22/20	51.5	52.7	41.2	66.8	38.8	33.3	48.7
LT-1	Northwestern Corner of Project Site	7/23/20	46.7	46.8	39.9	63.3	37.2	32.6	47.4
LT-2	Northeastern Corner of Project Site	7/22/20	48.3	44.7	41.9	60.9	41.7	38.0	54.8
LT-2	Northeastern Corner of Project Site	7/23/20	47.1	45.1	43.0	60.0	39.7	38.2	50.6

Notes:
- All values shown in dBA
- Daytime hours: 7:00 a.m. to 10:00 p.m.
- Nighttime Hours: 10:00 p.m. to 7:00 a.m.
- Source: Saxelby Acoustics 2020

EXISTING WASTEWATER TREATMENT PLANT OPERATIONAL NOISE

Saxelby Acoustics conducted noise level measurements of various wastewater treatment plant equipment to evaluate the existing noise levels generated by the wastewater treatment plant. The results of that data collection is shown in **Appendix B**.

The SoundPLAN noise prediction model was used to map existing WWTP noise levels. Inputs to the model included sound power levels for existing equipment, existing buildings, terrain type, and locations of sensitive receptors. These predictions are made in accordance with International Organization for Standardization (ISO) standard 9613-2:1996 (Acoustics – Attenuation of sound during propagation outdoors). ISO 9613 is the most commonly used method for calculating exterior noise propagation.

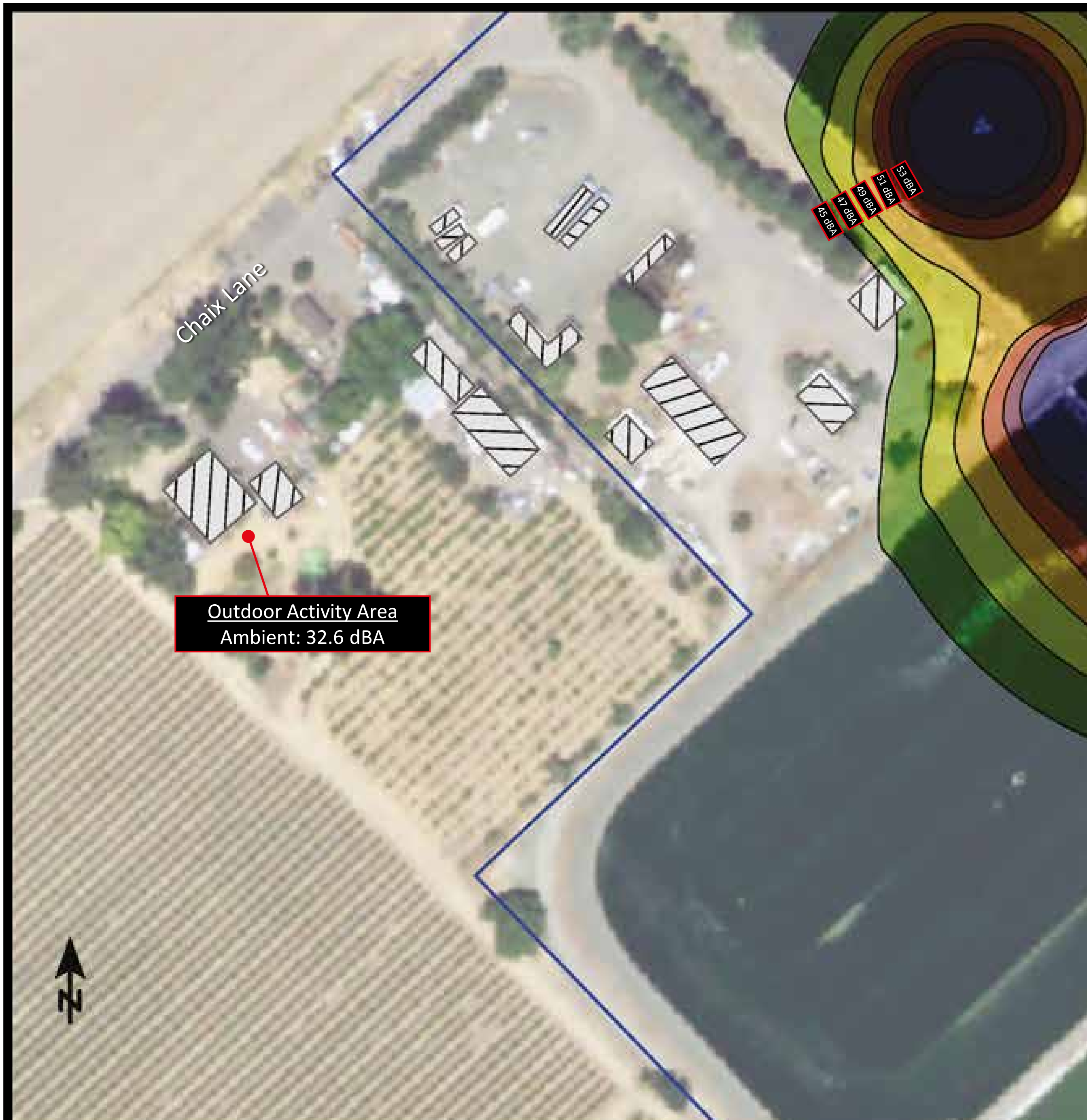
Figure 3 shows the existing operational noise contours for the wastewater treatment plant at the nearest residential use.

St. Helena Wastewater Treatment Plan

City of St. Helena, California

Figure 3

Existing WWTP Noise Contours (dBA L_{50})



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EVALUATION OF FUTURE OPERATIONAL NOISE AT RESIDENTIAL RECEPTORS

The following is a list of assumptions used for the noise modeling. The data used is based upon a combination of manufacturer's provided data and Saxelby Acoustics data from similar operations. **Figure 4** shows the predicted wastewater treatment plant noise contours following the addition of the MBR treatment plant.

MBR Packaged Unit:	Two packaged Cloacina MBR plants operating continuously during the daytime and nighttime. Data collected by Saxelby Acoustics. Assumes equipment is housed within sound attenuation enclosures, similar to that observed by Saxelby Acoustics at the Descanso Gardens 50,000 GPD-MEMPAC-M treatment system. Maximum noise level for this unit assumed to be 58 dBA at 25 feet in any direction from plant.
Sound Wall:	An 8-foot tall sound wall would be located west of the MBR unit, shielding the nearby residential use. The location of the wall is noted on **Figure 4** and shown in more detail on **Figure 5**.

Saxelby Acoustics used the SoundPLAN noise prediction model. Inputs to the model included sound power levels for the proposed equipment, existing and proposed buildings, terrain type, and locations of sensitive receptors. These predictions are made in accordance with International Organization for Standardization (ISO) standard 9613-2:1996 (Acoustics – Attenuation of sound during propagation outdoors). ISO 9613 is the most commonly used method for calculating exterior noise propagation.

St. Helena Wastewater Treatment Plan

City of St. Helena, California

Figure 4

Future Project Noise Contours (dBA L_{50})

Signs and symbols

8-Foot Wall

Packaged MBR Tank

Levels in dB(A)

<= 45
45 - 47
47 - 49
49 - 51
51 - 53
53 - 55
> 55

1 : 859

0 4.5 9 18 27 36 m

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CONSTRUCTION NOISE ENVIRONMENT

During the construction of the proposed project noise from construction activities would temporarily add to the noise environment in the project vicinity. As shown in **Table 3**, activities involved in construction would generate maximum noise levels ranging from 76 to 90 dB at a distance of 50 feet.

TABLE 3: CONSTRUCTION EQUIPMENT NOISE

Type of Equipment	Maximum Level, dBA at 50 feet
Auger Drill Rig	84
Backhoe	78
Compactor	83
Compressor (air)	78
Dozer	82
Dump Truck	76
Excavator	81
Generator	81
Pneumatic Tools	85

Source: *Roadway Construction Noise Model User's Guide*. Federal Highway Administration. FHWA-HEP-05-054. January 2006.

CONSTRUCTION VIBRATION ENVIRONMENT

The primary vibration-generating activities associated with the proposed project would occur during construction when activities such as grading, utilities placement, and parking lot construction occur. **Table 4** shows the typical vibration levels produced by construction equipment.

TABLE 4: VIBRATION LEVELS FOR VARIOUS CONSTRUCTION EQUIPMENT

Type of Equipment	Peak Particle Velocity at 25 feet (inches/second)	Peak Particle Velocity at 50 feet (inches/second)	Peak Particle Velocity at 100 feet (inches/second)
Large Bulldozer	0.089	0.031	0.011
Loaded Trucks	0.076	0.027	0.010
Small Bulldozer	0.003	0.001	0.000
Auger/drill Rigs	0.089	0.031	0.011
Jackhammer	0.035	0.012	0.004
Vibratory Hammer	0.070	0.025	0.009
Vibratory Compactor/roller	0.210 (Less than 0.20 at 26 feet)	0.074	0.026

Source: *Transit Noise and Vibration Impact Assessment Guidelines.* Federal Transit Administration. May 2006.

REGULATORY CONTEXT

FEDERAL

There are no federal regulations related to noise that apply to the Proposed Project.

STATE

There are no state regulations related to noise that apply to the Proposed Project.

LOCAL

The adjacent noise-sensitive receptors are located within Napa County. Therefore, the following standards from the Napa County General Plan and Napa County Code are used for this project.

NAPA COUNTY GENERAL PLAN

The following policies of the *Napa County General Plan* Noise Element are applicable to the project.

Policy CC-36: Residential and other noise-sensitive activities shall not be located where noise levels exceed the standards contained in the Noise Element without provision of noise attenuation features that result in noise levels meeting the current standards of the County for exterior and interior noise exposure.

Policy CC-38: The following are the County's standards for maximum exterior noise levels for various types of land uses established in the County's Noise Ordinance.

TABLE 5: NAPA COUNTY EXTERIOR NOISE STANDARDS

Land Use Type	Time Period	Noise Level (dBA) by Noise Zone Classification[1]		
		Rural	Suburban	Urban
Single-Family Homes and Duplexes[2]	10 p.m. to 7 a.m.	45	45	50
	7 a.m. to 10 p.m.	50	55	60
Multiple Residential 3 or More Units Per Building (Triplex)[2]	10 p.m. to 7 a.m.	45	50	55
	7 a.m. to 10 p.m.	50	55	60
Office and Retail	10 p.m. to 7 a.m.	60		
	7 a.m. to 10 p.m.	65		
Industrial and Wineries[3]	Anytime	75		

Notes: dBA =A-weighted decibels
1 noise levels not to be exceeded more than 30 minutes in any hour (L_{50})
2 For the purposes of implementing this policy, standards for residential uses shall be measured at the housing unit in areas subject to noise levels in excess of the desired levels shown above.
3 Industrial noise limits are intended primarily for use at the boundary of industrial zones rather than for noise reduction at the industrial use.

Source: Napa County 2008

NAPA COUNTY CODE

Section 8.16.060 – Interior noise standards

Section 8.16.060 of the Napa County Code identifies maximum permissible dwelling interior sound levels for residential uses. Daytime (7 a.m. – 10 p.m.) maximum interior noise levels for residential uses are limited to 60 A-weighted decibels (dBA); nighttime (10 p.m. – 7 a.m.) maximum interior noise levels are limited to 55 dBA. Section 8.16.060 indicates that no person shall operate or cause to be operated within a dwelling unit any source of sound or allow creation of any noise which causes exceedance of these noise levels for a cumulative period of more than 5 minutes in any hour, or these noise standards plus 5 decibels (dB) for a cumulative period of more than 1 minute in any hour, or these noise standards plus 10 dB for the maximum measured ambient noise for any period of time.

Section 8.16.070 – Exterior noise limits

Section 8.16.070 of the Napa County Code (Napa County 2013) identifies the noise standards for the various categories of land use identified by the noise control office (see **Table 5**). Section 8.16.070 states that no person shall operate, or cause to be operated, any source of sound at any location within the unincorporated area of the county, or allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person, which causes the noise level, when measured on any other property, either incorporated or unincorporated, to exceed:

a. The noise standard for that land use (see **Table 5)** for a cumulative period of more than 30 minutes in any hour;
b. The noise standard plus five dB for a cumulative period of more than 15 minutes in any hour;
c. The noise standard plus ten dB for a cumulative period of more than 5 minutes in any hour;
d. The noise standard plus fifteen dB for a cumulative period of more than 1 minute in any hour;
e. The noise standard plus twenty dB or the maximum measured ambient level, for any period of time.

In order to compensate for the character of sound, Section 8.16.070 states that if an offensive noise, as judged by the noise control officer, contains a steady, audible tone such as a whine, screech or hum, or is a repetitive noise such as hammering or riveting, or contains music or speech, the standard limits (see **Table 5)** shall be reduced by five dB, but not lower than forty-five.

Section 8.16.080 – Construction or Demolition

Section 8.16.080 of the Napa County Code identifies noise limits for construction activities, allowable in excess of the standard noise limits identified in **Table 6**. Specifically, Section 3.16.080 regulates noise generated by operation of any tools or equipment used in construction, drilling, repair, alteration or demolition work between the hours of 7 p.m. and 7 a.m., such that the sound therefrom creates a noise disturbance across a residential or commercial real property line, except for emergency work of public service utilities or by variance issued by the appropriate authority (**Table 6**).

TABLE 6: NAPA COUNTY NOISE LIMITS FOR CONSTRUCTION ACTIVITIES

	Residential	Commercial	Industrial
Daily: 7 a.m. to 7 p.m.	75 dBA	80 dBA	85 dBA
Daily: 7 p.m. to 7 a.m.	60 dBA	65 dBA	70 dBA
Source: Napa County 2020			

IMPACTS AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

Appendix G of the CEQA Guidelines states that a project would normally be considered to result in significant noise impacts if noise levels conflict with adopted environmental standards or plans or if noise generated by the project would substantially increase existing noise levels at sensitive receivers on a permanent or temporary basis. Significance criteria for noise impacts are drawn from CEQA Guidelines Appendix G (Items XI [a-f]).

Would the project:

a. Generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

b. Generate excessive groundborne vibration or groundborne noise levels?

c. For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

Noise Level Increase Criteria for Long-Term Project-Related Noise Level Increases

The California Environmental Quality Act (CEQA) guidelines define a significant impact of a project if it "increases substantially the ambient noise levels for adjoining areas." Generally, a project may have a significant effect on the environment if it will substantially increase the ambient noise levels for adjoining areas or expose people to severe noise levels. In practice, more specific professional standards have been developed. These standards state that a noise impact may be considered significant if it would generate noise that would conflict with local project criteria or ordinances, or substantially increase noise levels at noise sensitive land uses. The potential increase in traffic noise from the project is a factor in determining significance. Research into the human perception of changes in sound level indicates the following:

- A 3-dB change is barely perceptible,
- A 5-dB change is clearly perceptible, and
- A 10-dB change is perceived as being twice or half as loud.

Many jurisdictions have adopted specific criteria for determining significant noise increases. In this case the City of St. Helena General Plan Policy PS2.5 considers average noise increases of 5 dBA or greater to be significant and to constitute a noise impact for the purpose of environmental analyses.

PROJECT-SPECIFIC IMPACTS AND MITIGATION MEASURES

IMPACT 1: WOULD THE PROJECT GENERATE A SUBSTANTIAL TEMPORARY OR PERMANENT INCREASE IN AMBIENT NOISE LEVELS IN THE VICINITY OF THE PROJECT IN EXCESS OF STANDARDS ESTABLISHED IN THE LOCAL GENERAL PLAN OR NOISE ORDINANCE, OR APPLICABLE STANDARDS OF OTHER AGENCIES?

Operational Noise at Sensitive Receptors

As shown on **Figure 4**, the project is predicted to generate a noise level of 34.9 dBA L_{50} at the nearest residential use. This noise is primarily composed of sound emanating from the proposed MBR wastewater treatment plant and complies with the Napa County 45 dBA L_{50} nighttime exterior noise standard for rural residential uses.

When the project-only noise of 34.9 dBA L_{50} is combined with the existing measured average ambient noise level of 32.6 dBA L_{50}, the resulting existing plus project noise level would be 36.9 dBA L_{50}. This would be a 4.3 dBA increase over existing ambient noise levels. This is less than the City's 5 dBA test for significant noise increases.

Therefore, impacts relating to exterior noise levels due to operation of the proposed project would be considered ***less than significant***.

Construction Noise

During the construction phases of the project, noise from construction activities would add to the noise environment in the immediate project vicinity. As indicated in **Table 3**, activities involved in construction would generate maximum noise levels ranging from 76 to 85 dBA L_{max} at a distance of 50 feet. Construction activities would also be temporary in nature and are anticipated to occur during normal daytime working hours.

Construction of project components would occur over the course of 12 to 16 months. It is anticipated that construction of the WWTRP Phase I upgrades would begin in Spring of 2021 and completed in 2022. The following equipment may be utilized occasionally during construction of the Proposed Project:

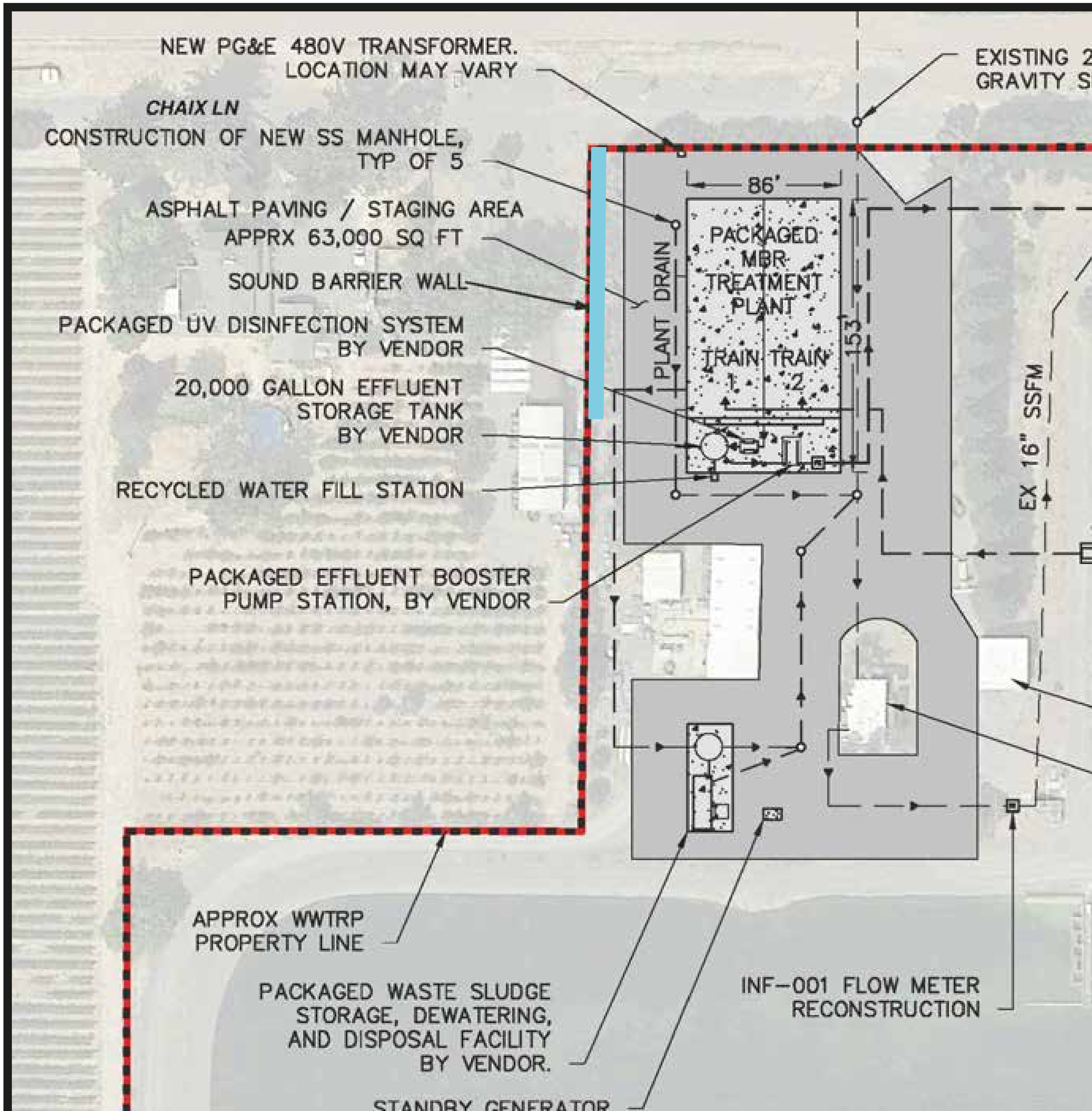
- Front-end loader
- Crane
- Water truck
- Air compressor
- Concrete truck
- Flat-back delivery truck
- Trencher
- Backhoe/Loader
- Welding truck
- Dump truck

Noise would also be generated during the construction phase by increased truck traffic on area roadways. A project-generated noise source would be truck traffic associated with transport of heavy materials and equipment to and from the construction site. This noise increase would be of short duration and would occur during daytime hours.

Noise from localized point sources (such as construction sites) typically decreases by approximately 6 dBA with each doubling of distance from source to receptor. Given this noise attenuation rate and assuming no noise shielding from either natural or human-made features (e.g., trees, buildings, fences), the existing sensitive receptor located within approximately 200 feet of construction activity could experience maximum instantaneous noise levels of up to 73 dBA L_{max}. Average noise levels would be expected to be 5-10 dBA less than maximum noise levels, or 63-68 dBA L_{eq}. These levels are less than the Napa County 75 dBA exterior construction noise standard for daytime (7 a.m. to 7 p.m.) activities.

The proposed project is predicted to generate **less-than-significant** noise levels, assuming the following:

- The residential use to the west of the MBR plant will be shielded from the project operational noise through the use of an 8-foot tall masonry sound wall. The wall height is measured as top of wall elevation relative to the MBR pad and existing grade of the adjacent residential uses, whichever is higher. The assumed location of this barrier is shown on **Figure 5**.
- The MBR plant generates an average noise level of 58 dBA L_{eq} at 25 feet.
- Construction activity occurs during daytime (7 a.m. to 7 p.m.)



St. Helena Wastewater Treatment Plan

City of St. Helena, California

Figure 5

Sound Wall Location

Legend

: 8-foot Tall Sound Wall

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IMPACT 2: WOULD THE PROJECT GENERATE EXCESSIVE GROUNDBORNE VIBRATION OR GROUNDBORNE NOISE LEVELS?

Construction vibration impacts include human annoyance and building structural damage. Human annoyance occurs when construction vibration rises significantly above the threshold of perception. Building damage can take the form of cosmetic or structural.

The **Table 4** data indicate that construction vibration levels anticipated for the project are less than the 0.2 in/sec threshold at distances of 26 feet. Sensitive receptors which could be impacted by construction related vibrations, especially vibratory compactors/rollers, are located further than 26 feet from typical construction activities. At distances greater than 26 feet construction vibrations are not predicted to exceed acceptable levels. Additionally, construction activities would be temporary in nature and would likely occur during normal daytime working hours.

This is a **less-than-significant** impact and no mitigation is required.

IMPACT 3: FOR A PROJECT LOCATED WITHIN THE VICINITY OF A PRIVATE AIRSTRIP OR AN AIRPORT LAND USE PLAN OR, WHERE SUCH A PLAN HAS NOT BEEN ADOPTED, WITHIN TWO MILES OF A PUBLIC AIRPORT OR PUBLIC USE AIRPORT, WOULD THE PROJECT EXPOSE PEOPLE RESIDING OR WORKING IN THE PROJECT AREA TO EXCESSIVE NOISE LEVELS?

There are no public or private airstrips within two miles of the project site. This is a **less-than-significant** impact and no mitigation is required.

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Appendix A: Acoustical Terminology

Acoustics	The science of sound.
Ambient Noise	The distinctive acoustical characteristics of a given space consisting of all noise sources audible at that location. In many cases, the term ambient is used to describe an existing or pre-project condition such as the setting in an environmental noise study.
ASTC	Apparent Sound Transmission Class. Similar to STC but includes sound from flanking paths and correct for room reverberation. A larger number means more attenuation. The scale, like the decibel scale for sound, is logarithmic.
Attenuation	The reduction of an acoustic signal.
A-Weighting	A frequency-response adjustment of a sound level meter that conditions the output signal to approximate human response.
Decibel or dB	Fundamental unit of sound, A Bell is defined as the logarithm of the ratio of the sound pressure squared over the reference pressure squared. A Decibel is one-tenth of a Bell.
CNEL	Community Noise Equivalent Level. Defined as the 24-hour average noise level with noise occurring during evening hours (7 - 10 p.m.) weighted by +5 dBA and nighttime hours weighted by +10 dBA.
DNL	See definition of Ldn.
IIC	Impact Insulation Class. An integer-number rating of how well a building floor attenuates impact sounds, such as footsteps. A larger number means more attenuation. The scale, like the decibel scale for sound, is logarithmic.
Frequency	The measure of the rapidity of alterations of a periodic signal, expressed in cycles per second or hertz (Hz).
Ldn	Day/Night Average Sound Level. Similar to CNEL but with no evening weighting.
Leq	Equivalent or energy-averaged sound level.
Lmax	The highest root-mean-square (RMS) sound level measured over a given period of time.
L(n)	The sound level exceeded a described percentile over a measurement period. For instance, an hourly L50 is the sound level exceeded 50% of the time during the one-hour period.
Loudness	A subjective term for the sensation of the magnitude of sound.
NIC	Noise Isolation Class. A rating of the noise reduction between two spaces. Similar to STC but includes sound from flanking paths and no correction for room reverberation.
NNIC	Normalized Noise Isolation Class. Similar to NIC but includes a correction for room reverberation.
Noise	Unwanted sound.
NRC	Noise Reduction Coefficient. NRC is a single-number rating of the sound-absorption of a material equal to the arithmetic mean of the sound-absorption coefficients in the 250, 500, 1000, and 2,000 Hz octave frequency bands rounded to the nearest multiple of 0.05. It is a representation of the amount of sound energy absorbed upon striking a particular surface. An NRC of 0 indicates perfect reflection; an NRC of 1 indicates perfect absorption.
RT60	The time it takes reverberant sound to decay by 60 dB once the source has been removed.
Sabin	The unit of sound absorption. One square foot of material absorbing 100% of incident sound has an absorption of 1 Sabin.
SEL	Sound Exposure Level. SEL is a rating, in decibels, of a discrete event, such as an aircraft flyover or train pass by, that compresses the total sound energy into a one-second event.
SPC	Speech Privacy Class. SPC is a method of rating speech privacy in buildings. It is designed to measure the degree of speech privacy provided by a closed room, indicating the degree to which conversations occurring within are kept private from listeners outside the room.
STC	Sound Transmission Class. STC is an integer rating of how well a building partition attenuates airborne sound. It is widely used to rate interior partitions, ceilings/floors, doors, windows and exterior wall configurations. The STC rating is typically used to rate the sound transmission of a specific building element when tested in laboratory conditions where flanking paths around the assembly don't exist. A larger number means more attenuation. The scale, like the decibel scale for sound, is logarithmic.
Threshold of Hearing	The lowest sound that can be perceived by the human auditory system, generally considered to be 0 dB for persons with perfect hearing.
Threshold of Pain	Approximately 120 dB above the threshold of hearing.
Impulsive	Sound of short duration, usually less than one second, with an abrupt onset and rapid decay.
Simple Tone	Any sound which can be judged as audible as a single pitch or set of single pitches.

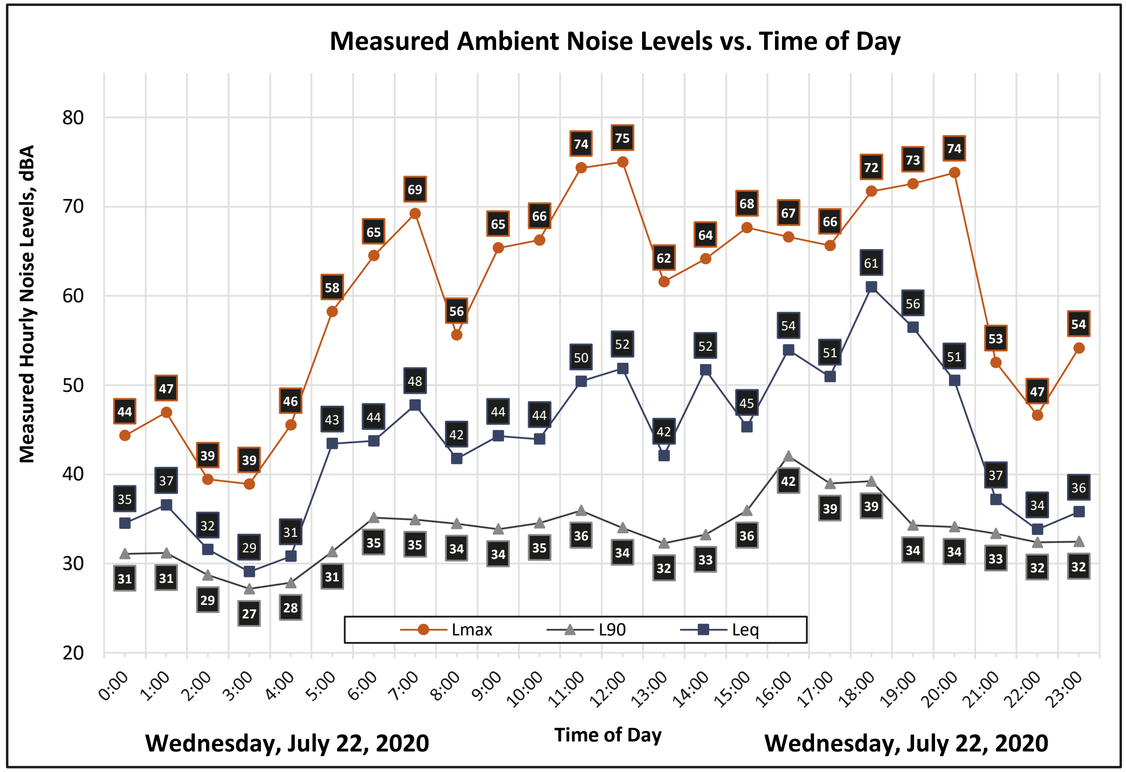
Appendix B: Continuous and Short-Term Ambient Noise Measurement Results

Appendix B1: Continuous Noise Monitoring Results

Site: LT-1
Project: St. Helena WWTP Expansion
Meter: LDL 812-1
Location: Northern Project Boundary
Calibrator: CAL200
Coordinates: 38.5008963°, -122.4419111°

Date	Time	Measured Level, dBA			
		L_{eq}	L_{max}	L_{50}	L_{90}
Wednesday, July 22, 2020	0:00	34.5	44.4	33.4	31.1
Wednesday, July 22, 2020	1:00	36.6	47.0	34.8	31.2
Wednesday, July 22, 2020	2:00	31.6	39.4	30.7	28.7
Wednesday, July 22, 2020	3:00	29.1	38.9	28.4	27.2
Wednesday, July 22, 2020	4:00	30.8	45.5	29.7	27.9
Wednesday, July 22, 2020	5:00	43.4	58.3	36.3	31.3
Wednesday, July 22, 2020	6:00	43.8	64.5	39.4	35.2
Wednesday, July 22, 2020	7:00	47.8	69.2	40.3	34.9
Wednesday, July 22, 2020	8:00	41.8	55.6	39.9	34.5
Wednesday, July 22, 2020	9:00	44.3	65.4	38.7	33.9
Wednesday, July 22, 2020	10:00	44.0	66.3	38.5	34.6
Wednesday, July 22, 2020	11:00	50.4	74.3	39.8	35.9
Wednesday, July 22, 2020	12:00	51.9	75.0	40.3	34.0
Wednesday, July 22, 2020	13:00	42.1	61.6	36.6	32.3
Wednesday, July 22, 2020	14:00	51.7	64.2	42.3	33.2
Wednesday, July 22, 2020	15:00	45.3	67.7	40.7	35.9
Wednesday, July 22, 2020	16:00	54.0	66.6	46.2	42.1
Wednesday, July 22, 2020	17:00	50.9	65.6	43.7	39.0
Wednesday, July 22, 2020	18:00	61.0	71.7	57.4	39.2
Wednesday, July 22, 2020	19:00	56.5	72.6	38.7	34.3
Wednesday, July 22, 2020	20:00	50.5	73.8	40.3	34.1
Wednesday, July 22, 2020	21:00	37.2	52.6	34.8	33.4
Wednesday, July 22, 2020	22:00	33.8	46.6	33.4	32.4
Wednesday, July 22, 2020	23:00	35.8	54.2	33.7	32.5

Statistics	Leq	Lmax	L50	L90
Day Average	52.7	66.8	41.2	35.4
Night Average	38.8	48.7	33.3	30.8
Day Low	37.2	52.6	34.8	32.3
Day High	61.0	75.0	57.4	42.1
Night Low	29.1	38.9	28.4	27.2
Night High	43.8	64.5	39.4	35.2
Ldn	51.5	Day %		97.9
CNEL	52.8	Night %		2.1



Appendix B2: Continuous Noise Monitoring Results

Site: LT-1

Project: St. Helena WWTP Expansion

Meter: LDL 812-1

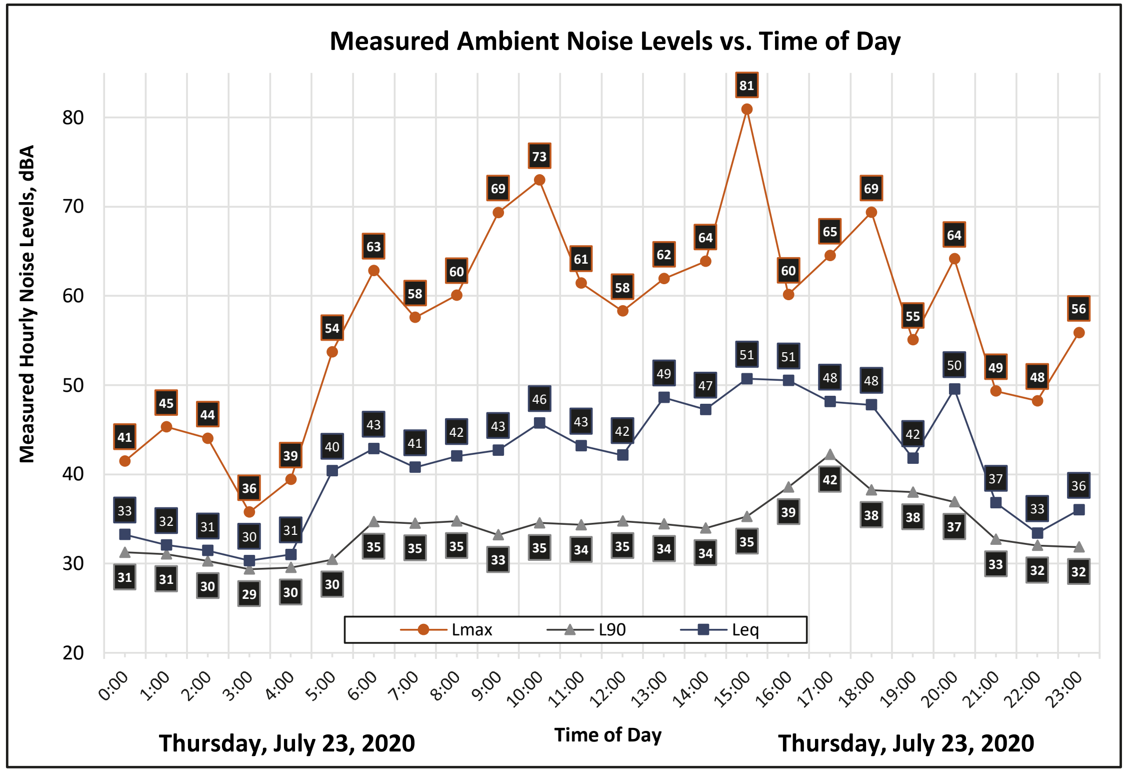
Location: Northern Project Boundary

Calibrator: CAL200

Coordinates: 38.5008963°, -122.4419111°

Date	Time	Measured Level, dBA			
		L_{eq}	L_{max}	L_{50}	L_{90}
Thursday, July 23, 2020	0:00	33.3	41.5	32.6	31.3
Thursday, July 23, 2020	1:00	32.1	45.3	31.8	31.1
Thursday, July 23, 2020	2:00	31.5	44.0	31.4	30.3
Thursday, July 23, 2020	3:00	30.3	35.8	30.4	29.4
Thursday, July 23, 2020	4:00	31.0	39.4	30.6	29.6
Thursday, July 23, 2020	5:00	40.4	53.7	33.0	30.5
Thursday, July 23, 2020	6:00	42.9	62.9	38.4	34.7
Thursday, July 23, 2020	7:00	40.8	57.6	38.1	34.5
Thursday, July 23, 2020	8:00	42.1	60.1	39.0	34.8
Thursday, July 23, 2020	9:00	42.7	69.4	37.9	33.2
Thursday, July 23, 2020	10:00	45.8	73.0	38.0	34.6
Thursday, July 23, 2020	11:00	43.2	61.5	38.1	34.3
Thursday, July 23, 2020	12:00	42.2	58.3	39.0	34.8
Thursday, July 23, 2020	13:00	48.6	61.9	38.5	34.4
Thursday, July 23, 2020	14:00	47.3	63.9	41.3	34.0
Thursday, July 23, 2020	15:00	50.7	80.9	38.5	35.3
Thursday, July 23, 2020	16:00	50.5	60.2	42.7	38.6
Thursday, July 23, 2020	17:00	48.2	64.5	46.2	42.2
Thursday, July 23, 2020	18:00	47.8	69.4	43.1	38.2
Thursday, July 23, 2020	19:00	41.8	55.1	41.4	38.0
Thursday, July 23, 2020	20:00	49.6	64.2	41.8	36.9
Thursday, July 23, 2020	21:00	36.8	49.3	34.4	32.7
Thursday, July 23, 2020	22:00	33.4	48.2	32.8	32.0
Thursday, July 23, 2020	23:00	36.0	55.9	32.8	31.9

Statistics	Leq	Lmax	L50	L90
Day Average	46.8	63.3	39.9	35.8
Night Average	37.2	47.4	32.6	31.2
Day Low	36.8	49.3	34.4	32.7
Day High	50.7	80.9	46.2	42.2
Night Low	30.3	35.8	30.4	29.4
Night High	42.9	62.9	38.4	34.7
Ldn	46.7	Day %		94.5
CNEL	47.6	Night %		5.5

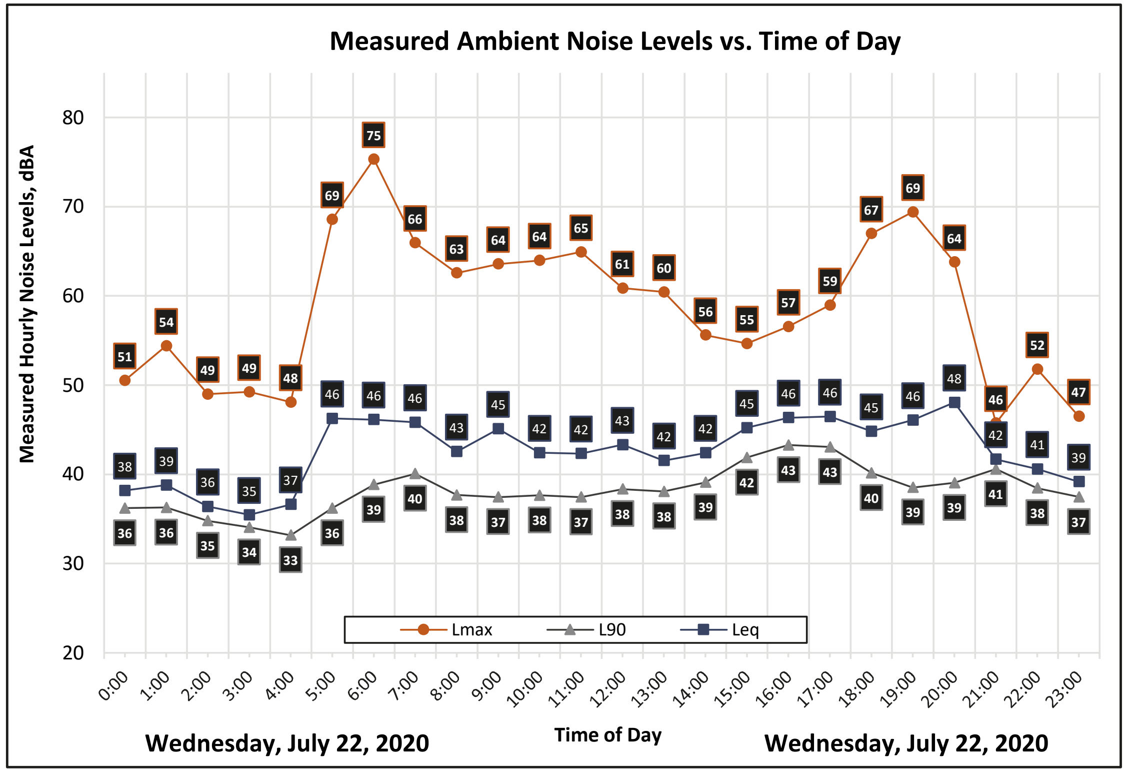


Appendix B3: Continuous Noise Monitoring Results

Site: LT-2
Project: St. Helena WWTP Expansion
Meter: LDL 812-2
Location: Northern Project Boundary
Calibrator: CAL200
Coordinates: 38.5030394°, -122.4391458°

Date	Time	Measured Level, dBA			
		L_{eq}	L_{max}	L_{50}	L_{90}
Wednesday, July 22, 2020	0:00	38.2	50.5	37.4	36.2
Wednesday, July 22, 2020	1:00	38.8	54.4	37.8	36.3
Wednesday, July 22, 2020	2:00	36.4	49.0	36.1	34.8
Wednesday, July 22, 2020	3:00	35.5	49.2	34.8	34.1
Wednesday, July 22, 2020	4:00	36.6	48.1	34.6	33.2
Wednesday, July 22, 2020	5:00	46.3	68.6	40.5	36.2
Wednesday, July 22, 2020	6:00	46.1	75.3	42.0	38.9
Wednesday, July 22, 2020	7:00	45.8	66.0	42.7	40.1
Wednesday, July 22, 2020	8:00	42.6	62.6	40.8	37.7
Wednesday, July 22, 2020	9:00	45.1	63.6	40.8	37.5
Wednesday, July 22, 2020	10:00	42.4	64.0	40.0	37.7
Wednesday, July 22, 2020	11:00	42.3	64.9	40.0	37.5
Wednesday, July 22, 2020	12:00	43.3	60.9	40.9	38.4
Wednesday, July 22, 2020	13:00	41.5	60.4	40.4	38.1
Wednesday, July 22, 2020	14:00	42.4	55.6	41.3	39.1
Wednesday, July 22, 2020	15:00	45.2	54.7	44.3	41.9
Wednesday, July 22, 2020	16:00	46.4	56.6	45.6	43.3
Wednesday, July 22, 2020	17:00	46.5	59.0	45.5	43.1
Wednesday, July 22, 2020	18:00	44.8	67.0	42.5	40.2
Wednesday, July 22, 2020	19:00	46.1	69.4	40.9	38.5
Wednesday, July 22, 2020	20:00	48.1	63.8	40.8	39.1
Wednesday, July 22, 2020	21:00	41.7	45.7	41.6	40.6
Wednesday, July 22, 2020	22:00	40.6	51.8	40.3	38.5
Wednesday, July 22, 2020	23:00	39.2	46.5	38.7	37.5

Statistics	Leq	Lmax	L50	L90
Day Average	44.7	60.9	41.9	39.5
Night Average	41.7	54.8	38.0	36.2
Day Low	41.5	45.7	40.0	37.5
Day High	48.1	69.4	45.6	43.3
Night Low	35.5	46.5	34.6	33.2
Night High	46.3	75.3	42.0	38.9
Ldn	48.3	Day %		79.1
CNEL	49.0	Night %		20.9

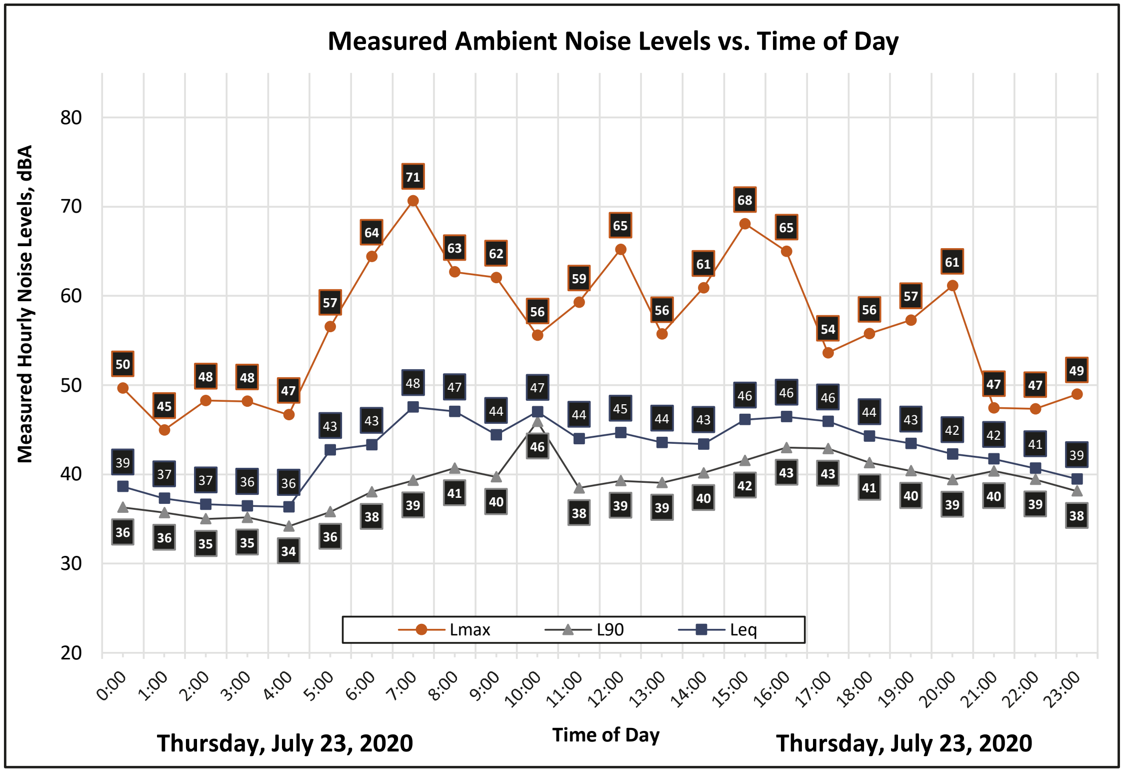


Appendix B4: Continuous Noise Monitoring Results

Site: LT-2
Project: St. Helena WWTP Expansion
Location: Northern Project Boundary
Coordinates: 38.5030394°, -122.4391458°
Meter: LDL 812-2
Calibrator: CAL200

Date	Time	Measured Level, dBA			
		L_{eq}	L_{max}	L_{50}	L_{90}
Thursday, July 23, 2020	0:00	38.6	49.7	38.0	36.3
Thursday, July 23, 2020	1:00	37.3	45.0	37.1	35.7
Thursday, July 23, 2020	2:00	36.6	48.3	36.0	35.0
Thursday, July 23, 2020	3:00	36.5	48.2	36.1	35.2
Thursday, July 23, 2020	4:00	36.4	46.7	35.6	34.2
Thursday, July 23, 2020	5:00	42.7	56.6	39.7	35.8
Thursday, July 23, 2020	6:00	43.3	64.4	41.6	38.0
Thursday, July 23, 2020	7:00	47.5	70.7	42.8	39.3
Thursday, July 23, 2020	8:00	47.1	62.7	44.1	40.7
Thursday, July 23, 2020	9:00	44.4	62.1	42.5	39.7
Thursday, July 23, 2020	10:00	47.0	55.6	46.9	45.9
Thursday, July 23, 2020	11:00	44.0	59.3	41.4	38.5
Thursday, July 23, 2020	12:00	44.7	65.2	41.6	39.3
Thursday, July 23, 2020	13:00	43.6	55.7	41.2	39.1
Thursday, July 23, 2020	14:00	43.4	60.9	41.8	40.2
Thursday, July 23, 2020	15:00	46.1	68.1	44.2	41.6
Thursday, July 23, 2020	16:00	46.5	65.0	45.3	43.0
Thursday, July 23, 2020	17:00	45.9	53.6	45.1	42.9
Thursday, July 23, 2020	18:00	44.3	55.8	43.5	41.3
Thursday, July 23, 2020	19:00	43.5	57.3	42.3	40.4
Thursday, July 23, 2020	20:00	42.3	61.1	41.0	39.4
Thursday, July 23, 2020	21:00	41.7	47.4	41.5	40.4
Thursday, July 23, 2020	22:00	40.7	47.3	40.5	39.4
Thursday, July 23, 2020	23:00	39.5	49.0	39.2	38.1

Statistics	Leq	Lmax	L50	L90
Day Average	45.1	60.0	43.0	40.8
Night Average	39.7	50.6	38.2	36.4
Day Low	41.7	47.4	41.0	38.5
Day High	47.5	70.7	46.9	45.9
Night Low	36.4	45.0	35.6	34.2
Night High	43.3	64.4	41.6	39.4
Ldn	47.1	Day %		86.7
CNEL	47.5	Night %		13.3



Appendix B5 : Short Term Noise Monitoring Results

Site: ST-1
Project: St. Helena WWTP Expansion
Location: Pond 1A
Coordinates: 38.501000°, -122.440840°
Meter: LDL 831-3
Calibrator: CAL200

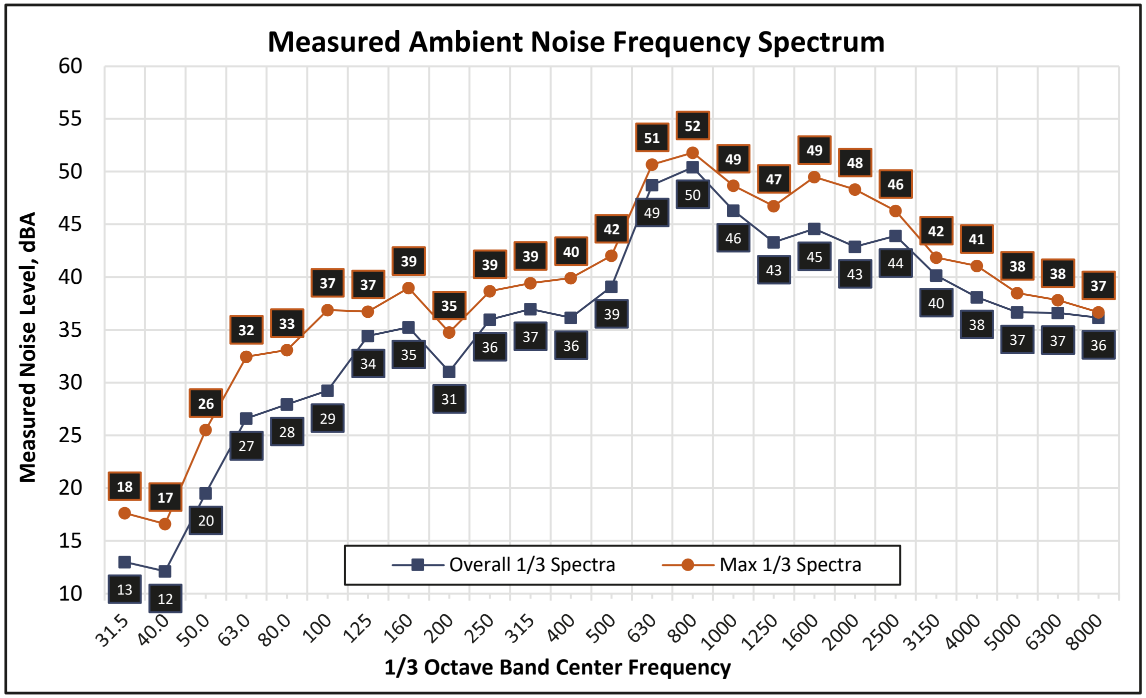
Start: 2020-07-21 09:36:31
Stop: 2020-07-21 09:39:08
SLM: Model 831
Serial: 1329

Measurement Results, dBA

Duration:	0:02
L_{eq}:	55.5
L_{max}:	57.2
L_{min}:	54.5
L_{50}:	55.5
L_{90}:	55.1

Notes

[redacted]



Appendix B6 : Short Term Noise Monitoring Results

Site: ST-2
Project: St. Helena WWTP Expansion
Location: Pond 1B
Coordinates: 38.501537°, -122.439663°

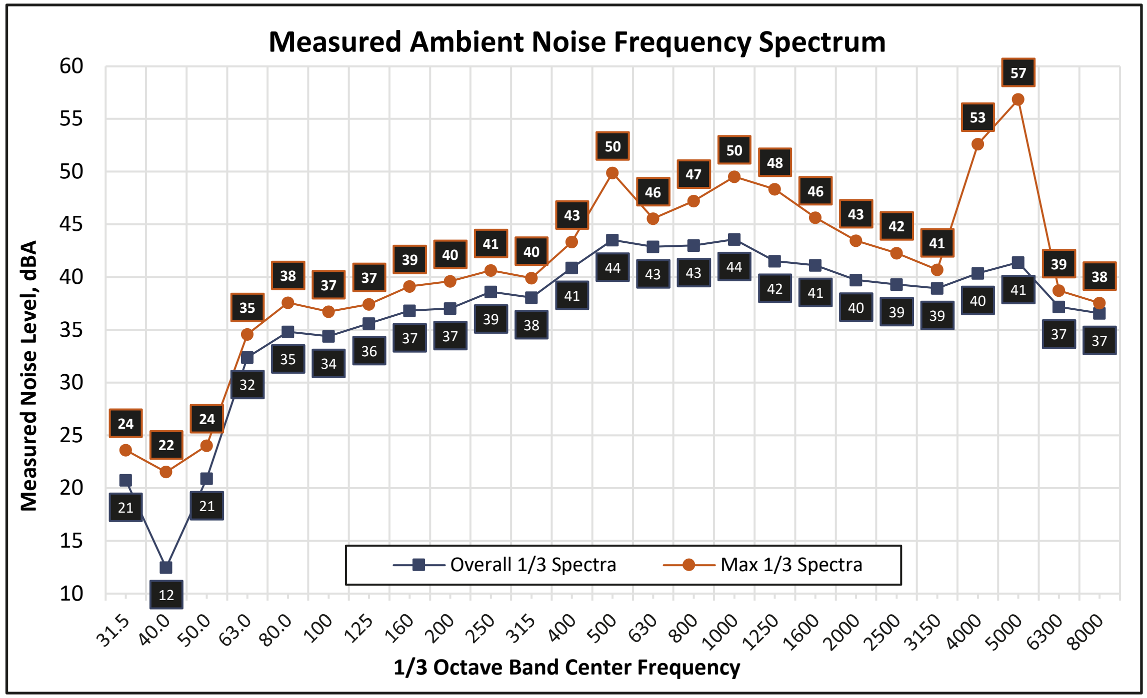
Meter: LDL 831-3
Calibrator: CAL200

Start: 2020-07-21 09:42:09
Stop: 2020-07-21 09:45:27
SLM: Model 831
Serial: 1329

Measurement Results, dBA

Duration:	0:03
L_{eq}:	52.9
L_{max}:	59.1
L_{min}:	51.5
L_{50}:	52.6
L_{90}:	52.1

Notes



Appendix B7 : Short Term Noise Monitoring Results

Site: ST-3
Project: St. Helena WWTP Expansion
Location: Pond 2
Coordinates: 38.500987°, -122.439469°
Meter: LDL 831-3
Calibrator: CAL200

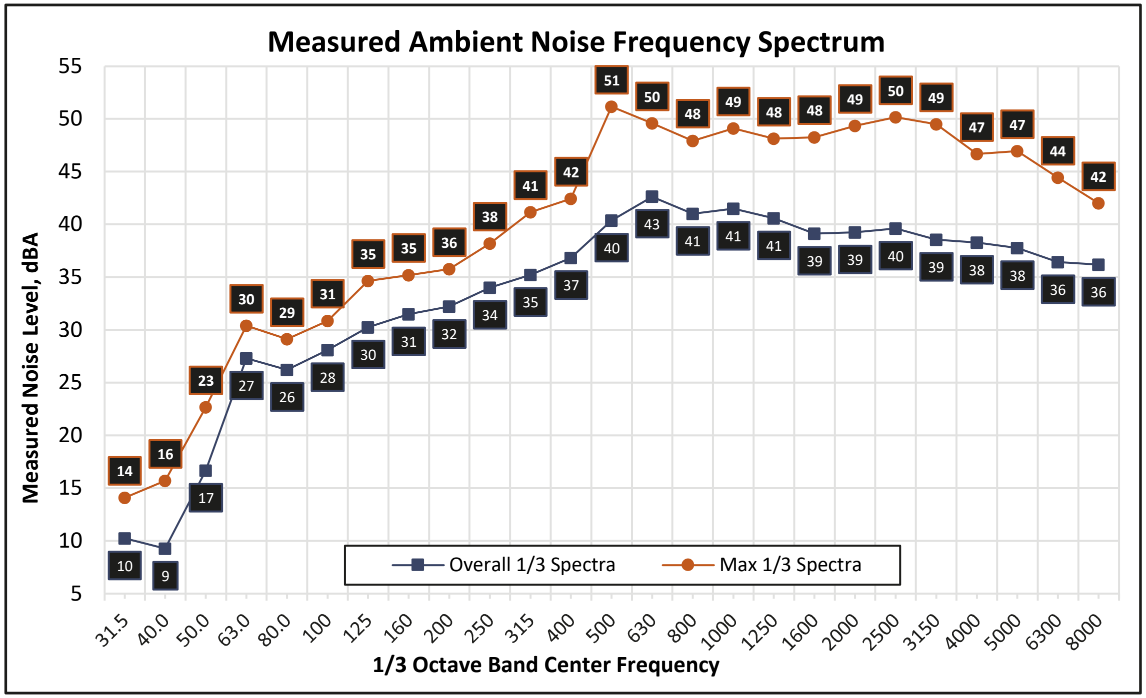
Start: 2020-07-21 09:56:14
Stop: 2020-07-21 09:58:59
SLM: Model 831
Serial: 1329

Measurement Results, dBA

Duration:	0:02
L_{eq}:	50.6
L_{max}:	59.5
L_{min}:	48.9
L_{50}:	50.2
L_{90}:	49.3

Notes

[redacted]



Appendix B8 : Short Term Noise Monitoring Results

Site: ST-4
Project: St. Helena WWTP Expansion
Location: Pond 5
Coordinates: 38.501479°, -122.436762°
Meter: LDL 831-3
Calibrator: CAL200

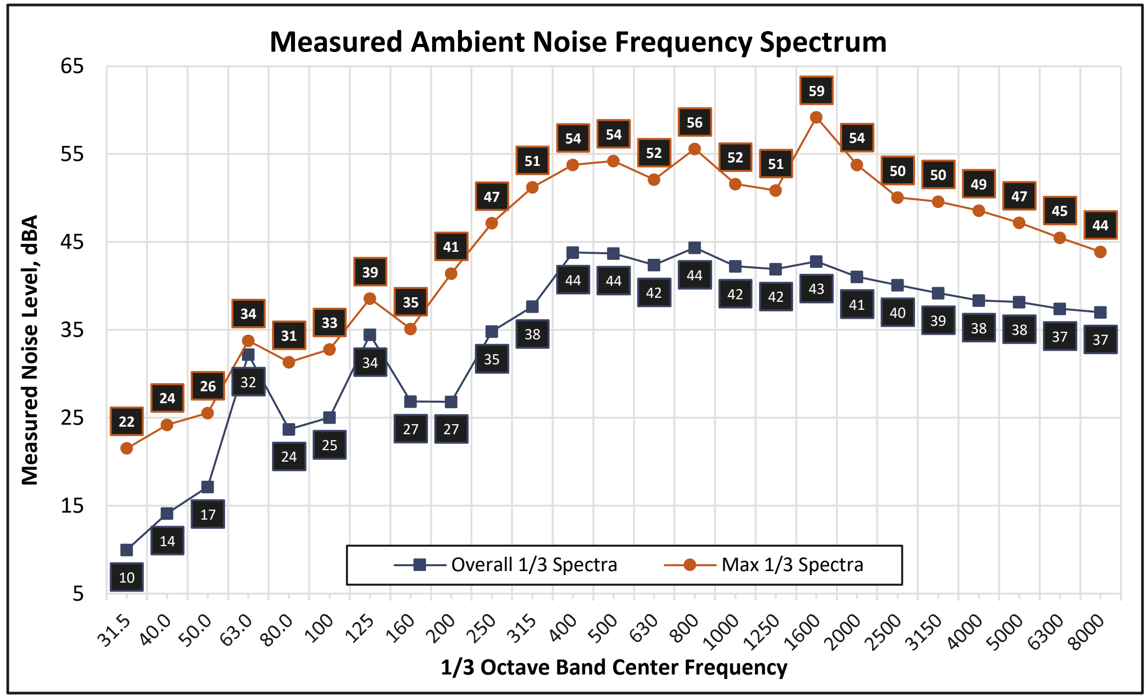
Start: 2020-07-21 10:41:45
Stop: 2020-07-21 10:51:45
SLM: Model 831
Serial: 1329

Measurement Results, dBA

Duration:	0:10
L_{eq}:	52.8
L_{max}:	61.9
L_{min}:	45.6
L_{50}:	51.6
L_{90}:	47.9

Notes

[redacted]



Appendix B9 : Short Term Noise Monitoring Results

Site: ST-5
Project: St. Helena WWTP Expansion
Location: Sprinkler
Coordinates: 38.501365°, -122.435343°
Meter: LDL 831-3
Calibrator: CAL200

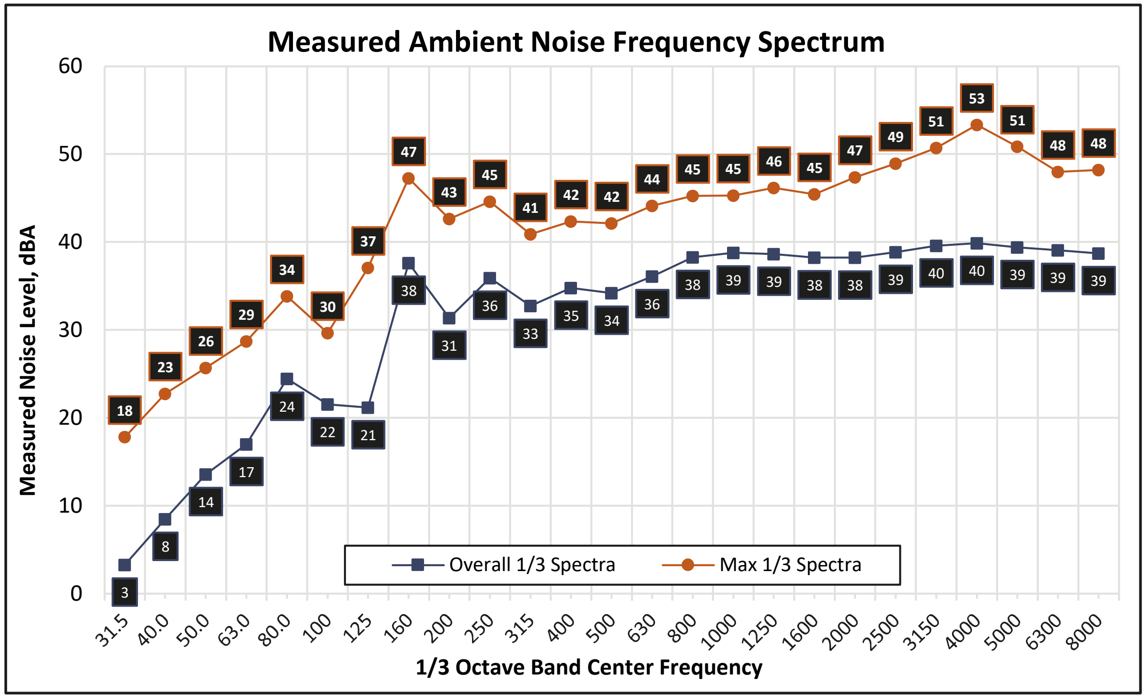
Start: 2020-07-21 11:02:40
Stop: 2020-07-21 11:06:36
SLM: Model 831
Serial: 1329

Measurement Results, dBA

Duration:	0:03
L_{eq}:	49.4
L_{max}:	58.0
L_{min}:	42.9
L_{50}:	48.0
L_{90}:	44.6

Notes

[redacted]



APPENDIX F

MITIGATION MONITORING AND REPORTING PROGRAM

CITY OF ST. HELENA
WWTRP PHASE I UPGRADES PROJECT
MITIGATION MONITORING AND REPORTING PROGRAM

INTRODUCTION

Section 15097 of the California Environmental Quality Act (CEQA) requires that all state and local agencies establish monitoring or reporting programs for projects approved by a public agency whenever approval involves the adoption of an Initial Study/Mitigated Negative Declaration (IS/MND). The mitigation monitoring and reporting program (MMRP) contained herein is intended to satisfy the requirements of CEQA as it relates to the City of St. Helena WWTRP Phase I Upgrades Project (Proposed Project).

This MMRP is intended to be used by the City of St. Helena (City) Staff and mitigation monitoring personnel to ensure compliance with mitigation measures during project implementation. The IS/MND for the Proposed Project presents a detailed set of mitigation measures applicable to implementation of the Proposed Project. The mitigation measures were initially developed during preparation of the IS/MND (October 2020) and, in some cases, were refined in response to comments on the IS/MND.

The intent of the MMRP is to ensure the effective implementation and enforcement of all adopted mitigation measures. The MMRP will provide for monitoring of construction activities, as necessary, and in the field identification and resolution of environmental concerns.

MITIGATION MONITORING PROGRAM

The table presented on the following pages provides the MMRP for the Proposed Project. The MMRP identifies:

1. The full text of the mitigation measure(s) applicable to each impact statement;
2. The timing of implementation of each mitigation measure; and
3. The party responsible for ensuring implementation of each mitigation measure.

Following completion of the monitoring and reporting process, the final monitoring results will then be entered into the City's Mitigation Monitoring and Reporting database.

Mitigation Measure	Timing of Action	Reviewing Party	Initial/Date Complete
Air Quality			
AQ-1: The following BMPs shall be implemented during construction: a. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day. b. All haul trucks transporting soil, sand, or other loose material off-site shall be covered. c. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited. d. All vehicle speeds on unpaved roads shall be limited to 15 miles per hour (mph). e. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be installed as soon as possible after grading unless seeding or soil binders are used. f. A publicly visible sign with the telephone number and person to contact at the lead agency regarding dust complaints shall be posted. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations. **AQ-2**: The following BMPs shall be implemented during construction: a. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of CCR). Clear signage shall be provided for construction workers at all access points. b. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified visible emissions evaluator.	During Construction	City of St. Helena	
Biological Resources			
BIO-1: The following measures shall be implemented to avoid or minimize adverse impacts to nest sites for migratory birds and other birds of prey during construction activities associated with the Proposed Project: ▪ If construction activities (e.g., building, grading, ground disturbance, removal of vegetation) are scheduled to occur during the general nesting season (February 15–September 15), a pre-construction nesting bird survey shall be conducted by a qualified biologist throughout accessible areas of suitable habitat within 500 feet of proposed construction activity. The survey shall occur no more than 7 days prior to the scheduled onset of construction. If construction is delayed or halted for more than 7 days, another pre-construction survey for nesting bird species shall be conducted. If no nesting birds are detected during the pre-construction survey, no additional surveys or mitigation measures are required. ▪ If nesting bird species are observed within 500 feet of construction areas during the survey, appropriate "no construction" buffers shall be established. The size and scale	Prior to and during construction	City of St. Helena	

Mitigation Measure	Timing of Action	Reviewing Party	Initial/Date Complete
of nesting bird buffers shall be determined by a qualified biologist and shall be dependent upon the species observed and the location of the nest. Buffers shall be established around active nest locations. The nesting bird buffers shall be completely avoided during construction activities. The buffers may be removed when the qualified wildlife biologist confirms that the nest(s) is/are no longer occupied and all birds have fledged.			
Cultural Resources			
CR-1: In the event of any inadvertent discovery of archaeological or paleontological resources, all such finds shall be subject to PRC 21083.2 and CEQA Guidelines § 15064.5. Procedures for inadvertent discovery include the following: ▪ All work within 50 feet of the find shall be halted until a professional archaeologist or paleontologist if the find is of a paleontological nature, can evaluate the significance of the find in accordance with NRHP and CRHR criteria. ▪ If any find is determined to be significant by the archaeologist, or paleontologist as appropriate, then representatives of the City shall meet with the archaeologist or paleontologist to determine the appropriate course of action. If necessary, a Treatment Plan shall be prepared by an archeologist (or paleontologist) outlining recovery of the resource, analysis, and reporting of the find. The Treatment Plan shall be submitted to the City for review and approval prior to resuming construction. ▪ All significant cultural or paleontological materials recovered shall be subject to scientific analysis, professional curation, and a report prepared by the professional archaeologist or paleontologist according to current professional standards.	During construction	City of St. Helena	
CR-2: In the event that human remains are encountered during construction activities, the City shall comply with Section 15064.5 (e) (1) of the CEQA Guidelines and Health and Safety Code Section 7050.5. All project related ground disturbance within 100 feet of the find shall be halted until the county coroner has been notified. If the coroner determines that the remains are Native American, the coroner will notify the NAHC to identify the most likely descendants of the deceased Native Americans. Project-Related ground disturbance in the vicinity of the find shall not resume until the process detailed in Section 15064.5 (e) has been completed.	During construction	City of St. Helena	
Hazards and Hazardous Materials			
HAZ-1: The City shall ensure through the enforcement of contractual obligations that all contractors transport, store, and handle construction-required hazardous materials in a manner consistent with relevant regulations and guidelines, which may include, but is not limited to, transporting and storing materials in appropriate and approved containers, maintaining required clearances, and handling materials using approved protocols.	During construction	City of St. Helena	
HAZ-2: An accidental spill prevention and response plan shall be developed which will include a list of all hazardous materials used and/or stored on the Project site during construction activities; appropriate information about initial spill response, containment,	Prior to construction	City of St. Helena	

Mitigation Measure	Timing of Action	Reviewing Party	Initial/Date Complete
and cleanup strategies; and a list of appropriate City contact information. The spill prevention and response plan shall be included as a component of the SWPPP described in Mitigation Measure HYD-1. The plan shall require containment equipment and sufficient supplies to combat spills of oil or hazardous substances shall be on site at all times during construction.			
HAZ-3: Construction staging shall be established a minimum distance of 100 feet away from the Napa River. The storage of construction materials, including oils and hazardous substances will be at a distance of 100 feet from all drainage courses to prevent spills from reaching the aquatic environment. No vehicle maintenance shall occur on-site during construction.	Prior to construction	City of St. Helena	
HAZ-4: During construction, staging areas, welding areas, or areas slated for development using spark-producing equipment shall be cleared of dried vegetation or other materials that could serve as fire fuel. To the extent feasible, the contractor shall keep these areas clear of combustible materials in order to maintain a fire break. Any construction equipment that normally includes a spark arrester shall be equipped with an arrester in good working order. This includes, but is not limited to, vehicles, heavy equipment, and chainsaws.	During construction	City of St. Helena	
Hydrology/Water Quality			
HYD-1: The City shall obtain coverage for project related construction activities under the SWRCB NPDES Construction General Permit. The SWRCB requires that all construction sites have adequate control measures to reduce the discharge of sediment and other pollutants to streams to ensure compliance with Section 303 of the CWA. To comply with the NPDES permit, the City will file a Notice of Intent with the SWRCB and prepare a SWPPP prior to construction, which shall include a detailed, site-specific listing of the potential sources of stormwater pollution; pollution prevention measures (erosion and sediment control measures and measures to control non-stormwater discharges and hazardous spills) including a description of the type and location of erosion and sediment control BMPs to be implemented at the Project site; and a BMP monitoring and maintenance schedule to determine the amount of pollutants leaving the Project site. A copy of the SWPPP must be current and remain on the Project site. Control measures are required prior to and throughout the rainy season. Water quality BMPs identified in the SWPPP could include, but are not limited to, the following: ▪ Areas where ground disturbance would occur shall be identified in advance of construction and limited to only approved areas. ▪ All vehicular construction traffic shall be confined to the designated access routes and staging areas. ▪ All equipment maintenance and cleaning shall be confined to staging areas. Staging areas utilized for equipment maintenance and cleaning shall be located a minimum of 100 feet from streams and waterways, including the Napa River. No vehicle maintenance shall occur on-site during construction.	Prior to construction	City of St. Helena, SWRCB	

Mitigation Measure	Timing of Action	Reviewing Party	Initial/Date Complete
▪ All supervisory construction personnel shall be informed of environmental concerns, permit conditions, and final project specifications. Said Personnel will be responsible for instructing all on-site work to meet the requirements of the SWPPP including making sure all work is conducted outside of protected trees' drip lines to the extent possible. ▪ Restore disturbed areas to pre-construction contours to the fullest extent possible. ▪ Hay/straw bales and silt fences would be used to control erosion during stormwater runoff events. ▪ Salvage, store, and use the highest quality soil for native re-vegetation/seeding. ▪ Leave drainage gaps in topsoil and spoil piles to accommodate/reduce surface water runoff. ▪ Sediment control measures shall be in place prior to the onset of the rainy season and will be maintained until disturbed areas have been re-vegetated. Erosion control structures must be in place and operational at the end of each day if work activities are to occur during the rainy season. ▪ Fiber rolls shall be placed along the perimeter of disturbed areas to ensure sediment and other potential contaminants of concern are not transported off-site or to open trenches. Locations of fiber rolls will be field adjusted as needed and according to the advice of the certified SWPPP inspector. ▪ Vehicles and equipment stored in the construction staging area shall be inspected regularly for signs of leakage. Leak-prone equipment will be staged over an impervious surface or other suitable means will be provided to ensure containment of any leaks. Vehicle/equipment wash waters or solvents will not be discharged to surface waters or drainage areas. ▪ During the rainy season (dates to be specified in the SWPPP), soil stockpiles and material stockpiles will be covered and protected from the wind and precipitation. Plastic sheeting will be used to cover the stockpiles and straw wattles will be placed at the base for perimeter control. ▪ All contractors shall immediately control the source of any leak and immediately contain any spill utilizing appropriate spill containment and countermeasures. All leaks and spills shall be reported to the designated representative of the lead contractor and shall be evaluated to determine if the spill or leak meets mandatory SWPPP reporting requirements. Contaminated media shall be collected and disposed of at an off-site facility approved to accept such media.			
Tribal Cultural Resources			
TCR-1: If prehistoric archaeological resources are discovered during ground-disturbing activities, all such activities shall halt within 50 feet of the find until a professional archaeologist can evaluate the significance of the find in accordance with NRHP and CRHR criteria. In addition, representatives of the Native American community who were contacted by the City during the AB 52 process shall be contacted and asked if they wish	During construction	City of St. Helena	

Mitigation Measure	Timing of Action	Reviewing Party	Initial/Date Complete
to consult under the provisions of Section 106 of the NHPA. Construction shall not resume in the vicinity of the find until consultation is concluded or until a reasonable good-faith effort has failed to provide a resolution to further impacts that is acceptable to the consulting parties.			