Gualala Community Services District

SWRCB Grant Funded Wastewater Planning Project Engineering Report

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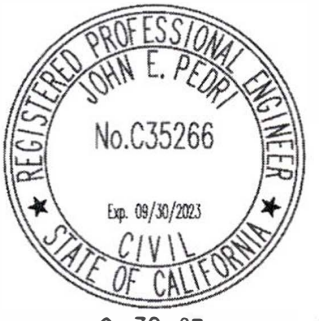
Certification

This report was prepared under the direction and supervision of the following California Registered Professional Civil Engineers:



9-30-23

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ABBREVIATIONS

AC- asbestos-concrete
ACL-Administrative Civil Liability
ACS- American Community Survey
ADA- Americans with Disabilities Act
AES- Analytical Environmental Services, Inc.
AISI- American Iron and Steel Institute
APR- annual percentage rate
ARV- air release valve
AWWA- American Water Works Association
BFP-backflow preventor
BOD- biochemical oxygen demand
CalOSHA- California Occupational Safety and Health Act
CBOD- Carbonaceous Biochemical Oxygen Demand
CCC- chlorine contact channel
CCR- California Code of Regulation
CDBG- Community Development Block Grant
CDO- cease and desist order
CDPH- California Department of Public Health
CEQA- California Environmental Quality Act
CIP- Capital Improvement Plan
COD- chemical oxygen demand
CRP- Capital Replacement Plan/Program
CSA- Community Service Area
CSA6N- Sonoma County Community Service Area 6N
DAC- disadvantaged community
DDW- California Department of Drinking Water
DO- dissolved oxygen
DWSRF- Drinking Water State Revolving Fund
(E)- Existing
EDU- equivalent dwelling unit
EPA/US EPA- United States Environmental Protection Agency
FOG- fats, oils, and grease
FY- fiscal year
GCSD- Gualala Community Services District
GIS-geographical information systems
GPD- gallons per day
HDPE- high-density poly-ethlyene
HGL- hydraulic grade line
HP- horsepower
IPPS-in-plant pump station
LAFCO- Local Area Formation Commission
LS- lift station
MG- million-gallon
MGD-million gallons per day
MHI- median household income
MLSS- mixed liquor suspended solids
MPN- most probable number
NCRWQCB- North Coast Regional Water Quality Control Board
(N)- New
NEPA-National Environmental Quality Act
NFPA- National Fire Protection Agency
NGWC- North Gualala Water Company
NTU-nephelometric turbidity unit
OIT- operator in training
PLC- programmable logic controller
PF- peaking factor
PVC- polyvinylchloride
RAS- return activated sludge
ROW- right of way
ROWD- report of waste discharge
RWQCB- Regional Water Quality Control Board
SCADA- supervisory control and data acquisition
SCWA- Sonoma County Water Agency
SDAC- severe disadvantaged community
SFD- single family dwellings
SFE- single family equivalent
SOI- sphere of influence
SRA- Sea Ranch Association
SRF- State Revolving Fund
SRGL- Sea Ranch Golf Links
SRN- Sea Ranch North
SRT- solids retention time
STEG-septic tank effluent gravity
STEP- septic tank effluent pump
SVI-sludge volume index
SWRCB- State Water Resources Control Board
TDH- total developed head
TKN- total kjeldahl nitrogen
TMLSS- total mixed liquor suspended solids
TOC- table of contents
TSRA-The Sea Ranch Association
TSS- total suspended solids
UPC- Uniform Plumbing Code
USDA- United States Department of Agriculture
VFD- variable frequency drive
VGS- variable grade sewer
VSS- volatile suspended solids
WD- waste discharge
WDR- waste discharge requirements
WEF-Water Environment Federation
WWTP- wastewater treatment plant
WWTRF-wastewater treatment and reclamation facility

SECTION 1- BACKGROUND

1.1 INTRODUCTION

This Clean Water State Revolving Fund (CWSRF) funded planning study is intended to address deficiencies and impending issues in the Gualala Community Services District (GCSD or District) wastewater collection system, tertiary wastewater treatment plant (WWTP) and the related service area by recommending future capital improvement projects and related funding sources and responsibilities. Detailed objectives that support this primary goal are outlined in Section 1.2.

1.1.1 OVERVIEW OF EXISTING SYSTEMS

Gualala Community Services District

The GCSD was established in 1986 in response to adverse impacts from failing septic systems. The Mendocino County Board of Supervisors approved District formation pursuant to a 1987 pollution study which resulted in the State Water Resources Control Board (SWRCB) listing of Gualala as an eligible community. In the early 1990's, a Septic Tank Effluent Pump Station (STEP) collection system and a tertiary treatment facility were constructed. This system, completed in 1993, is still in operation today and serves the Gualala business district and nearby residents. Upper portions of Pacific Woods and Old Stage Road are not part of the STEP system. The WWTP is located south of Gualala across the Gualala River, east of Highway 1.

Commercial buildings and residential homes utilize septic tanks as part of the collection system. The septic tanks retain solids and liquid wastewater is pumped into the collection system. Each septic tank has its own submersible pump along with a float system for pump control and a control panel. The STEP system consists of 34,600 feet of gravity and 27,900 feet of pressurized mains ranging in diameter from 2 to 6 inches. GCSD currently serves 61 commercial and 177 residential customers. The total population in the town of Gualala as of the 2010 census was 2,093.

The GCSD is responsible for maintaining some customer assets and the GCSD staff conducts routine inspection and repair of customer tanks. Commercial septic tanks are pumped annually, and residential septic tanks are pumped as needed. Pumps, ranging in size from ½ horsepower (HP) to 2 HP, are maintained by the GCSD staff. The solids in the commercial tanks are checked every quarter while the residential tanks are checked once a year by trained staff. Any solids removed from the septic tanks are taken to H Bar H Ranch, which is an approved dumping site located in Point Arena, Ca.

GCSD has historically generated low volumes of biosolids at the WWTP, due in part to the long sludge age in the aeration basin. Some biosolids have been buried on site of the WWTP, a practice that the regional water quality control board (RWQCB) will not permit in the future. Solids from customer tanks are discharged to a Mendocino County and RWQCB approved settling pond at H Bar H Ranch and accepted by a nearby farmer for subsequent use as a fertilizer.

Sea Ranch North and GCSD Relationship

The Sonoma County Water Agency (SCWA) currently owns and operates several wastewater treatment plants south of the main planning area in Gualala, including the Sea Ranch North WWTP (CSA 6). The Sea Ranch North WWTP is in northern Sea Ranch, east of Highway 1 and is permitted by RWQCB Order No. 94-4. Please refer to **Figure 1.1.1-1** for the relative locations of the Sea Ranch North and GCSD treatment facilities.

Figure 1.1.1-1 GCSD Treatment Plant and Sea Ranch North Treatment Facility Location
(Background Image Reproduced from Google Earth)

GCSD currently accepts primary effluent from Sea Ranch North. Sea Ranch primary effluent is combined with raw liquid sewage from the town of Gualala and treated, filtered, and disinfected at the GCSD WWTP. Treated effluent from GCSD is conveyed to a 20 MG storage pond at the GCSD WWTP and then to a 8.4 million-gallon (MG) storage pond within the Sea Ranch North Boundaries as needed for volume control. Reclaimed water from the storage pond is used to irrigate the Sea Ranch Golf links golf course. The "Tri-Party Agreement" has been signed by appropriate representatives of GCSD, Sea Ranch North, and Sonoma County Water Agency representing Sea Ranch Village, Inc. The agreement defines each entity's responsibility with regards to wastewater treatment and disposal.

1.1.2 PRIOR ANALYSIS

Collection System Mapping

The collection system includes four lift stations, existing septic tanks, and related gravity sewers and force mains. An extensive mapping program for the collection system, as well as a review of existing record drawings, was completed as part of this grant funded planning study. As part of this mapping program, a geographical information systems (GIS) database has been developed that can be utilized for projecting maintenance and replacement needs within the GCSD collection system and related costs as well as assisting in daily operations.

Title 22 and ROWD

A Title 22 Engineering Report and new Report of Waste Discharge (ROWD) were prepared by MC Engineering as a component of this project. Both reports are included as an attachment to this Engineering Report. Related permitting work was originally initiated by others and is being completed by MC Engineering.

STEP Expansion

At the request of the GCSD, MC Engineering was tasked with investigating unsewered areas, primarily Zones 3, 4, and a future proposed zone 5, for septic system failures and possible impacts on local water quality. There are a total of 415 residential and commercial lots currently sewered with interceptor tanks with either small pump stations or gravity drains that flow to the mains. Unsewered areas in Zones 3, 4, and 5 total 339 residential (improved lots). Many of these septic systems in the town of Gualala outside of the current GCSD service area have encountered serious and continuous maintenance issues and threats of failure. It is suspected that the failing septic systems are posing an environmental hazard to the community. Septic tank effluent has the potential to contaminate the Big Gulch and Robinson Gulch, both of which are public drinking water sources, as well as privately owned drinking water wells.

The GCSD previously considered expansion of the existing STEP system in 2002. An initial Sewer Feasibility Study was completed by Winzler and Kelly Consulting Engineers in 2002/2003 which evaluated the feasibility of connecting septic systems in Zones 3 and 4 and the Ocean Ridge Drive area in Gualala to the GCSD sewer service area. At the time, expanding the sewer service to other/ parcels in Gualala was reportedly rejected by the future potential customers in Gualala due to significant rate increases (high amortized cost for capital and O&M costs for service). Grant funding was not previously considered. This study includes a much more in-depth analysis of the existing threats as well as detailed surveys of the proposed alignments while focusing on acquiring grant funding to offset initial capital costs.

Sea Ranch North Assessment

In 2015 the Sonoma County Water Agency retained Stantec Engineers to prepare an Assessment of the Sea Ranch North WWTP capacity along with a Title 22 compliance evaluation for GCSD with consideration of including the Sea Ranch North WWTP flows with an additional 174 future connections in Sea Ranch. The Stantec report did not assume any additional flows from north of the Gualala River in their capacity evaluation. Stantec estimated a total future average annual flow of 38,000 gpd from Gualala and 43,000 gpd from Sea Ranch North (an increase of 11,000 gpd from the 174 vacant parcels in Sea Ranch).

Inflow and Infiltration

Although there is limited data on existing influent flows from both Gualala and the Sea Ranch, it is evident that the service area experiences high Inflow and Infiltration (I/I). During the winter months, I/I related flows have resulted in a 10:1 peaking of flows. A Stantec study (prepared in December of 2015) identified deficiencies with existing storage in a 1 in 100-year storm season without relying on the existing percolation pond. The GCSD WWTP is marginally capable of handling peak flows. The condition of the existing collection system is contributing to infiltration, particularly in the area served by Lift Station 1 as discussed in more detail in this report.

1.1.3 Summary of Existing Deficiencies

The GCSD is experiencing several issues that need immediate attention, many of which may be considered a violation of waste discharge (WD) Order No. 92-120, which is currently in the process of being revised/amended:

- Biosolids disposal practices are outdated and will soon result in violations.
- The existing permit is unclear with respect to the liability and responsibility of involved parties (Sea Ranch North, GCSD, Sonoma County Water Agency/Sea Ranch Village Inc.).
- GCSD does not have complete authority over reclaimed water use at the golf course.
- The GCSD WWTP is not equipped to handle peak storm event flows.
- Various permit related requirements have prompted the need for new capital improvement projects at the WWTP.
- CalOSHA and other related health and safety issues within the WWTP Facilities.
- Much of the original infrastructure including collection system, pump stations, STEP systems) and treatment facilities have reached the end their useful life and are in need of replacement. Some currently pose as a health and safety risk.
- Existing revenues are insufficient to meet projected budget needs for capital improvements and O&M.
- Public drinking water supplies and the environment are threatened by failing septic tanks, particularly within the unsewered Zone 5.

1.2 OBJECTIVES

The purpose of this Engineering Report is to identify and prioritize future projects and related funding sources and responsibilities. The goal will be achieved by completion of the following seven objectives:

1. Identify Applicable Waste Discharge Requirements and Title 22 and Work in Collaboration with the North Coast Regional Water Quality Control Board (NCRWQCB), Sonoma County Water Agency, Sea Ranch Golf Links, and Sea Ranch North
2. Review and assess the GCSD Tri-Party Agreement
3. Analyze Existing Assets and Identify Related Deficiencies
4. Evaluate the Option of Expanding the GCSD Service Area
5. Develop a Future Capital Improvement Program
6. Identify Funding Sources
7. Evaluate the Existing Rate Structure and Recommend Modifications

The objectives are interrelated, and some relevant tasks overlap. The objectives and related subtasks are discussed further in the following sections.

1.2.1 IDENTIFY APPLICABLE WASTE DISCHARGE REQUIREMENTS

An objective of this Engineering Report is to verify applicable waste discharge requirements. The salient points of the updated permit related work will be summarized with consideration of both maintaining the current service area as well as the implications of an expanded service area. In general, permit related impacts are focused on improvements needed at the WWTP to meet Title 22 requirements with consideration of an updated water balance and wet weather flow study, improvements needed for reclamation related components at the Sea Ranch golf course, and necessary improvements required to address biosolids management. A goal of the related permitting activity will be to acquire a new Report of Waste Discharge, pending responses from the NCRWQCB. The new ROWD and related Title 22 requirements will consolidate separate pre-existing permits for the plant and reclamation facilities.

1.2.2 Review and Access the GCSD Tri-Party Agreement

This objective will include review and assessment of the terms and conditions of the GCSD Tri-Party Agreement. This agreement defines the relationship between GCSD, Sea Ranch Golf Links (SRGL), and SCWA. The SCWA is responsible for collection facilities serving Sea Ranch North and maintains the Sea Ranch primary treatment and pumping facility that is used to convey flows to GCSD.

Items of concern, to be considered when reviewing the agreement in the context of this study include:

- Update relevant cost for service (treatment, conveyance, maintenance, and operating costs) and related rates charged by GCSD to SCWA/Sea Ranch North based on the agreement terms and corresponding equitable sharing of related costs.
- Identify permit related implications and shared responsibilities for new capital improvement projects that need to be addressed by and between GCSD, SRGL and SCWA.
- Identify implications of an updated water balance intended to verify storage and irrigation capabilities related to the delivery of tertiary treated effluent by GCSD to SRGL (both with and without an expanded GCSD service area).

1.2.3 Analyze Existing Assets and Identify Related Deficiencies

This objective includes analyzing and identifying existing deficiencies associated with the existing WWTP and the GCSD collection system. The new GIS asset database will be utilized to document and study the existing collection system. Deficiencies at the WWTP will include those related to the new Report of Waste Discharge, pre-existing deficiencies, and items that have reached their useful life. Taken collectively, the identified needs will be used to develop a recommended Capital Improvement Plan (CIP). The competing needs for existing facilities will be evaluated in the context of potential grant funding that might be applied to expanding the GCSD service area.

1.2.4 Evaluate the Option of Expanding the GCSD Service Area

An objective of this report is to assess expanding the STEP system to customers in Zones 3, 4 and the unsewered Zone 5. This report will revisit the initial Winzler and Kelly system expansion recommendations with consideration of adding Zone 5 also and acquiring grants to fund a large percentage of the improvements. To justify expansion needs, this report includes an in-depth analysis of existing septic tank failures, water quality impacts associated with failing systems, and a thorough topographic surveying and mapping effort to define proposed pipeline alignments needed to expand the GCSD service areas. Additional public input will be considered to solicit desires of the community based on the above implications, with an emphasis on grant and loan funding opportunities for new facilities and investments needed to mitigate on-going degradation of existing systems.

1.2.5 Develop a Future Capital Improvement Program

This objective includes analysis of capital improvement needs and development of a preliminary CIP. Needs include those associated with a combination of replacing and repairing aging and deficient assets, funding additional facilities needed for permit compliance, and potential service area expansion costs. Cost sharing (capital and O&M) associated with individual property owner connections, septic tank modifications, control panels, and related facilities will be considered separately.

1.2.6 IDENTIFY FUNDING SOURCES

This objective includes identification of potential grants and low-interest loans. A variety of government agencies will be considered, including the following:

- United States Department of Agriculture (USDA) loans and grants
- SWRCB State Revolving Fund (SRF) loans and grants
- Private funding sources
- Community Development Block Grants (CDBG)
- Other state and federal programs that may be identified in the future

The GCSD service area is considered a disadvantaged community (DAC) due to the median household income (MHI) of **$58,657**. It is expected that GCSD will be eligible for some degree of grant funding due to the DAC status. Other recent estimates indicated the MHI for Mendocino County communities were approximately $36,201, suggesting that an independent site-specific income study is likely warranted. Critical capital improvement needs, and related costs will be prioritized to minimize rate impacts.

Final determination of rates, service connection fees, and related budget impacts will be dependent upon the degree of grant vs. loan funding that is available. The overall goal of this financing program will be to limit monthly service charges to GCSD customers while continuing to fund needed capital improvement projects as well as on-going operation, maintenance, and replacement programs as identified in this study.

1.2.7 EVALUATE EXISTING RATE STRUCTURE AND RECOMMEND MODIFICATIONS

This objective includes evaluation of the existing rate structure and developing recommendations for future modifications. Future modifications will address existing debt service, needed capital improvements, and increases in annual O/M costs. GCSD receives revenue from several sources to pay on-gong operation and maintenance costs as well as debt service for past improvements. There are a few competing costs that will be considered when re-assessing needed changes to the current rates, most of which is gleaned through County tax role assessments for debt service and O&M costs. Other sources and methods of recovering lost revenue will be evaluated in this study include:

- Revenue from golf course related water sales
- Leachate hauling fees from Sonoma County Parks
- Revenue from Sonoma County for CSA 6 treatment
- Increased revenue from Sea Ranch Golf Links for tertiary treatment costs
- Improvements and system-wide operational efficiencies

1.3 PROJECT PLANNING AREA

The project proposed in this report is located in and around the community of Gualala, CA. Gualala is a small coastal community situated in the southwest corner of Mendocino County, along the north bank of the Gualala River at its junction with the sea. Gualala is located approximately 100 miles north of San Francisco and 60 miles south of Fort Bragg along Highway 1. The GCSD service area and location are shown in **Figure 1.3-1**. The GCSD currently serves a population of approximately 2,500 in Gualala. This area is unincorporated and the County of Mendocino, under the Mendocino County Local Coastal Plan and the Mendocino County General Plan, administrates all land used decisions.

The GCSD service area boundary and the location of existing treatment facilities are depicted in **Figure 1.3-2**. The GCSD existing collection system is depicted in **Figure 1.3-3** and represents the extent of the District's sewer service area and the location of the existing treatment facilities.

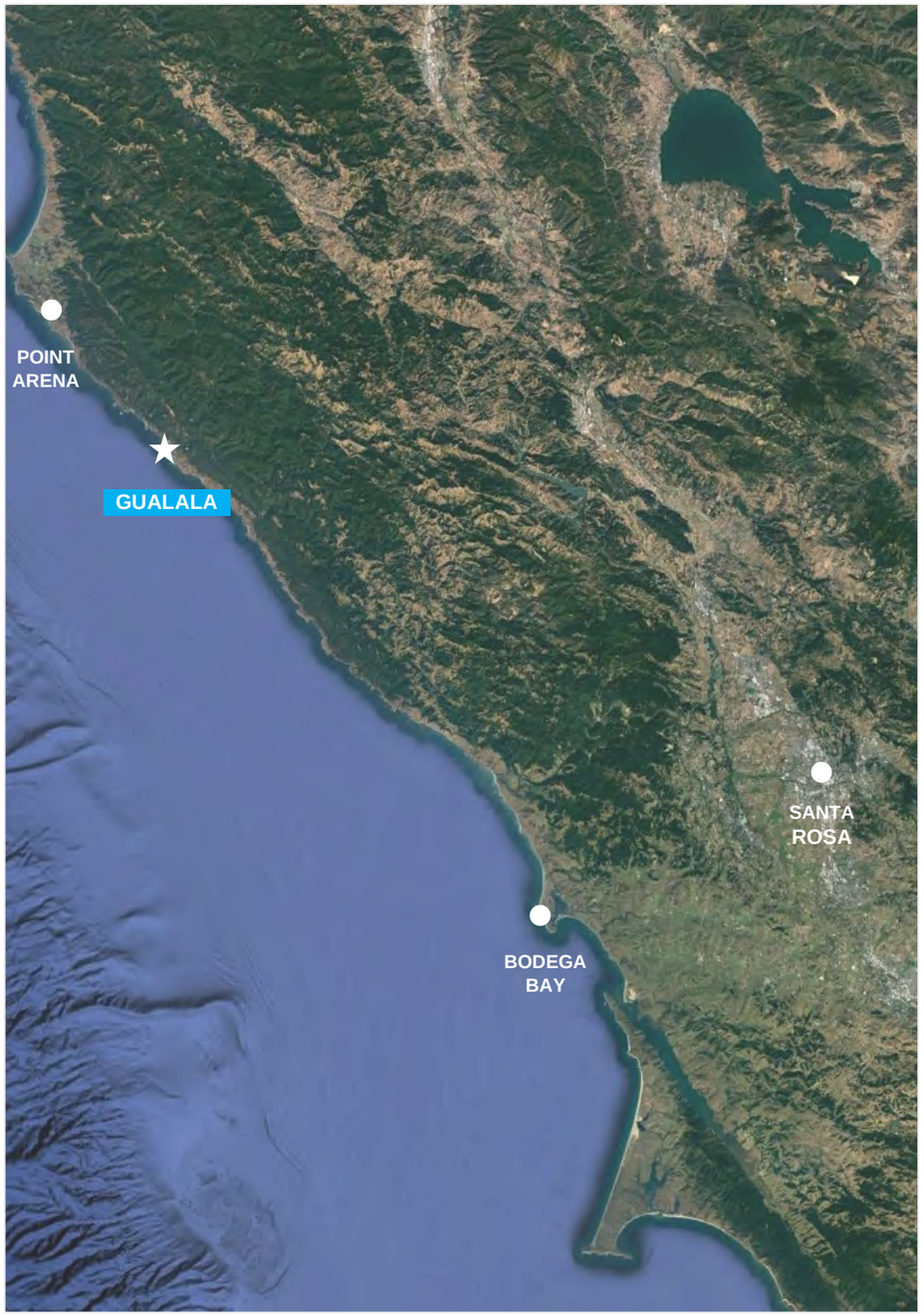


Figure 1.3 -1 Project Location Map

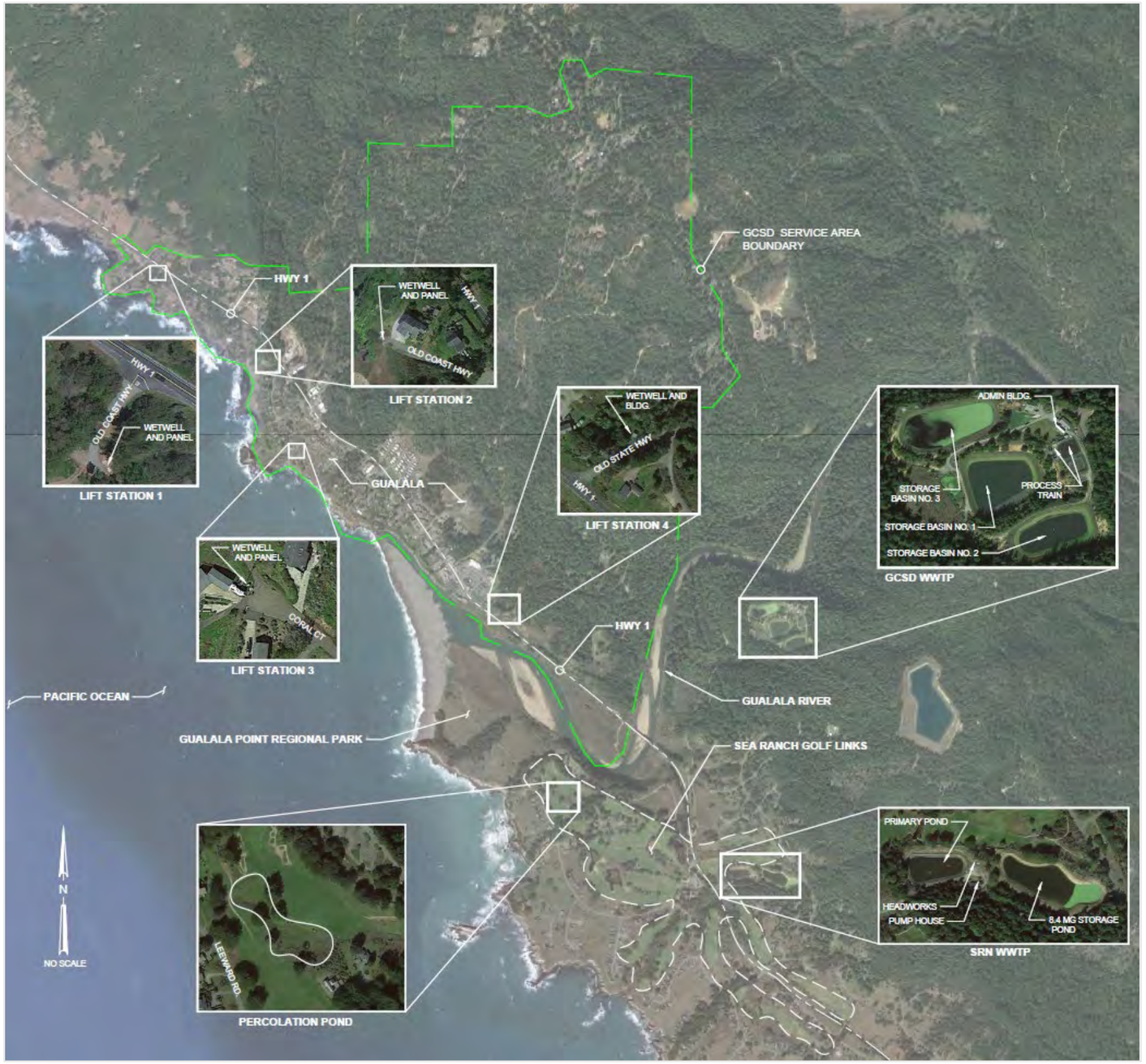
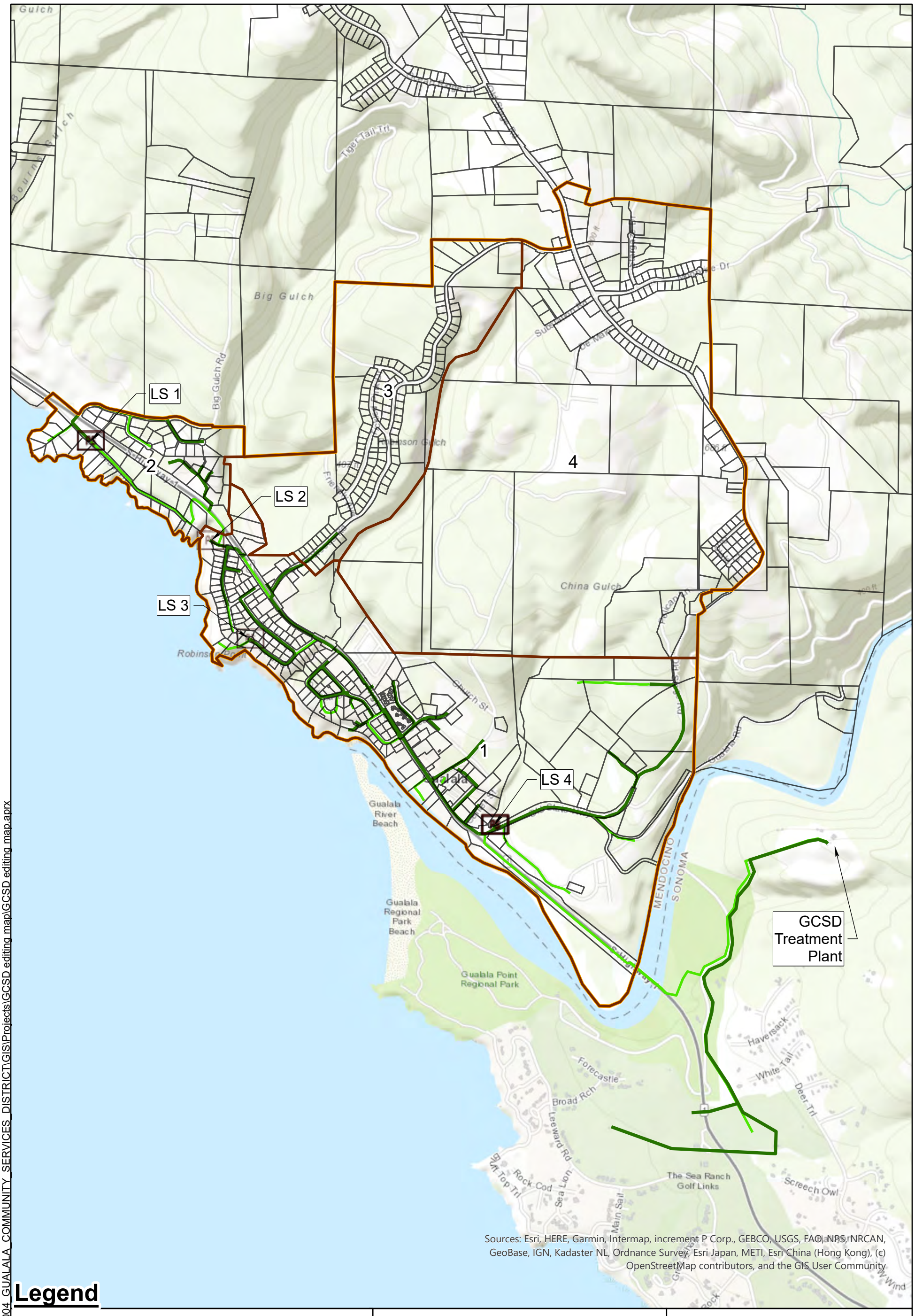


Figure 1.3 -2 Project Vicinity Map



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Legend

- District Boundary
- Zones
- Parcels

Collection System Assets

- PS Lift Stations
- Gravity Mains
- Pressurized Mains

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Title:
GCSD WASTEWATER STUDY

Figure 1.3-3:
Existing Collection System

Feet
0 500 1,000

N

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1.4 OVERVIEW OF GCSD

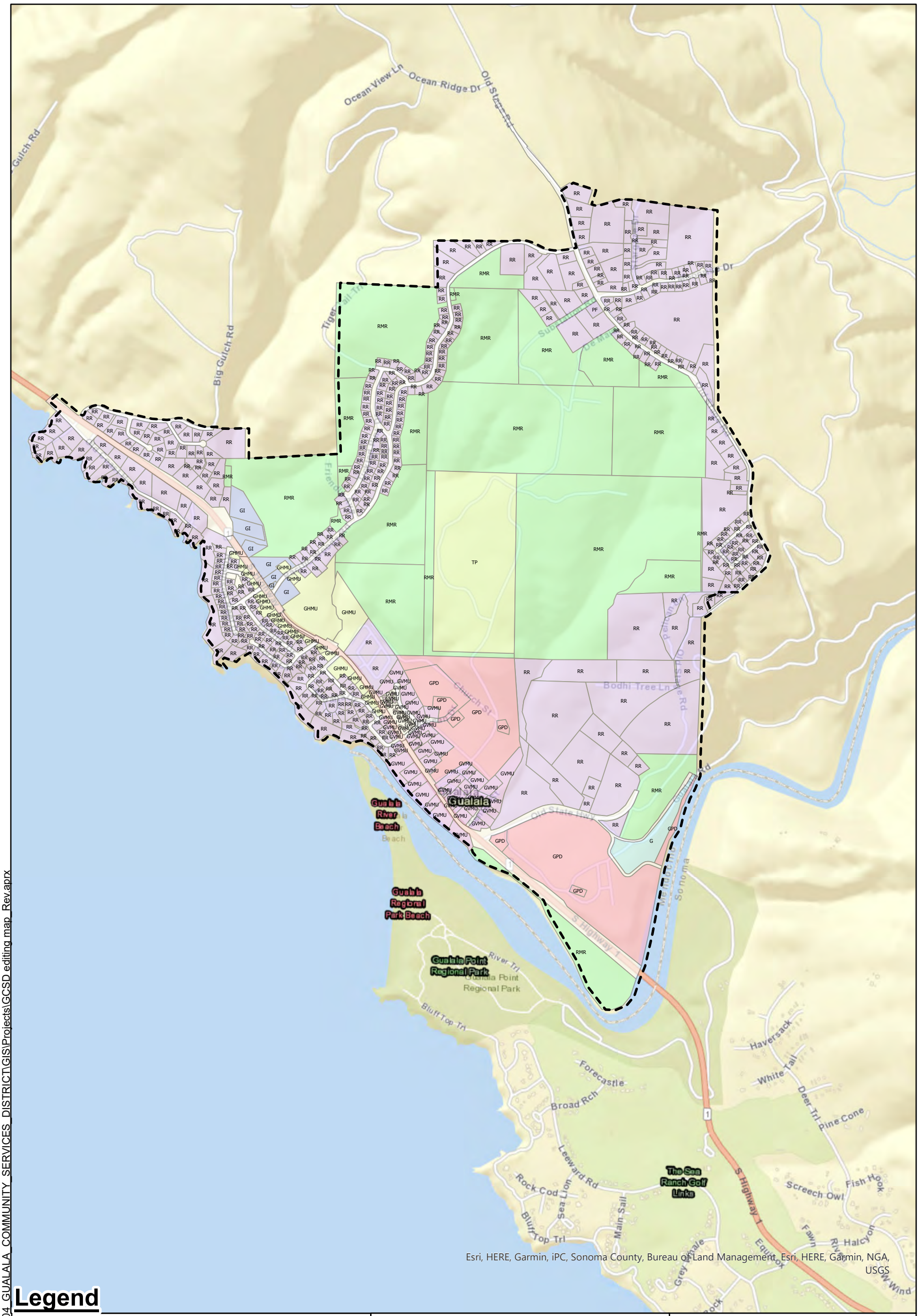
1.4.1 CURRENT AND FUTURE LAND USE

Land use parcel data, in the form of GIS shape files, was provided by the Mendocino County Planning Department. Zoning designations tied to each parcel were used as a basis for developing wastewater flows for the system in conjunction with actual billed water usage, results of flow metering, historical logs from the lift stations, and data from the District's monthly sewer bills. A summary of the mapping results can be found in subsequent chapters of this report.

Limitations and restrictions on the water supply have resulted in a building moratorium with no foreseeable lifting in the near future. Growth would be limited to water availability in the future for Gualala, while Sea Ranch continues to connect at a moderate rate since they are served by their own water utility.

Land Use Mapping

Figure 1.4.1-1 depicts the current Mendocino County land use map covering the existing GCSD service area. Information for this map was generated from the Mendocino County General Plan and other zoning information. As can be discerned from the figure, the primary land use is residential. A key to the abbreviations in the zoning map can be found in **Appendix K**. There are a variety of hotels, stores, and small commercial businesses concentrated in the downtown area. No industrial customers have been identified.



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Legend

District

LAND USE DESIGNATION

AG
AG
AV
C

C1
C2
FL
FV
G
GHM
GI
GPD
GVM
I
I1
I2
MC
MFL
MMU
MOS
MPF
MRM
MRR
MSR
MTR
OS
PF
PI
R1
R2
R3
RC
RL
RMR
RR
RV
SR
TP
UR

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Gualala Community Services District:

Figure 1.4.1-1
Land Use Designations

Feet
0 500 1,000

N

1.4.2 CURRENT SYSTEM USERS, CUSTOMER TYPES, AND CHARACTERISTICS

The GCSD collection system serves single family, multi-family, and commercial connections. There are 365 utility connections in the GCSD sewer collection system within Zones 1 and 2 in the town of Gualala. Additional metered flows are accepted from the SRN. The SRN is billed based on flow volume and other qualitative and quantitative factors. Treated wastewater is used for irrigation on the Sea Ranch Golf Links. The majority of these are single family dwellings (SFD) which total 288 units. Additionally, there are 77 commercial accounts consisting of multi-family, mobile home park dwelling units, hotels, laundromat, churches, restaurants, and other small businesses. **Table 1.4.2-1** contains a breakdown of customer types and billing units from fiscal year (FY) 2020/21. It is important to note that these are billing units and **not** EDUs. Some billing units have multiple EDUs. Please refer to **Table 1.4.2-4** for estimated total EDUs within the GCSD and SRN service areas.

Table 1.4.2-1- Sewer Service Customers FY 2020/21 (General)

Dwelling Designation	Number of GCSD Billing Units
Residential	288
Commercial	77

The District's single family residential equivalent wastewater flows were calculated using two approaches. The first approach calculated the single-family equivalent (SFE) flows using all residential users (**Table 1.4.2-2**), both permanent and non-permanent, while the second approach calculated only permanent SFE residential users (**Table 1.4.2-3**). The number of District-wide permanent residents were derived from metered water usage for FY 2020/2021 (**Appendix A**) and assumed that a residential customer using more than 20,000 gallons per year were considered permanent. Using these two methods, permanent and non-permanent customers, the calculated average SFE connection ranges from 76 gallons per day (GPD)/SFE customers to 120 GPD/SFE customers.

Table1.4.2-2 provides the actual and realistic Average Dry Weather Flow (ADWF) per customer and will be used to establish the base rate. It will also provide important information for billings and future rate studies. This table also uses both permanent and non-permanent residences to establish both average GPD/EDU and average per capita flow. The ADWF was calculated using metered water flow for the months of June – September. The yearly EDU or SFEC per all residential types was calculated to be 76 GPD/EDU, while the ADWF (June-September) EDU is 87 GPD/EDU with the residential per capita flow being 34 GPD/EDU and 39 GPD/EDU, respectively.

Table 1.4.2-2 – Single Family Equivalent and Per Capita Calculation for Permanent and Non-Permanent Residences

Account Type	Annual Average Per SFE User Type [1]				GPD/Capita			ADWF Summer Flow (June-Sept) Avg/ SFE User Type [2]				GPD/Capita (June-Sept)		
	Actual GPD/Yr. (Metered Flow)	Theoretical Flow w/PF	No. of SFE [5][6][7]	Actual Average GPD/SFE / Yr.	SFE [5][6][7]	Person/ SFE [3]	Avg Per Capita/ Day	CF per 4 Mos. [5]	Convert to Gallons	SFE [5][6][7]	Average GPD/SFE/ 3 Mos.	SFE [5][6][7]	Person/ SFE [3]	Avg Per Capita/ Day
Residential	8,017,984	NA	288	76	288	2.25	34	409,557	3,063,486	288	87	288	2.25	39
Commercial [4]	4,134,398	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

(1) Twelve Month Period w/flows acquired from North Gualala Water Company (NGWC)
(2) Four month flow period (June-September 2020/21) w/ flows acquired from NGWC
(3) Person per Household as per 2016 LAFCO Report/2010 Census
(4) Total flows calculated from water meter usage
(5) Residential customers added (Non-permanent)
(6) Includes Ocean View Estates Trailer Park with 58 SFE's
(7) Does not include 94 vacant lots

Table1.4.2-3 provides the actual and realistic Average Dry Weather Flow (ADWF) per customer and will be used to establish the base rate. It will provide important information for billings and future rate studies. This table also uses only permanent residences to establish both average GPD/EDU and average per capita flow. The ADWF was calculated using water metered flow for the months of June – September. The yearly EDU or SFEC per permanent resident was calculated at 107 GPD/EDU, while the ADWF (June-September) EDU is 120 GPD/EDU with the residential per capita flow being 48 GPD/EDU and 53 GPD/EDU, respectively.

Table 1.4.2-3 – Single Family Equivalent and Per Capita Calculation for Permanent Residences Only

Account Type	Annual Average Per SFE User Type [1]				GPD/Capita			ADWF Summer Flow (June-Sept) Avg/ SFE User Type [2]				GPD/Capita (June-Sept)		
	Actual GPD/Yr. (Metered Flow)	Theoretical Flow w/PF	No. of SFE [5][6][7]	Actual Average GPD/SFE/ Yr.	SFE [5][6][7]	Person/ SFE [3]	Avg Per Capita/ Day	CF/ 4 Mos. [5]	Convert to Gallons	SFE [5][6][7]	Average GPD/SFE /3 Mos.	SFE [5][6][7]	Person /SFE [3]	Avg Per Capita/ Day
Residential	6,982,752	NA	178	107	178	2.25	48	348,413	2,606,129	178	120	178	2.25	53
Commercial [4]	4,134,398	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

(1) Twelve Month Period w/flows acquired from North Gualala Water Company (NGWC)
(2) Four month flow period (June-September 2020/21) w/ flows acquired from NGWC
(3) Person per Household as per 2016 LAFCO Report/2010 Census
(4) Total flows calculated from water meter usage
(5) All Residential customers added (Permanent) >20,000 Gal/Yr.
(6) Includes Ocean View Estates Trailer Park with 58 SFE's
(7) Does not include 94 vacant lots

Table 1.4.2-4 is a combined EDU calculation for both GCSD and the SRN service areas. The EDU value currently used by GCSD is 415, which is based on actual billed EDUs, while the EDU calculation for SRN is based on yearly average waste flows using the base of 415 actual EDUs of GCSD and pro-rating the SRN 494 EDUs with an equivalent ratio method. The total combined EDUs entering the GCSD WWTP is 909.

Table 1.4.2-4 Total EDU Calculation with GCSD and SRN

Agency	Years of Flow Record	Combined Avg. Flow	Total Combined	EDU Equiv. Ratio	Total Calculated EDUs/Agency (1) (2)	Total EDUs For GCSD and SRN
GCSD	2015 - 2020	31,600	73,770	0.43	415	909
SRN	2015 - 2020	42,170		0.51	494	

Note: **(1)** GCSD EDUs are based on actual billing units and calculation
(2) SRN 494 EDUs are calculated using the equivalent EDU ratio

Using the FY 2020/2021 water meter data, it was also determined that the overall District-wide permanent residency is 62% (**Table 1.4.2-5**). This calculation was based on residents using more than 20,000 gallons per year of water and it also assumed that a customer was present at their residence for a minimum of 6-months.

Table 1.4.2-5 GCSD Permanent Resident Calculation

Permanent Resident Calculation		
No. Total Permanent SFEC's	No. of SFECs Based on Customer Metered Flows > 20,000 Gal/Yr. (1)	% Perm. Residents
288	198	69

Note: **(1)** Based on data acquired from GCSD metered water usage from FY 2020/2021
(2) Assumes that customer metered flow min. 20,000 gal/year for permanent resident

1.4.3 Current Annual Income and Rate Structure

The current rate structure is as shown within **Table 1.4.3-1** and based upon 2019 data.

Table 1.4.3-1- GCSD Income Sources

Income Source	Percentage of Revenue
Sewer Fees and Special Assessment	71.31%
Sea Ranch Golf Course Sales	6.06%
Leachate Hauling	4.39%
Equipment Rental/Interest/Late Fees	0.31%
CSA#6 Processing Fees/Sonoma County	17.93%
Total	**100.00%**

Residential sewer fees are based on a flat rate with additional surcharges applied when water usage exceeds 76,656 gallons of water and is based on winter flows of the previous year. North Gualala Water provides the GCSD with water usage information monthly. Sewer fees for each residential billable unit billed on the county tax bills are as shown in **Table 1.4.3-2**.

Table 1.4.3-2 Residential Sewer Fees

Sewer Fees Per Billable Unit	2018-2019	2019-2020	2020-2021
Flat Rate Sewer Fee	$771	$786	$802
Annual Standby (Admin) Fee	$51	$51	$51
Special Assessment	$278	$278	$278
County 2% Collection Fee	$22	$22	$22
Total	$1,122	$1,137	$1,153

Commercial units are billed per gallon of water used during the winter months. If a commercial unit uses less than 76,656 gallons of water per year it pays the flat rate as above. **Table 1.4.3-3** depicts rates for commercial sewer. A portion of the commercial customers are billed monthly, while the remaining commercial customers are billed, along with the residential, on the County tax rolls.

Table 1.4.3-3 Commercial Sewer Fees

Commercial Sewer Unit	2018-19	2019-20	2020-21
Cost per gallon over 76,656	0.0270	0.0275	0.0280

Sewer fees are increased by 2% for flat rate and $0.0005 per gallon for commercial every July 1. The **Table 1.4.3-3** does not include flows from the CSA 6 Service Area.

1.4.4 Population and Population Trends

Gualala Community Services District is located within an unincorporated region of Mendocino County. According to the California Department of Finance, Mendocino County grew by -0.5% from 2010 to 2020 (**Table 1.4.4-1**). The California Department of Finance tracks population data for Mendocino County as a whole, and for four communities in Mendocino County, Fort Bragg, Point Arena, Ukiah, and Willits.

Table 1.4.4-1 Mendocino County Population Estimates

State/County/City	Total Population 1/1/2019	Total Population 1/1/2020	Percent Change
California	39,695,376	39,782,870	0.2
Mendocino	88,388	87,946	-0.5
Fort Bragg	7,471	7,427	-0.6
Point Arena	441	451	2.3
Ukiah	16,029	16,061	0.2
Willits	5,117	5,072	-0.9
Balance of County	59,330	58,935	-0.7

On June 9, 2009, the SWRCB issued Order WR 2009-0036-EXEC approving a settlement agreement between the SWRCB's Division of Water Rights Prosecution team and North Gualala on the matters contained in the draft cease and desist order (CDO) and administrative civil liability (ACL) issued to North Gualala. One of the terms imposed by this order states that:

"Until such time as a contingency plan is submitted by North Gualala and approved by the Deputy Director for Water Rights (Deputy Director), North Gualala shall not make any new service connections to its existing water system unless such connections were the subject of an intent-to-serve letter dated prior to October 28, 2008. North Gualala shall provide the Deputy Director with a 30-day written notification prior to making any service connection pursuant to an intent-to-serve letter dated prior to October 28, 2008."

This order remains in effect as of the writing of this Facilities Plan. It is unknown when the moratorium may be lifted. The impact of the Water Moratorium has an effect on the future planning for wastewater expansion. This includes any parcels within the North Gualala Water Company service area. This definition excludes parcels within the SCWA service area which remain unaffected by the moratorium, including those within CSA 6.

1.4.5 Environmental Resources

Analytical Environmental Services (AES), Inc., an environmental firm based on Sacramento, was retained to prepare required environmental documents for the proposed improvements. Refer to the AES California Environmental Quality Act (CEQA)/ National Environmental Policy Act (NEPA) document for additional details (expected completion December 2021).

1.4.6 District Formation and Financing History

The GCSD prepared a financial package that included both grant and loan funds from the State Resources Control Board Clean Water Grant Program to finance the wastewater system improvements as required through a local septic system prohibition from the SWRCB, and as set-forth in WD Permit No. 92-120. A 1913/15 Act Assessment District was formed that created the necessary funding for the local project match of $973,118.18 with total project cost being approximately $7M. Clean water grants were applied to limit the local share. To properly fund the operations and maintenance (O&M), a revenue program was prepared and approved by the SWRCB which established a user fee system adequate to fund operations on an annual basis.

1.4.7 Tri-Party Agreement

An important consideration addressed in this report includes evaluating and updating the District's agreement with SCWA and SRGL based on relevant findings and future cost projections through the agreement provisions. The Tri-party agreement was originally executed on July 1, 1991. The most recent amended agreement as adopted by the Sonoma County Board of Supervisors was signed March 21, 2016. The term of the original agreement was set at 40 years with a caveat that the parties "reconvene to negotiate in good faith" a renewal extension every five years. In general, the Agreement defines the responsibilities of each party along with an initial formula for computing shared operating costs that are subject to updates on an annual basis. The complete agreement can be found in the **Appendix B**.

The salient points contained in the agreement require that SCWA maintain the Sea Ranch North effluent pump station while GCSD is responsible for the force main conveying flows from the effluent pump station to the GCSD treatment plant. Furthermore, SCWA is required to pay their pro-rata share of the cost to GCSD to treat the flows from Sea Ranch North at the GCSD plant from primary to secondary levels. SRGL is responsible for the cost of tertiary treatment and delivering reclaimed water taken from secondary to tertiary standards up to a maximum of 75 million gallons per year. These cost sharing terms and conditions are described in two attachments to the original agreement. Attachment II lays out the pro-rata costs for SCWA secondary treatment while Attachment III outlines the operating costs for treating the flows to tertiary levels and related SRGL billing.

It should be recognized that since the last amended agreement was signed, GCSD has been working with the NCRWQCB to update the existing waste discharge requirements and prepare an approved Title 22 Engineering Report that outlines the new facilities needed for providing tertiary treated water in accordance with state requirements. Various capital improvement projects were required to date as a condition of acquiring the new waste discharge permit and for GCSD to meet related Title 22 requirements. Estimates for related facility improvements and operating costs needed to comply with the Title 22 requirements, and an update to the original costs for treatment, are discussed further in Section 9.

SECTION 2- EXISTING FACILITIES AND WASTEWATER CHARACTERISTICS

2.1 INTRODUCTION

This section describes the existing wastewater collection systems, lift stations, treatment facilities, and wastewater characteristics in more detail. Current operating permits and agreements are presented along with more information regarding the existing relationship between GCSD, SCWA, and SRGL. Portions of the GCSD service area that include on-site systems are introduced in the context of the need for expansion of the collection system. A summary of current O&M procedures and staffing is also presented.

2.2 WWTP PROCESSES

2.2.1 OPERATING PERMITS AND AGREEMENTS

The GCSD WWTP is operated under two permits issued by the NCRWQCB WDR No. 92-120 and 92-121.

WDR No. 92-120

These waste discharge requirements were issued in 1992 and authorize GCSD to treat up to 0.131 MGD (average dry weather flow). Effluent constituent limits are presented in **Table 2.2.1-1.**

Table 2.2.1-1 Waste Discharge Requirements (WDR No. 92-120)

Constituent	Units	Constituent Limits				Type of Sample	Sampling Frequency
		30-day Average	7-day Average	Monthly Median	Daily Maximum		
BOD5	mg/l	10	15	-	20	24-hour composite	weekly
Nonfilterable Residue (TSS)	mg/l	10	15	-	20	24-hour composite	weekly
Settleable Solids	ml/l/hr	0.1	-	-	0.2	grab	daily
Total Coliform Organisms	Most Probable Number (MPN)/100 ml	-	-	2.2	23	grab	twice weekly
Turbidity	nephelometric turbidity unit (NTU)	2	-	-	5	Continuous	daily
Chlorine Residual	mg/l	1.5	-	-	-	grab	daily

In addition to monitoring the constituents above the storage pond, subdrains must be monitored for Total Dissolved Solids, Nitrate Nitrogen, pH, and conductivity.

In 1997 the GCSD monitoring and reporting program was revised to include continuous influent flow monitoring, require coliform sampling once a week instead of twice, and continuous chlorine residual sampling instead of daily grab samples.

WDR No. 92-121

WDR No. 92-121 sets forth provisions regarding the use of the tertiary effluent as reclaimed irrigation water. It also states that the GCSD WWTP is designed to treat up to 0.291 MGD designating 0.131 MGD to Gualala and 0.160 MGD to SRN (secondary effluent).

WDR No. 94-4

WDR No. 94-4 was established in 1994 and includes the discharge requirements for the SRN facility. This WDR assumed the old process train whereby the SRN would treat influent to produce disinfected tertiary and hold the finished effluent in the 8.4 MG storage pond. The WDR also allowed conveyance of SRN's secondary effluent to be conveyed up to the GCSD facility where both GCSD and SRN secondary effluent was blended upstream of the GCSD filtration process.

It should be noted that the filtration and disinfection facilities at SRN have since been abandoned and the SRN primary effluent is now combined with the GCSD influent at the GCSD aeration basin. WDR No. 94-4 has not been updated to reflect this change. WDR No. 94-4 also included provisions to discharge to the SRGL with authorization by the NCRWQCB. The effluent limitations for discharge to the percolation pond are presented below in **Table 2.2.1-2.**

Table 2.2.1-2 Percolation Pond Discharge Requirements (WDR No. 94-4)

Constituent	Units	Constituent Limits	
		Mean	Maximum
BOD5	mg/l	30	60
Nonfilterable Residue (TSS)	mg/l	30	60
Settleable Solids	ml/l/hr	0.1	1.0
Total Coliform Organisms	MPN/100 ml	23	230

Triparty Agreement History

SCWA owns the SRN ponds and pumping station located near the SRGL, an 18-hole golf course. The SCWA is in contract with The Sea Ranch Association (TSRA) to operate the SRN ponds and pumping station. As previously discussed, effluent from the SRN is conveyed to the GCSD WWTP where it is treated to Title 22 disinfected tertiary standards. The three parties (GCSD, SCWA, and SRGL) entered into an agreement in 1991 (amended and approved by Sonoma County Board of Supervisors, March 21, 2016) which specifies the roles, responsibilities, and financial obligations of each agency; this agreement is referred to as the Tri-Party Agreement, see the **Appendix B** for additional details.

The SRN facility is regulated under WDR Order No. 94-4. The initial intent of the operation (as reflected in Orders 92-121 and 94-4) was that the sewage collected from the SRN service area is aerated, filtered, and disinfected at the SRN WWTP prior to conveyance to the GCSD WWTP where it would enter the process train downstream of the secondary treatment for additional filtration and disinfection prior to storage at GCSD. By 2013, primary effluent was conveyed directly from the

SRN facility's aeration pond to the GCSD aeration basin, bypassing the filtration, disinfection, and the use of the 8.4 MG holding pond at SRN as agreed by GCSD and SRN. The intent of this process change was to increase the BOD loading within the GCSD aeration basin to improve plant performance.

Historically, the SCWA by permit has discharged finished effluent to a percolation pond located on the SRGL during years of excessive precipitation. Neither permit authorizes a discharge of finished effluent to the percolation pond for disposal. The NCRWQCB has requested that GCSD through SRN permits report any unauthorized discharges to the percolation ponds within 30 days of the discharge.

In 2016 the Tri-Party Agreement was amended to account for the additional costs in operations and maintenance associated with providing secondary treatment for the primary treated sewage conveyed to GCSD from SRN. However, the aforementioned waste discharge orders have not been updated to reflect these changes. All three parties (SCWA, GCSD, and SRGL) are not reserved to in consolidating these orders into a single discharge order that is representative of the current operations for the GCSD and SRN WWTPs.

Discharge Permit Renewal

As mentioned, the new waste discharge permit would represent the processes changes previously made and also include updated requirements for constituent discharge limits and monitoring. Issuance of the new permit also requires that GCSD provide a Report of Waste Discharge and Title 22 Engineers Report showing that the facility is in compliance with the California Code of Regulation (CCR) for production of recycled water. Many of the facility deficiencies identified within Section 5 of this study are a direct result of the Title 22 requirements which are not currently being met at the GCSD WWTP. It should be noted that MC Engineering has also been tasked with preparing the Title 22 Engineers Report which is currently under review by the NCRWQCB and DDW.

While it is suspected that the new permit will include expanded effluent monitoring requirements including TDS, chloride, sodium, boron, ammonia, nitrite, and nitrate; specific discharge limits have not yet been issued and therefore the secondary treatment analysis presented in Section 4 was limited to carbonaceous biochemical oxygen demand (CBOD) removal and did not include an analysis of ammonia, nitrite, or nitrate removal.

Further, it is expected that the new permit will also incorporate provisions similar to the SRN WDR No. 94-4 which allows discharge to the percolation pond located at the SRGL when authorized by an executive officer. Again, due to the pending status of the permit renewal it is unknown if the percolation pond will be included within the permit as an optional discharge point.

2.2.2 WWTP Processes

Sewage is treated within a complete mix extended aeration basin designed to provide simultaneous nitrification and denitrification in addition to BOD removal which includes secondary clarification with activated sludge return and wasting pumps. The aeration basin consists of a lined earthen pond equipped with (2) 5-Hp floating mechanical aerators and (1) 7.5-Hp floating mechanical mixer. Sedimentation is achieved by one of two secondary clarifiers with activated sludge continuously returned from secondary clarifiers to the aeration basin with the RAS pump station.

Basin Capacity for Biological Treatment

Currently, process control is governed by maintaining a target MLSS of nearly 2,000 mg/L within the aeration basin by wasting to the sludge digester adjacent to the aeration basin on a biweekly basis. At this rate, considering an average annual flow of 0.71 MGD, the sludge retention time (SRT) expected by be nearly 115 days. This SRT is due to the basin's large volume of nearly 361,000 gallons as intended by the original designers. MLSS flows from the aeration basin to a downstream manhole featuring a 12" wide rectangular weir with end contractions. The weir controls the surface of the aeration basin and attenuates flows from Lift Station (LS) 4. Given an initial "no flow" condition into the aeration basin it would require nearly 3 hours of continuous pumping for the outlet flows at the weir to "catch up" with an inlet flow of 380 gpm. Downstream of the weir MLSS is routed to either clarifier for sedimentation/clarification.

Secondary Clarification

Sedimentation of activated sludge is achieved by one of two 24-ft diameters secondary clarifiers. One of the two clarifiers is capable of handling historic peak flows through the plant. The additional clarifier was constructed to satisfy Title 22 reliability requirements. A state point analysis for a single clarifier in service under existing loadings is presented in Section 4. Settled mixed liquor suspended solids (MLSS) is returned to the aeration basin by use of 1 of 2 return activated sludge (RAS) pumps. With both pumps in service RAS may be returned at a rate of nearly 200 gpm. The pump speed is controlled by variable flow drives (VFDs) and a magnetic flow meter downstream of the pumps is used to control the flow rate as well as signal an alarm if no flow is measured after the pumps have been called to run.

Filtration

Secondary effluent flows from the GCSD clarifier to the filters by gravity. To comply with the process redundancy requirements of Title 22, a NOVA® disk filter was installed to operate in parallel with the existing travelling bridge filter in 2016 while providing a redundant unit process for filtration.

TRAVELLING BRIDGE FILTER

The travelling bridge filter has a bed area of 144 sq-ft with a maximum loading rate of 2.0 gpm/sq-ft per Title 22 provisions equating to a maximum treatment of nearly 288 gpm. Backwashes are controlled by a float system. Filters are typically backwashed once daily. Backwash flows drain to the In-Plant Pump Station (IPPS) and are then returned to the aeration basin for treatment.

NOVA DISK FILTER

The Nova Ultra-screen Filter uses a woven stainless-steel media (American Iron and Steel Institute (AISI) 316 Stainless Steel) that features 20-micron cross sectional openings and is capable of retaining finer particles down to 10 microns by a snowball effect whereby the accumulation of larger particles primes the filter to retain those smaller than the 20-micron screen openings.

The Nova disk filter contains two disks, each disk has a surface area of 15.6 sq.-ft. Title 22 provisions limit the loading rate to 6 gpm/sq-ft assuming downstream disinfection processes demonstrate 4-log inactivation of viruses, equating to a maximum treatment capacity of nearly 187 gpm.

Disinfection

Disinfection is achieved in an underground chlorine contact chamber (CCC). The chamber consists of a 48-inch diameter concrete pipe 229 feet in length with a total volume of 21,500 gallons. Initial tracer studies concluded that the modal contact time is nearly 90 minutes with flows near 60 gpm. In an effort to increase the modal contact time by promoting mixing within the CCC, a 1.5" diameter PVC manifold pipe was installed within the first 80ft of the CCC with 1/8-inch holes spaced at 18 inches on center. The manifold is connected to the discharge of a ½ hp submersible pump located in the CCC manhole inlet. After installing the manifold, another tracer study was conducted under the direction of the State Division of Drinking Water (DDW) which showed a peak concentration at 210 minutes with flows averaging 63 gpm. Since the theoretical detention time of the CCC at 63 gpm is 341 minutes, the baffling factor was determined to be nearly 61%. The study also noted that another submersible pump and manifold could be installed within manhole "B" to increase the baffling factor. Recently GCSD installed an additional submersible pump in manhole "B" and an additional tracer study was conducted. In October 2021, the new baffling factor was determined to be 1.0. A schematic of the CCC is shown below in **Figure 2.2.2-1**.

Hach CL17 chlorine analyzers continuously monitor the chlorine concentration feed on the inlet of the CCC as well as the residual concentration on the outlet side in manhole "B". Since both the flow rate and residual chlorine are measured, the CT value is determined by supervisory control and data acquisition (SCADA) allowing an alarm to trigger if the CT value drops below the minimum 450 mg-min/L. The resulting CT values vary between 900 and 500 mg-min/L, depending on the flow rate.

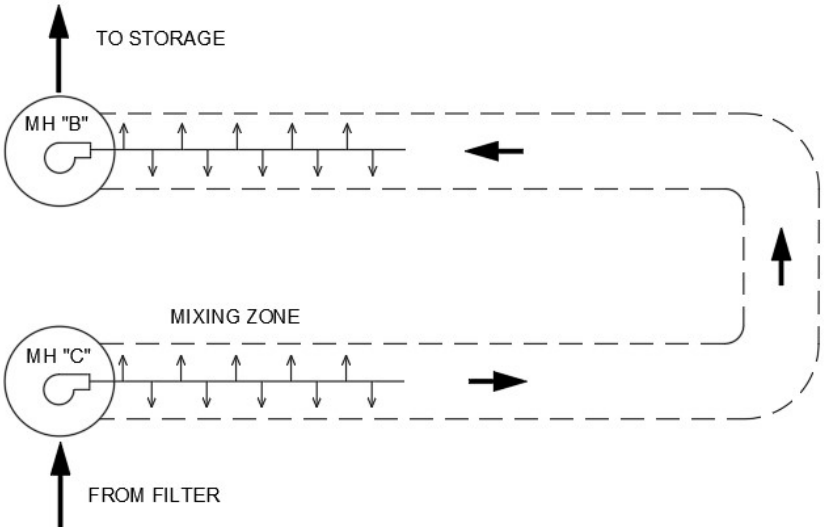


Figure 2.2.2-1 – Chlorine Contact Chamber

The chlorine feed system consists of an on-site chlorine generator. Softened water and a brine solution, prepared by staff, is feed into the generator to produce sodium hypochlorite. The sodium hypochlorite is stored in a day tank, and it feeds the chlorine contact chamber by use of a metering pump. If the metering pump fails, one of the two back up peristaltic pumps will automatically take the lead and resume operation. If the generator fails, one of the two backup 55 gallon drums of sodium hypochlorite can be utilized.

2.2.3 WATER QUALITY CHARACTERISTICS

The combined SRN primary effluent and GCSD raw sewage provide a low- to medium-strength BOD loading which averages approximately 170 mg/l. Influent TKN is estimated to be near 41 mg/l. Data indicating typical influent total organic carbon (TOC), chemical oxygen demand (COD), total dissolved solids (TDS), fats, oils, and grease (FOG), alkalinity, and other trace constituents has not been made available. There are no known industrial discharges received by either GCSD or SRN collections, neither have shock loadings been reported. Sampling of biosolids has indicated that little to no heavy metals are present within the effluent.

2.2.4 DISCHARGE LOCATION AND BENEFICIAL USES

Three tertiary effluent storage ponds exist at the GCSD facility featuring a total combined volume of 20 MG. All three earthen ponds are lined by high density polyethylene (HDPE) or a similar material. A magnetic flow meter is located downstream of these ponds to totalize flow delivered to the Sea Ranch Golf Links for Irrigation. Downstream of the meter, flows are either routed directly to the Sea Ranch Golf Links for irrigation of the 18-hole golf course or diverted to the 8.4 MG holding pond located at the SRN treatment facility.

During winter when there is little to no agronomic demand at the SRGL and the three storage basins, combined with another storage basin at the SRN WWTP, are used to store tertiary effluent until late spring when agronomic demands are supplied with the water until fall.

On numerous winters over the years the capacity of the storage basins has been found to be insufficient for holding all of the finished effluent due to the excessive inflow and infiltration within each collection system. Historically, during wet years when flows began to breach the freeboard of the storage basins, operators have been left with no other option than to route flows to a percolation pond located at the SRGL for disposal. The SRGL percolation pond was previously used by the SRN for disposal of secondary effluent prior to construction of the GCSD WWTP in the early 90s, at which point it was abandoned. Currently, neither the SRN or GCSD discharge permits include any updated provisions for disposing tertiary effluent to the percolation pond, and any emergency discharges to the percolation pond have been initiated only after notifying the NCRWQCB.

Currently, GCSD is pursuing authorization to dispose tertiary effluent to the percolation pond as part of their permit renewal. If the renewed permit does not allow these provisions the construction of more storage basins will be required to manage all of the tertiary effluent produced during periods of wet weather.

SRGL Percolation Pond

The percolation pond is situated in the far northwest corner of the SRGL bound by the Gualala Regional Park on the west, the mouth of the Gualala River nearly 800 feet to the north, and the Pacific Ocean nearly 1000 feet to the south. The elevation of the pond is nearly 60 ft above sea level. The percolation pond is used by the SRN to dispose excessive volumes of tertiary effluent when the level within the 8.4 MG storage pond begins to breach the freeboard. Discharge to the percolation pond was originally authorized under the SRN WDR 94-4.

During times of high inflow and infiltration, when tertiary storage is no longer available, the Regional Water Quality Control Board has required that the SRGL notify them in advance of any planned discharge to the percolation pond including sampling of Nitrate, Chloride, Total Dissolved

Solids, Specific Conductance, and pH from the three monitoring wells outside the pond and from the pond itself.

Data showing the daily percolation pond level and flows discharged to the pond on a daily basis from February to early March of 2017 indicate that a total of approximately 7.85 MG of effluent was disposed at the percolation pond without breaching the pond's freeboard.

The measured pond levels indicated that a maximum percolation rate of nearly 600,000 gpd could be achieved.

2.2.5 Biosolids Management

Sludge Process

Waste Activated Sludge (WAS) is taken off the RAS return line on an intermittent basis and conveyed to the aerobic digester, also referred to as the sludge storage basin. Operators waste about once every 1 to 2 weeks when the MLSS exceeds 2000 mg/L. Wasting is accomplished by operating two gate valves near the aerated pond. In order to waste, the valve to the Aerobic Digester is opened and the valve to the aerated pond is closed temporarily. The Aerobic Digester features the same geometry, volume (361,000 gallons), and liner as the adjacent aeration basin. Intermittently, the aeration is stopped, and the pond is allowed to settle. Supernatant is taken out of the pond and returned to the front of the plant via a floor drain in the RAS pump station and the in-plant pump station.

Biosolids Disposal

Currently aerobically digested sludge is removed from the Aerobic Digester with a "Vactor truck" and trucked to a berm unlined area near the existing plant return pump station. Periodically, the area was allowed to dry, and the digested sludge was worked into the surrounding soil on the GCSD WWTP site. This practice has since been stopped, and biosolids are hauled to the Lystek Facility in Fairfield for recycling. A solids flow diagram is shown below in **Figure 2.2.5-1**.

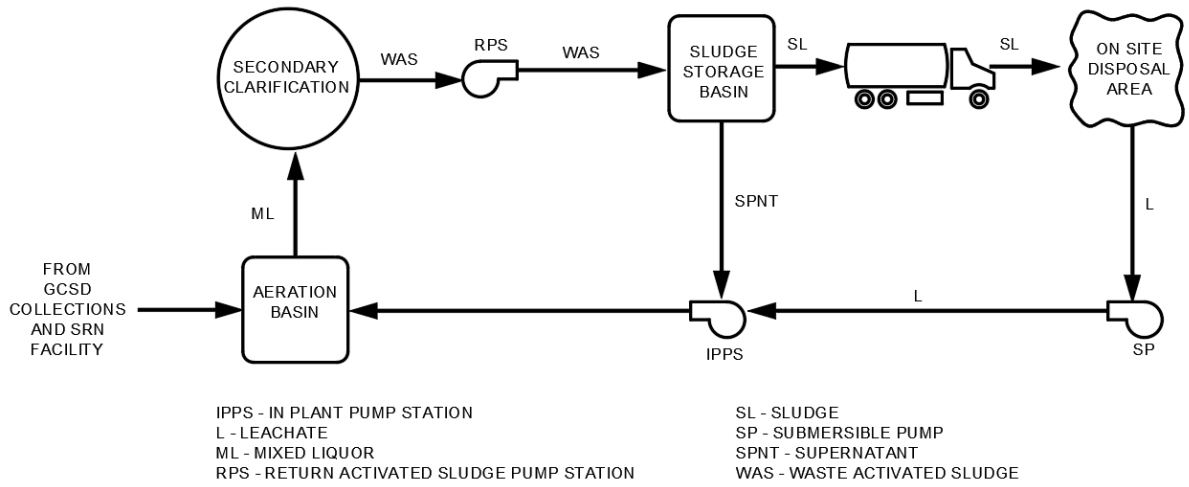


Figure 2.2.5-1 Sludge and Biosolids Process Schematic

2.3 OPERATIONAL, ADMINISTRATIVE AND OTHER FACILITY UPGRADES

2.3.1 Operations and Administration Buildings, Vehicle and Equipment Storage, and Chemical Storage Room

The District currently relies on a temporary mobile office for its administration building which is sited adjacent to the operations building. The operations building is a wood framed structure with wood siding and a metal roof that was constructed in 1992 along with the rest of the facility. The administration building contains the General Manager's office, record storage, and the District's accountant's office, among other things. A sink is located in the building that is fed by reclaimed water from the plant effluent, a practice that should be ceased immediately and replaced with a reliable source of potable water.

The operation of the plant, as a whole, is dependent upon the electrical and control equipment located in the operations building. The building also contains laboratory facilities critical to the on-going monitoring and reporting required for permit compliance.

Equipment storage on the site is provided by two containers, both of which have deteriorated significantly. There is a metal building (approx. 40' x 30') that is used for limited storage or pumps and equipment, shop space, equipment repairs, et

The administration building has reached the end of its useful life. The operations building is in dire need of painting and plumbing retrofits and should be upgraded to make it more fire resistant. Photos of the existing structures are presented below.

2.3.2 Potable Water

There is currently no means of conveying potable water to the GCSD WWTP by means of a dedicated pipeline. Bottled water is used for drinking and the treated plant effluent is used for toilet flushing and at least one sink for handwashing. At one point in the past, potable water was conveyed from the CSA 6 to the GCSD WWTP via a booster pumping system and a 1-1/2" PVC line of unknown location. A 5,000-gallon tank at the plant provided what is noted on the plans as "2-water" for in-plant uses. The 1.5" line was depicted on the design drawings as being in a common trench with other reclaimed water lines. The proximity to the other lines would appear to violate separation standards established in the California public health standards.

Reclaimed water is pumped from the chlorine contact channel to a separate tank, out of which it is boosted by a small centrifugal pump and conveyed throughout the site for various outdoor and indoor uses. Drinking water is delivered with a truck bi-monthly, or as needed, in the form of multiple 5-gallon bottles.

2.3.3 Fire Protection and Related Facility Needs

The GCSD plant and related facilities are located in a Cal Fire designated State Responsibility Area (SRA). Cal Fire provides limited protection to private timber lands, such as those surrounding the plant. However, Cal Fire does place an emphasis on protection of structures. The nearest Cal Fire facility is Station 44 located at the Sea Ranch approximately 5 miles from the WWTP. The travel time is greater than 20 minutes. Currently there are no designated fire protection facilities at the plant other than seasonal reservoirs that might provide a water source if portable pumping or rotorcraft and air drops are employed in firefighting activities. The existing wood structures, in particular, are

vulnerable and there is very limited defensible space around the plant. A map of the Sonoma County SRA and fire risk zones can be found in **Appendix C**. The tertiary storage ponds at the WWTP are typically at their lowest point, or empty, at the most vulnerable point in the fire season that occurs in the late summer/early fall months.

2.3.4 Access Road

The GCSD WWTP is located on the south side of the Gualala River with initial access shared with the Sonoma County Parks campground facility. Immediately after the campground, the road to the plant, which is currently owned by the Gualala Redwoods Timber Company, is unpaved (**Figure 2.3.4-1**). The road consists of relatively well compacted and graded aggregate base material approximately 12 to 16 feet in width. The distance from the campground entrance to the WWTP site is approximately 0.6 miles (3,200 LF +/-). There is an estimated 10 culvert crossings along the access road alignment with numerous cut and fill slopes and drainage crossings leading up to the plant.

Figure 2.3.4-1 Unpaved Access Road

The plant access road was closed off during storm events in 2017 due to failure of a fill bank and a related slide that covered the road. Access was cut off and plant staff had to rely on off-road-vehicles to access the site until such time that the road could be repaired.

2.4 COLLECTION SYSTEM

The GCSD collection system consists of seven miles of gravity and five miles of pressurized sewer pipe. The majority of the collection system is polyvinyl chloride (PVC) pipe. The system begins at the Old Coast Hwy, which is where LS 1 is located. LS 1 is fed from homes located on Old Coast Hwy and Big Gulch Rd. Flow is pumped from LS#1 and runs along Old Coast Hwy to State Hwy 1 where it terminates at LS 2, which is located on Robinson Reef. LS 2 is also fed by homes located on Robinson Reef and Windward Ct. The flow is pumped from LS 2 back to State Hwy. 1 where it then flows to LS 4, which is located on Old Stage Road. LS 3 is located at the end of Coral Ct. and is fed from homes located on Westward Ho, Pacific Dr, and Coral Ct. Flows from LS 3 are pumped to State Hwy 1 and terminates at LS 4. LS 4 also receives flows from Pacific Woods, Sedalia Dr., Hubert Dr., Ocean Dr., Cypress Way, an easement located on the south end of Gualala Supermarket, Center St., and Bodhi Tree Lane. From LS 4 the raw septic tank effluent is then pumped to the WWTP. Please refer to **Figure 2.4-1** for a map of gravity and pressurized sewer mains.

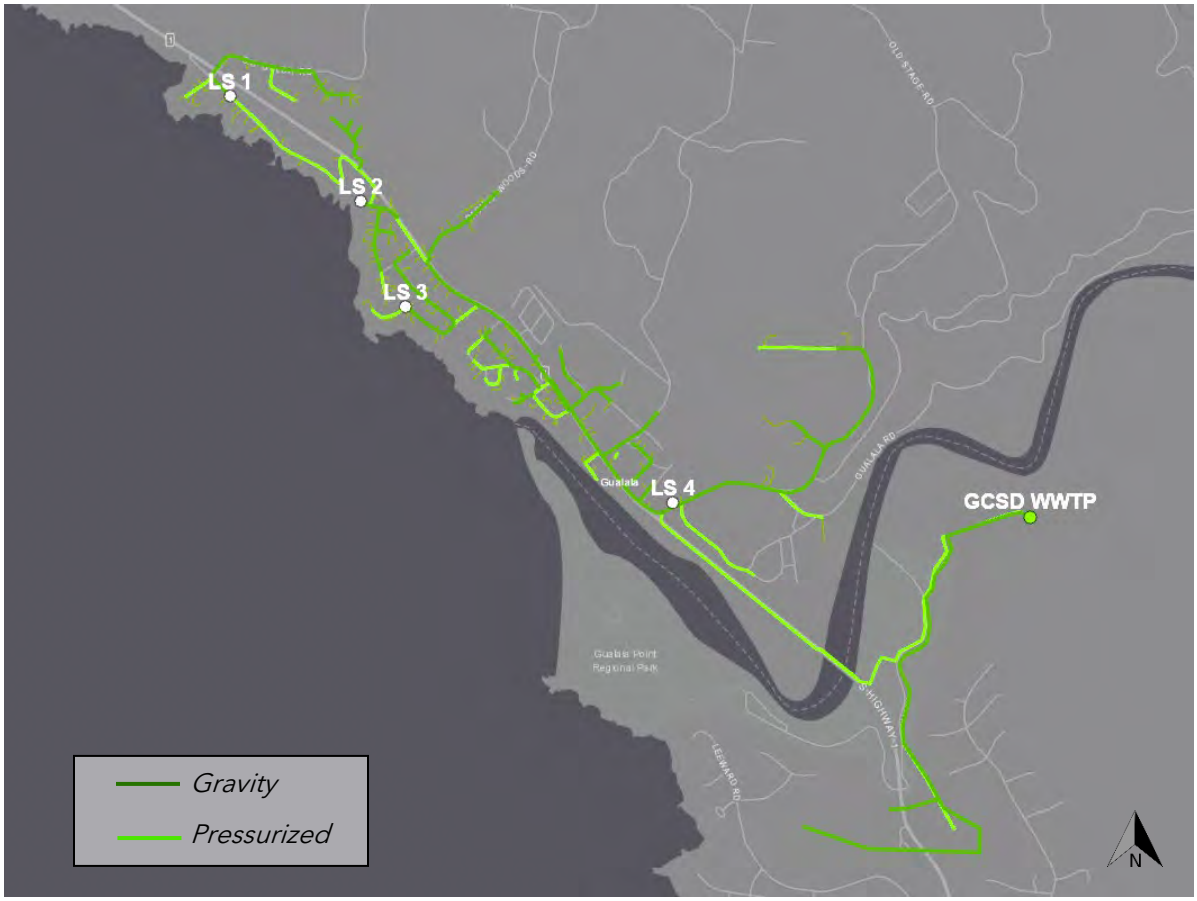


Figure 2.4-1 GCSD Gravity and Pressurized Sewer Mains

2.4.1 GCSD Collection System

Step Systems

In the GCSD STEP system, each connection has a septic tank and pump. Each pump has a control panel. Wastewater from each connection flows into the septic tank, where the solids remain, and the liquid is pumped into the step system with a small diameter lateral. The GCSD maintains 238 septic tanks and 125 pump control panels which range from 1/2 to 2 hp pumps. Because the septic tank effluent is liquid only, smaller diameter collection mains can be utilized.

The District currently maintains a total of 238 existing septic tanks and related control panels, including 177 residential systems and 61 commercial systems. The majority of the tanks are concrete with a fiberglass riser on the liquid side providing access to pumps. Panels are typically wall mounted units that control the pumps based on signals from mercury float switches within the tanks.

Routine maintenance includes, at a minimum, annual pumping and inspections combined with panel upgrades and tank repairs. All work required for the maintenance of the O&M of the STEP systems is performed by the staff of the GCSD, including periodic pumping-out of the interceptor tanks. A typical commercial tank site and panel are depicted in **Figure 2.4.1-1**. The District removes the accumulated solids in the tanks on an as-needed basis and hauls the septage to a permitted facility in Point Arena where it is stored in a pond and land applied in accordance with the permit requirements. The septage disposal site is monitored closely and test results are reported regularly by Mendocino County.

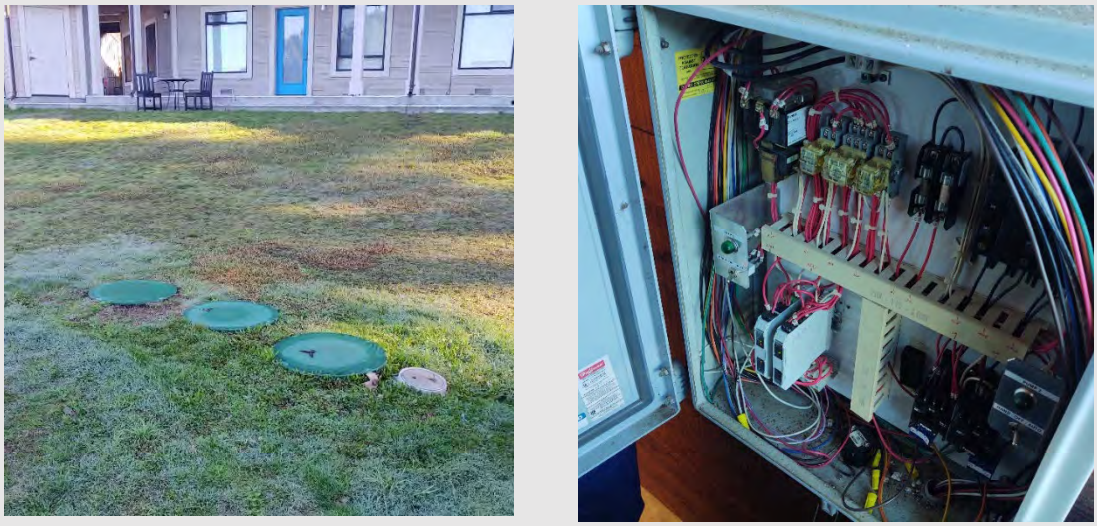


Figure 2.4.1-1 Commercial Septic Tank Lids and Panel

Small-Diameter Gravity

The GCSD STEP system consists of seven miles of small diameter gravity sewer. Small diameter sewer is a variation of a gravity sewer system. Because the collection system only conveys liquid effluent, smaller diameter pipe is used, and manholes are not needed as frequently. Gravity sewer

mains range in diameter from 4 to 12 inches. Pressurized STEP mains become gravity mains as they flow downhill. Where the Hydraulic Grade Line flows downhill, the GCSD small diameter gravity system contains some sections of reverse-grade "Variable Grade Sewer" (VGS).

Variable Grade Sewer

The GCSD collection system includes some segments of variable grade sewer (VGS). The VGS allows gravity lines to have some uphill portions, this eliminates the need for excessively deep sewers or additional lift stations. "A variable-grade gravity sewer operates on the principle of a sink trap. . . If there is positive net fall from inlet to outlet, any amount of liquid put in the upper end will eventually reach the lower end." (USDA 1984) Reverse-grade sections do not create a problem since the solids have been removed. A segment of VGS is illustrated in **Figure 2.4.1-2**.

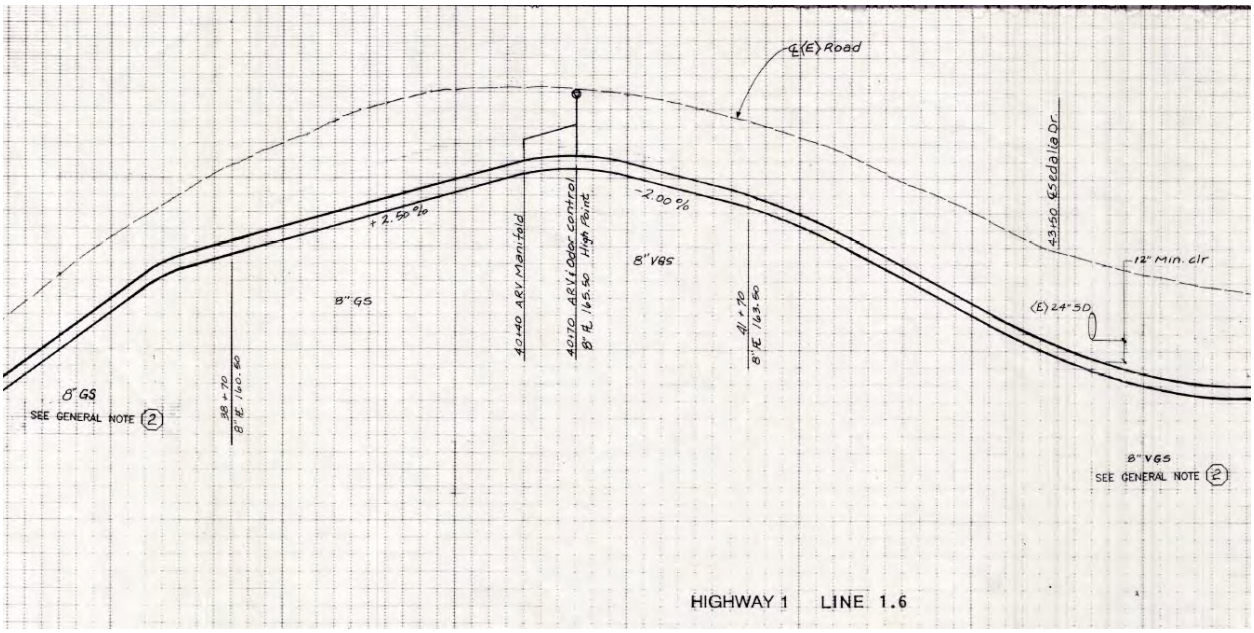


Figure 2.4.1-2 GCSD VGS Example

Pressurized Mains

The majority of the GCSD collection system is gravity driven. Sections of the collection system that do not have a net downhill hydraulic grade line (HGL) are pressurized. There are pressurized uphill mains following LS 1 and LS 4. In addition, a pressurized line runs uphill from Sea Ranch North to the GCSD WWTP.

2.4.2 GCSD Lift Stations

The District currently operates 4 primary lift stations that convey septic tank effluent from residences and businesses in Gualala to the treatment facility on the south side of the Gualala River. As described previously, LS 3 conveys flows to LS 2 and LS 2 and 3 pump into the main conveyance system through the downtown area and ultimately to LS 4. All flows from the north side of the Gualala River are conveyed via an existing 6" forcemain from LS 4 to the treatment facility. A description of each of the 4 stations is presented in this section. **Table 2.4.2-1** includes a summary of the pump types, sizes, and capacities for all four lift stations.

Table 2.4.2-1 Lift Station Pump Information

Lift Station No.	Location	Date Installed	No. of Connections	Zone(s)	Pumps	HP	Manufact	Pump Station Type	Diameter	Capacity (gpm)
1	37891 Old Coast HWY	1993	30	2	1 of 2	3	Flygtt	Submersible	3	150
					2 of 2	3	Flygtt		3	130
2	38101 Robinson Reef Dr	1993	54	1 & 2	1 of 2	7.5	Flygtt	Submersible	3	360
					2 of 2	7.5	Flygtt		3	360[1]
3	38600 Coral Ct	1993	31	1	1 of 2	3	Flygtt	Submersible	3	140
					2 of 2	3	Flygtt		3	140
4	Old State HWY & S. HWY 1	1993	123	1 & 2	1 of 5	10	Goulds	Five Stage Centrifugal	6	100
					2 of 5	10	Goulds		6	100
					3 of 5	30	Moyno	Progressive Cavity	6	320
					4 of 5	30	Moyno		6	365[2]
					5 of 5	30	Moyno		6	410

Notes:
1. Flow assumed same as Pump 1. Pump 2 inoperable during January 2020 flow tests performed by MC Engineering and GCSD staff based on timed wetwell drawdown tests
2. Taken as the average between pumps 1 and 3 based on January 2020 flow tests performed by MC Engineering and GCSD staff based on timed wetwell drawdown tests

Lift Station 1

LS 1 is located off of the Old Coast Highway and is the most northerly lift station. It also includes two submersible pumps in a precast concrete circular wetwell. Similar to stations 2, and 3, adjacent piping and valving is located in a nearby vault. The adjacent vault contains a check valve and gate valve on each discharge as well as a wye that combines flows prior discharging into the related force main that conveys flows to LS 2. During the October site visit the valve vault was full of water, indicating a need form improved drainage in the vault. A ground mounted control panel is adjacent to the wetwell and is used to house motor starters and a small programmable logic controller (PLC) and radio to monitor and control the pump run status and alarm conditions. Operators can also start and stop the pumps remotely from the central control computer located at the WWTP. When in "Auto" pumps start and stop based on the position of mercury float switches in the wetwell. Photos of LS 1 and related appurtenances are presented in **Figure 2.4.2-1**.

Figure 2.4.2-1 Lift Station 1 from Street and Under Hatch

Lift Station 2

LS 2 is located off of Robinson Reef Drive at the end of a private driveway. It is equipped with two somewhat larger submersible pumps in a precast concrete circular wetwell and adjacent piping and valves are located in a nearby vault. Flows from adjacent homes and LS 1 discharge into the LS 2 wetwell. The adjacent vault contains a check valve and gate valve on each discharge as well as a wye that combines flows prior discharging into the related forcemain that conveys flows to LS 4. Corroded piping has been replaced in some areas with smaller diameter pipes. A ground mounted control panel is adjacent to the wetwell and is used to monitor and control the pump run status and alarm conditions. Operators can also start and stop the pumps remotely from the central control computer located at the WWTP. While in "Auto" pumps start and stop based on the position of mercury float switches in the wetwell. There is no level or flow monitoring capability. The access driveway to LS 2 is in need of repair. Wiring and corrosion are reportedly significant concerns for the LS 2 control panel, in particular seen in **Figure 2.4.2-2**.

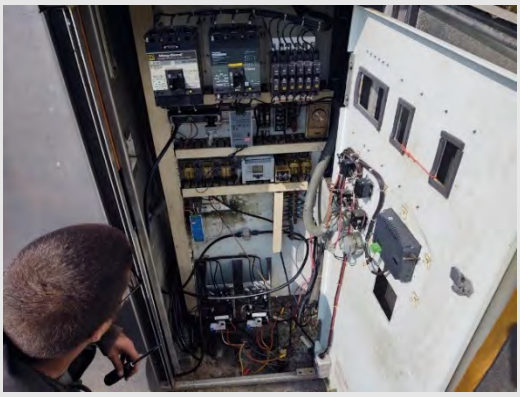


Figure 2.4.2-2 Lift Station 2 and Panel

Lift Station 3

LS 3 is located on Coral Court and it includes two submersible pumps in a precast concrete circular wetwell with piping and valving in a nearby vault. The adjacent vault contains a check valve and a gate valve on each discharge as well as a wye fitting that combines flows prior discharging into the related forcemain that conveys flows to LS 4. A ground mounted control panel is adjacent to the wetwell and is used to monitor and control the pump run status and alarm conditions. Operators can also start and stop the pumps remotely from the central control computer located at the WWTP. While in "Auto", pumps start and stop based on the wetwell depth as determined by mercury float switches in the wetwell. There is no level or flow monitoring capability. The wetwells at LS 1, 2, and 3 were recently lined with an interior epoxy coating system to address cracks, spalling, and related inflow and infiltration problems. Since that time, inflows have reportedly been significantly lower. Photos of LS 3 and related appurtenances are presented in **Figure 2.4.2-3**.

Figure 2.4.2-3 Lift Station 3

All existing control panels for LS 1, 2, and 3 are scheduled for replacement. Much of the wiring has corroded and there is limited control capability. The existing discharge piping at each station is severely corroded and the check valves are generally in disrepair, as are the springs on the hatches and other ferrous metals that have broken down in the marine air. Pump rails are galvanized steel and have localized areas of corrosion. None of the stations are equipped with a bypass connection. LS 4 is the only station with flow metering. No analog level controllers are installed to monitor the levels in LS 1, 2, or 3. All of the smaller lift stations include a plug to accommodate a portable standby generator. None of the sites have a water service connection to serve a hose bib for washdown and there is limited lighting at each site to accommodate night-time emergencies.

Lift Station 4

LS 4 is located in/below a masonry building near the intersection of Old Stage Road and Highway 1. It serves as the main station that conveys all flows from Gualala, across the Gualala River and on to the WWTP. There are two smaller 10 HP five stage Gould centrifugal pumps and three larger 30 HP Moyno progressive cavity pumps at LS 4. Both of the 30 HP pumps are rated at 175 gpm at 376' total developed head (TDH). Operators recorded the maximum flow with two large pumps running at 381 gpm and 81 gpm with the two smaller low flow pumps running. A standby generator capable of operating the lift station is located on the first floor of LS 4. Photos of LS 4 and related appurtenances are presented in **Figure 2.4.2-4**.

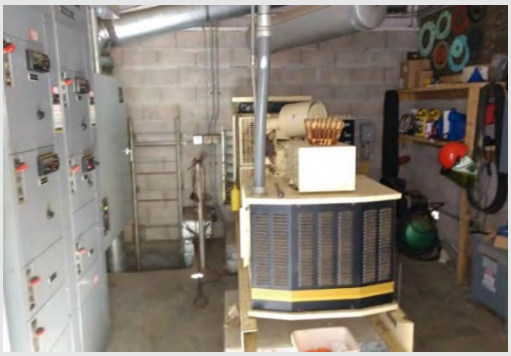


Figure 2.4.2-4 Lift Station 4 Pumps and Panels

2.4.3 SEPTAGE DISPOSAL SITE

The nature of the STEP systems requires that the solids be removed from the septic tanks and disposed of separately. All septage is removed from the septic tanks by GCSD staff as part of routine maintenance. The material is pumped into a truck and hauled to a permitted disposal site near Point Arena. The state/county approved, permitted, and monitored Point Arena disposal site has been serving areas south of the Navarro River since the early 1970s. Material is dumped into an earthen pond/ditch where liquids are allowed to percolate into the native soils and solids are subsequently land applied to the adjacent pastureland. Recently, a cast in place concrete inlet channel was constructed that includes removable screens that are designed to separate large objects like face masks and rags, a condition made worse due to the proliferation of masks associated with the Covid 19 pandemic. A series of monitoring wells downgradient of the disposal site are sampled and reported regularly by the Mendocino County Public Health officials. Photos of the pond/ditch, intake structure, and adjacent grazing lands where the biosolids are applied are presented in **Figure 2.4.3-1**.

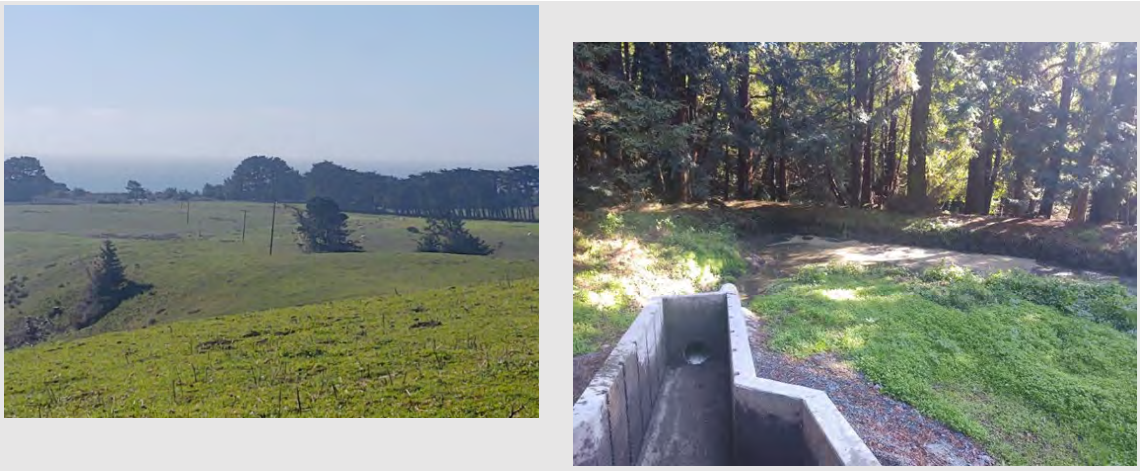


Figure 2.4.3-1 Septage Disposal Site

2.4.4 SEA RANCH NORTH COLLECTION SYSTEM AND CSA 6 FACILITY

The Sea Ranch North (SRN) Collection System includes 11 miles of 4"-12" PVC and asbestos cement (AC) gravity sewer and force mains. The majority of the pipeline is gravity. Sewage is collected from the northern portion of the Sea Ranch development. Flows from the SRN are conveyed by four dedicated lift stations to the CSA 6 primary pond where the liquids are subsequently pumped to GCSD for secondary and tertiary treatment before it is returned for disposal at the Sea Ranch Links golf course.

2.5 UNSEWERED AREAS

2.5.1 UNSEWERED AREA ZONES

The GCSD service area is separated into 5 zones. Zones 1 and 2 include the downtown area and lower elevations, respectively, which are currently connected to the STEP system. Zones 3 and 4

were annexed into the GCSD service area after construction of the initial project. Zone 5 includes areas in the northernmost reaches of Old Stage Road as well as Ocean Ridge Drive.

In order to serve Zone 5, a local agency formation commission (LAFCO) approval and formal annexation would be required. During the course of the study, the alignments in Zone 5 were surveyed and mapped and preliminary budgets were included for future consideration, pending LAFCO approval and identification of funding to extend service.

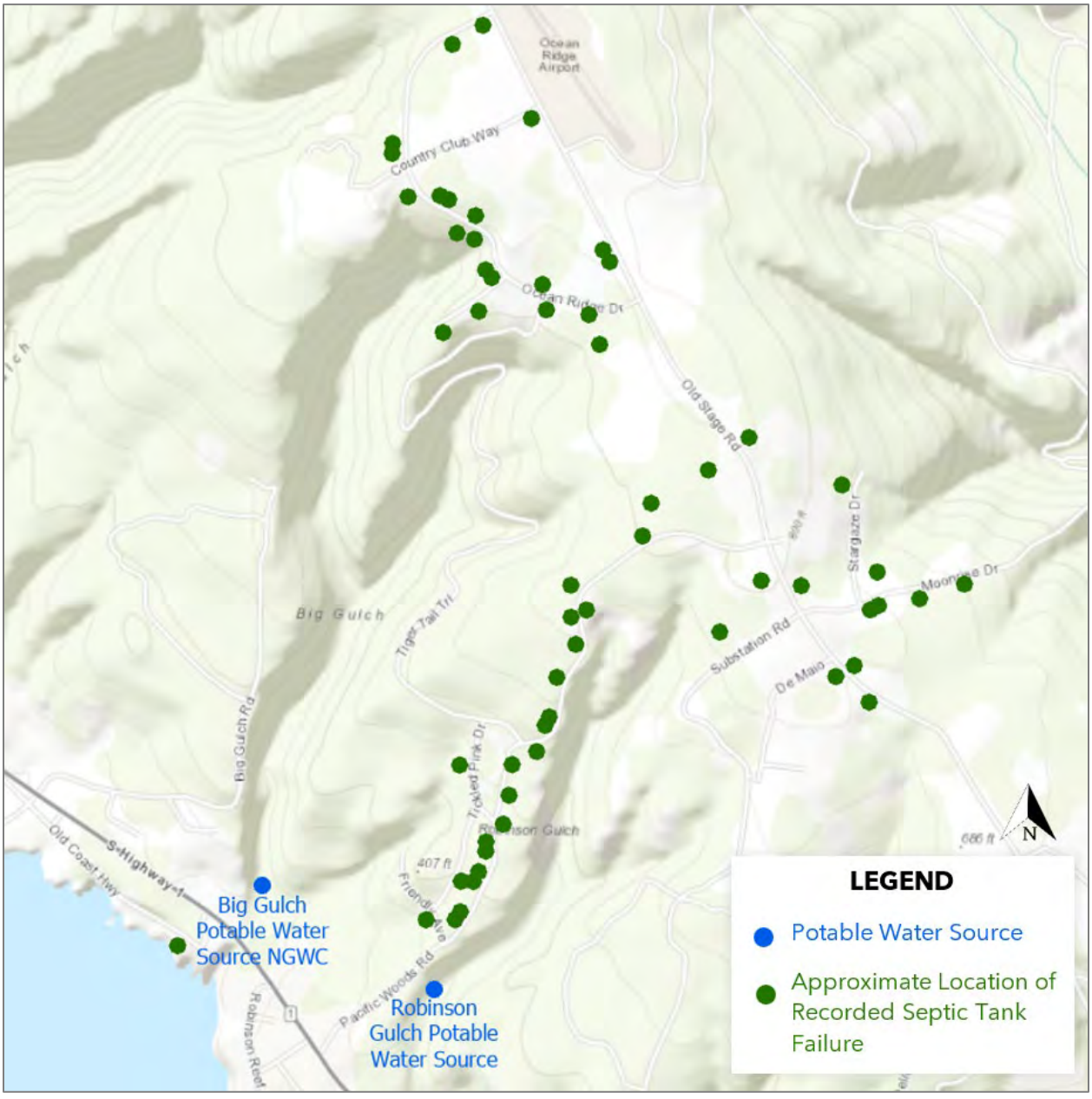


Figure 2.5.2-1 NGWC Potable Water Sources with Respect to Recorded Septic Tank Failures

2.5.2 Existing On-site Systems

All of Zones 3, 4, and 5 currently utilize on-site septic systems. Many of these systems were installed in the late 1960's and early 70's. The systems typically include a concrete septic tank and an adjacent leach field, many of which are marginalized and failing due largely to the proximity of trees and resulting root intrusion.

Figure 2.5.2-1 illustrates the approximate location of recorded septic tank failures[1] with respect to the primary drinking water sources for North Gualala Water Company (NGWC). NGWC serves approximately 1,000 connections in Gualala and nearby Anchor Bay. Big Gulch and Robinson Gulch are perennial streams that are directly downgradient of aging and failed septic systems. Continued use of failed septic systems can potentially pose a health risk to the community. NGWC also maintains a well to the east in an area known as "Elk Prairie" near the Gualala river.

The following table illustrates the approximate number of unsewered connections in each zone:

Table 2.5.2-1 GCSD Number of Unsewered Connections Per Zone

Zone Number	Total Unsewered Connections
1	-
2	-
3	91
4	132
5	116

Note: Vacant lots are not included in the "total unsewered connections" due to the current building moratorium.

2.6 O&M PROCEDURES AND STAFFING

2.6.1 WWTP, Title 22, and Biosolids O&M

GCSD currently retains 4 staff including a General Manager, Lead Operator/Lab Director, two Operators in Training (OIT), and an Administrative Assistant. All staff, with the exception of the Administrative Assistant, participate in the operations and maintenance functions. Job descriptions for each role are summarized as follows:

General Manager

Responsible for administration, operation, and maintenance of entire district infrastructure. Exercises direct authority over all system functions, personnel, and customer relations in accordance with approved policies and procedures. Inspects plant regularly. Analyzes and evaluates operation and maintenance functions and initiates or recommends new or improved practices. Develops plans and procedures to insure efficient plant operation. Recommends plant

[1] Septic tank failure records are primarily obtained from routine home sale inspections. The majority of failures are due to root intrusion in the leach field (**Section 3.4.1**). Many failed systems have since been repaired, while other systems have failed without being discovered.

improvements and additions. Collates data and prepares or reviews and approves staff reports and budget requests. Responsible for expenditure of budgeted funds and requests approval for major expenditures, if required. Recommends specifications for major equipment and material purchases. Organizes and directs activities of plant personnel, including training programs and delegation of duties to the Lead Operator. Maintains effective communications and working relationships with employees, government officials, the general public and performs other duties as required. This position is a salaried position with negotiated benefits. The GM must hold a Grade III SWRCB Wastewater Treatment Plant Operator or higher as well as a Class C California Driver's License.

Lead Operator/Lab Director

The Lead Operator position serves as the operator in charge during any given shift and is second in command to the General Manager. The incumbent is guided by assignments received from the General Manager but exercises independent judgment in accomplishing the work. This is a safety-sensitive position. The position requires a minimum of 5 years' experience and a valid California Class B Driver's License.

The fundamental reason for the existence of the Lab Director classification is to supervise the operation of the Districts laboratory, and to perform a variety of complex chemical, bacteriological and physical analyses. The incumbent is designated Laboratory Director as defined by Title 22, Section 64817 of the California Code of Regulations.

The Laboratory Director is the first line Directory classification in the Laboratory Analyst series. Under general direction, the incumbent supervises the activities of the laboratory at the Districts WWTP and to perform the most complex laboratory analyses. The Laboratory Director is responsible for the supervision of the laboratory staff and the overall performance of the laboratory. The Lab Director must possess a Grade I Laboratory Analyst/Water Quality Analyst Certificate from California Water Environment Association (CWEA) is required.

Operator In Training (OIT)

The OIT serves under the direction and supervision of the General Manager or Plant Operator and works to efficiently and productively provide assistance as needed in the repair, replacement, operations and maintenance of District facilities; performs a wide variety of semi-skilled and skilled tasks. The operator-in-training also performs laboratory tests under the direct supervision of the General Manager or Plant Operator and performs other duties as required. This position is an hourly position. The position requires a SWRCB Wastewater Treatment Plant Operator-in-Training certificate.

Administrative Assistant

The Administrative Assistant works under supervision of the General Manager; acts as secretary to the General Manager; attends to administrative detail on special matters assigned by the General Manager; composes correspondence on own initiative on matters not requiring personal attention of the General Manager; writes reports and letters; acts as Office Manager in the absence of the General Manager. The Administrative Assistant prepares agenda; transcribes and edits minutes; prepares drafts of agenda items requiring action by the Board; gives information to organizations, employees, customers and the general public regarding District matters; prepares correspondence and maintains files on official actions of the Board and the General Manager. The Administrative assistant acts as District Treasurer, being responsible, under the direction of the General Manager, for depositing, withdrawing, and transferring District funds, and preparing a

monthly Treasurer's Report. The Administrative Assistant performs all Accounts Payable, Accounts Receivable, Payroll functions, using a computer accounting program; general accounting functions, support to outside auditor, prepares relevant documentation for the District Auditor, monthly preparation of financial reports including the income statement and balance sheet, and performs other duties as required. This position is an hourly position. He/she must have completed twelve (12) semester hours of professional accounting (one year of additional qualifying experience may be substituted for the education requirement), and the equivalent to completion of high school (grade 12).

2.6.2 Collection System and Pump Station O&M

The septic tank O&M includes regular inspection and, when warranted pumping of the solids prior to trucking and disposal at the permitting site near Point Arena. Septage pumping is performed by the OIT staff who spend a majority of their time on this activity. The pumping operations requires a Class B driver's license. As a result, either the GM or the Lead Operator must assist in the collections work involving the GCSD Vactor truck. A majority of the O&M is performed at the LS's 1, 2, 3, and 4, including daily readings and inspections, repairs and periodic replacement of pumps, upgrades to control panels and SCADA. Emergency call-outs are encountered on a periodic basis.

2.6.3 STEP System O&M

The current O&M required for STEP Systems includes periodic inspections and pumping out solids from interceptor tanks. Other maintenance tasks include and are not limited to repair and replacement of small STEP system pumps, control panels, repair and replacement of cracked and old and deteriorated interceptor tanks, emergency call-out per alarms and customers.

SECTION 3- DATA COLLECTION AND RECORD SEARCH

3.1 INTRODUCTION

This section describes the data collection process and records used as a basis for preparing the recommendations in subsequent sections. It is intended to describe, in general, the level of information utilized at this initial planning level. Each respective project will require additional investigative efforts at the predesign and design level to confirm conditions and, ultimately serve as the basis for design.

3.2 WWTP

3.2.1 GCSD AND SRN INFLUENT FLOW DATA

Record influent flow data from October 2009 to as recent as January of 2021 was made available for analysis. The data consisted of the daily volume of sewage received for both the GCSD collection system and SRN facility.

3.3 COLLECTION SYSTEM

3.3.1 GCSD COLLECTION SYSTEM AND LIFT STATIONS

A majority of the GCSD collection system consists of force mains which make it difficult to inspect the pipelines, so there is very little data available to monitor both conditions and flows within the collection system. The existing lift stations have hour-meters, but they have not been replaced and/or read on a regular basis. To acquire wastewater flow-data form the lift stations, the staff of the GCSD and MC Engineering installed data loggers at the following locations: LS No. 1, 2, 3, and 4. Refer to **Figure 3.3.1-1** to see the existing lift station shed area.

Historic Lift Station/Pump Records

Prior to installation of the Hobo dataloggers, the only data available on pump run times was the total elapsed time for each station. No flow data or interval data was recorded in the past by GCSD staff.

Hobo Data Loggers and GCSD Lift Station Wet Weather Flows

In order to evaluate inflow and infiltration in the GCSD collection system, MC Engineering retained Southport Controls to install "Hobo" data loggers at the lift stations to record pump run times which were later converted to flow rates. A detailed analysis of the wet weather flow data is presented in Section 4.

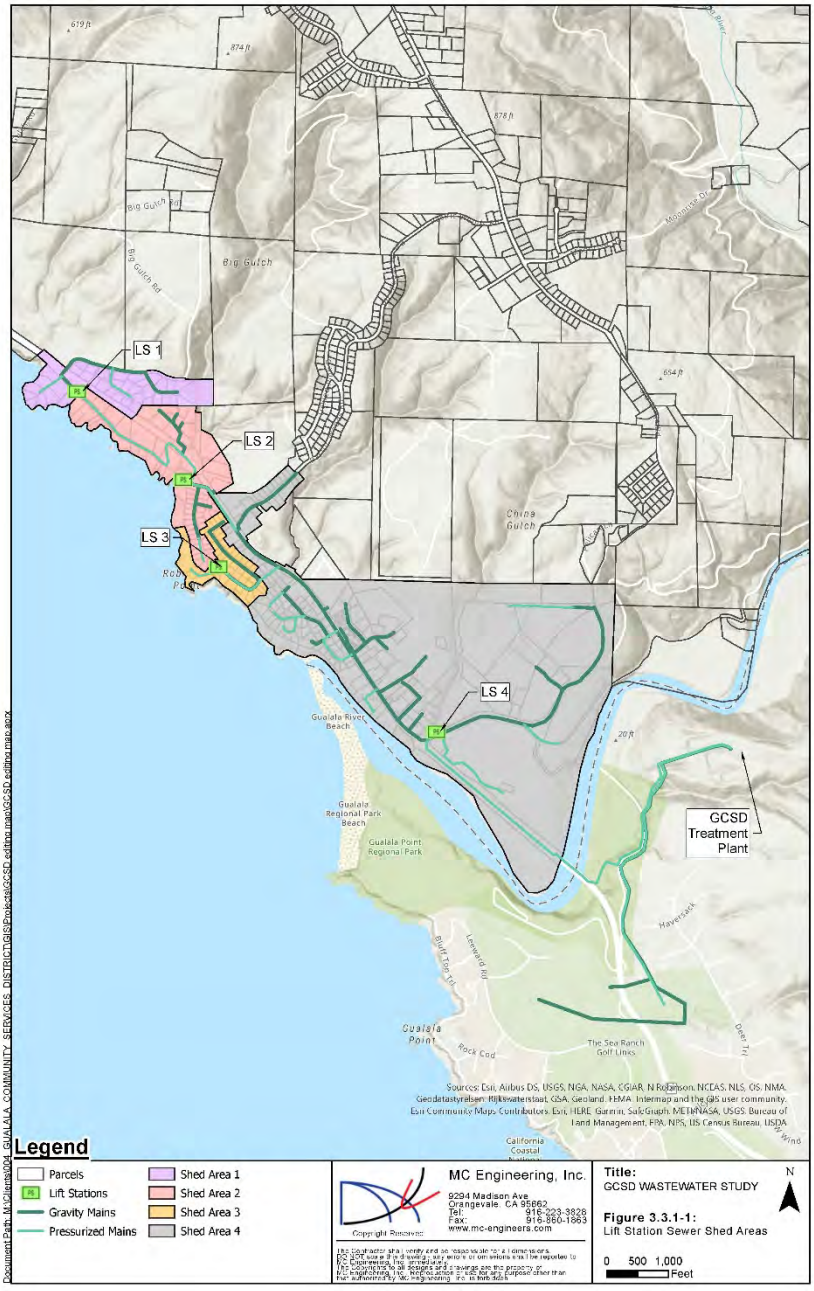


Figure 3.3.1-1 Lift Station Sewer Shed Areas

Septage Receiving Facility Records

Records for both the time and quantity of the septage waste has been tracked by the staff of the GCSD. These quantities were tabulated (see **Table 3.3.1-1**) by MC Engineering and used for subsequent analysis of the on-site septage receiving facility as described further in Section 4.

Table 3.3.1-1 Septage Hauling Records in 2020

Number of Trips (avg. year)	Average Truck Load (gals)	Cost per Load	Distance Traveled Round Trip (miles)	Average Time Spent per Trip (hrs)
68	1,100	$550	35	4

Collection System Mapping

Record Drawing Tool

As part of the grant funded planning work, MC Engineering scanned record drawings and saved them into Dropbox Cloud Storage in PDF format to create a record drawing tool that can be accessed both in the field and office. A digital map was created in Esri ArcGIS format in which record drawing coverage area is represented by green rectangles. The map user can click on a rectangle to view information about the sheet contained in a database created by MC Engineering along with a link to the PDF. The database can be filtered based on the date, engineer of record, and other search parameters. Record drawings can be filtered as shown in **Figure 3.3.1-2**.

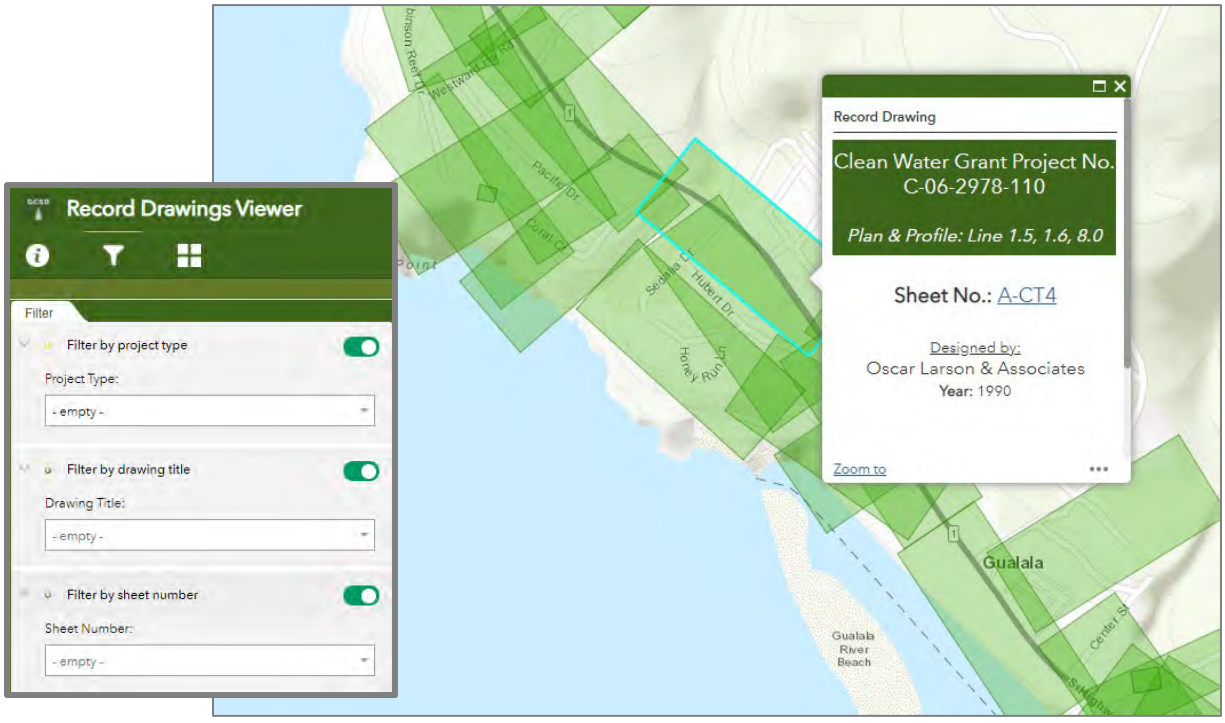


Figure 3.3.1-2 Record Drawing Organization Tool

GIS-Based Asset Database

The record drawing tool was used as a foundation for creating the GIS-Based Asset Database. The Asset Database consists of high-accuracy location representations of selected above-ground assets and schematic representations of below-ground collection mains. Please refer to **Figure 3.3.1-3** for a sample representation of the asset database.

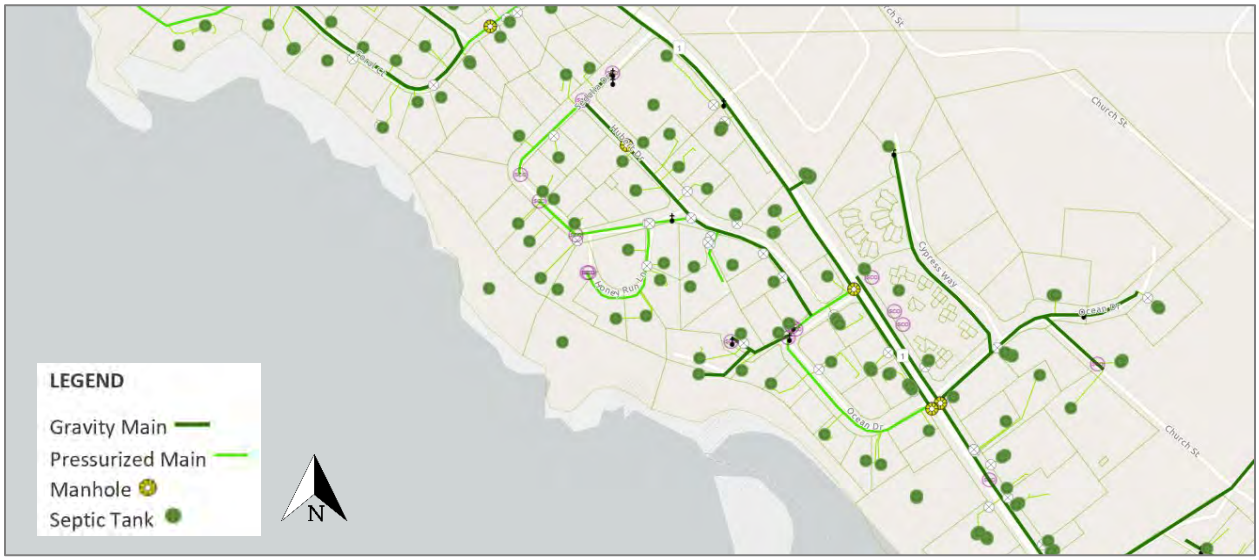


Figure 3.3.1-3 GIS-Based Asset Database Sewer Collection System Map

The following above-ground assets have been geographically located by MC Engineering as part of the grant funded study:

- Septic Tank Lids
- Manholes
- Clean Outs
- Pump Stations

Many of the following above-ground assets have also been geographically located:

- Lateral Valves
- Septic Tank Pump Control Panels

Above-ground assets were located with a combination of drone photogrammetry and hand-held GPS. Please refer to **Figure 3.3.1-4** for a sample of drone photogrammetry imagery.

Both gravity and pressurized collection system mains have been schematically represented. Collection system mains are classified by diameter and conveyance method. Customer service laterals have also been schematically represented. Parcel Locations, assessor's parcel numbers (APNs), and addresses have been added to the map.

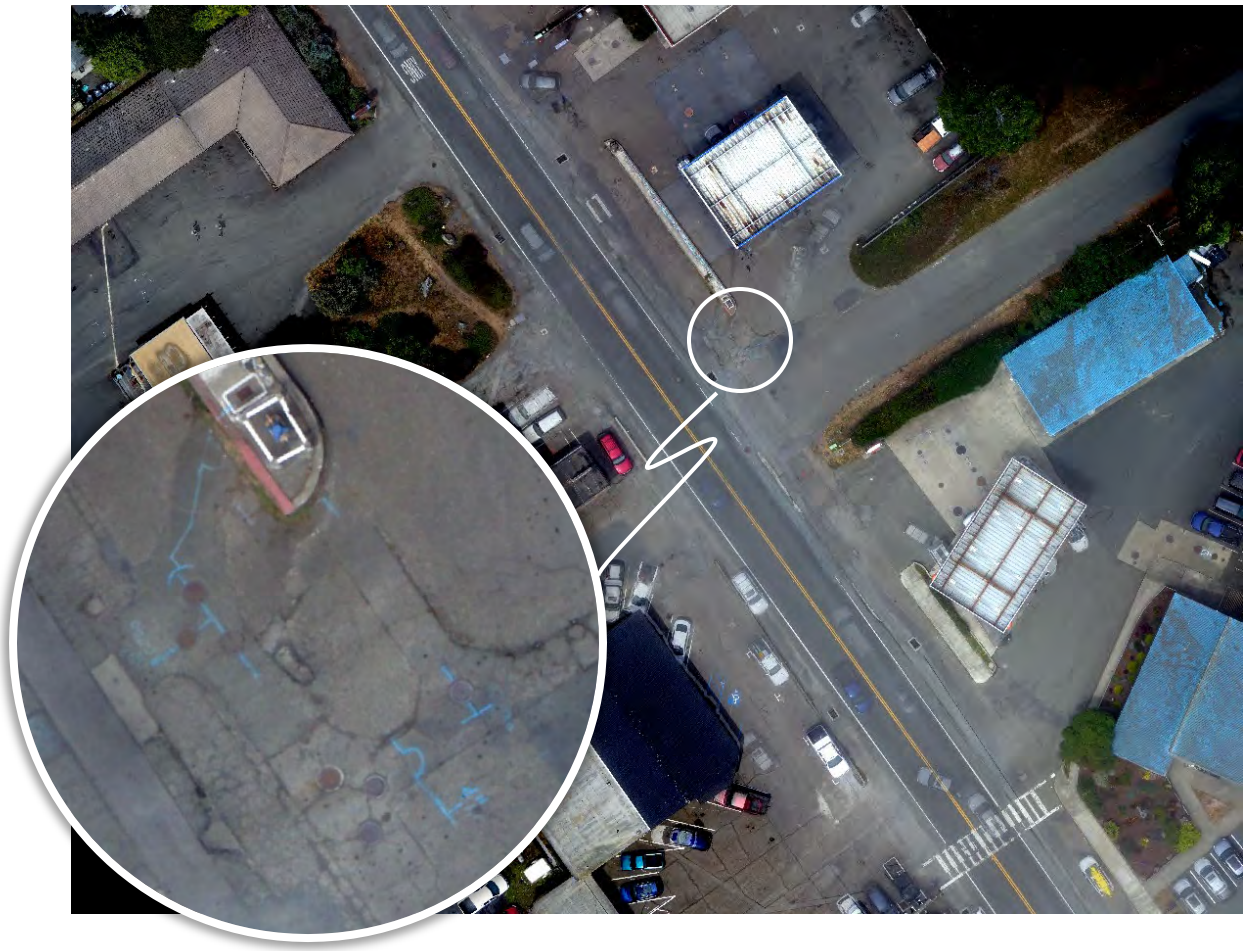


Figure 3.3.1-4 Drone Photogrammetry Sample

3.3.2 Sea Ranch North Collection System

Quantification of Wet Weather Flows (Sea Ranch North)

To date no flow monitoring has been performed within the sewer sheds of the SRN collection system in an attempt to quantify inflow and infiltration. The available flow data has been limited to ultrasonic measurements taken at the headworks of the SRN facility, which are reportedly inaccurate due to conflicting readings between CSA 6 and GCSD through calibration and the daily totalized flow conveyed from the SRN primary pond to GCSD's aeration basin.

Raw sewage produced by the SRN collection system is stored within the primary pond downstream of the headworks at the SRN treatment facility. GCSD staff convey primary sewage to the GCSD treatment facility by calling the SRN pumps to run as required to maintain adequate freeboard within the primary pond. Since flows generated by the SRN collection system are attenuated by the volume of the primary pond, the maximum daily flow conveyed to GCSD for treatment is primarily a function of the primary pond characteristics, pump capacity, and the pumping schedule as managed by the operators. Parameters of the storage and conveyance system are shown in **Table 3.3.2-1**.

Table 3.3.2-1 SRN Primary Pond and Pumping Parameters

Parameter	Value
Capacity at Freeboard	2.6 MG
Surface Area	46,617 sqft
Side slopes	3:1
Depth	8 feet
Maximum pump capacity	90 gpm

Historically, maximum flows received at GCSD have occurred as a result of conveying flows from the SRN facility and the GCSD collection system simultaneously. Ideally, pumping from the SRN primary pond would be reduced or suspended altogether during events of high precipitation when LS 4 is cycling frequently, or prior to the day when severe wet weather is expected. The volume of flow accumulated at the SRN primary pond would then be conveyed to GCSD as soon as dry weather prevails to avoid dual wet weather loadings on the plant.

The limitations of this approach were realized during early 2019 when severe wet weather required nearly continuous pumping from January to May to maintain adequate freeboard within the SRN primary pond. The graph presented in **Figure 3.3.2-1** shows the daily flows conveyed from both the SRN primary pond and GCSD collection system to the GCSD WWTP from late January to early May of 2019. As identified on the graph, pumping from the SRN facility was significantly reduced on days where high flows were received from the GCSD collection system. Despite efforts to reduce pumping from the SRN facility the total flow received at GCSD reached a historic 0.247 MG on February 26th. Had no flows been conveyed from SRN, the total flow would have been limited to the 0.205 MG generated from the GCSD collection system on that day.

Had there been sufficient storage within the primary pond, pumping from SRN would have been ceased altogether in anticipation of high precipitation. The reduced pumping as shown on February 13th, and 26th; as well as March 25th suggests that at no time adequate freeboard was available within the primary pond. This is also evidenced by the average pumping flow rate of 58 gpm during the 3-month period, the maximum pump capacity is 90 gpm; however mechanical issues associated with the pump have required a reduced rate of nearly 60 gpm.

An analysis to determine the effects an increased pumping capacity at the SRN facility would have had, in an effort to decrease loadings at the GCSD facility, is presented in Section 4.4.

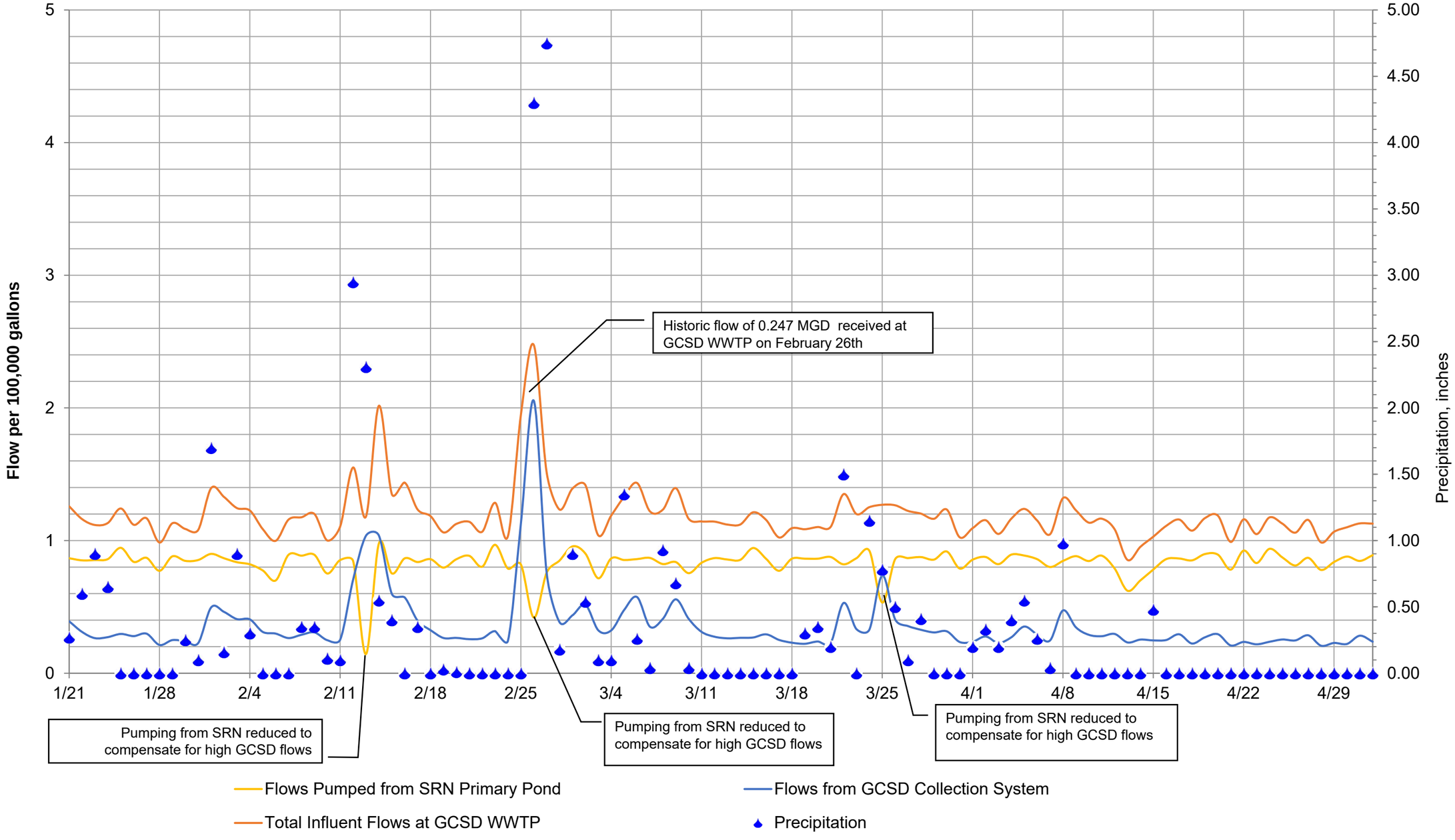


Figure 3.3.2-1 GCSD WWTP 2019 Influent Flows and Precipitation

3.4 UNSEWERED AREAS

3.4.1 POLLUTION STUDY EVALUATION INCLUDING SEPTIC SYSTEM FAILURE RATE (UNSEWERED – ZONES 3, 4, & 5)

The Gualala Community Services District (GCSD) was formed in 1986 after the Mendocino County Board of Supervisors approved district boundaries and gave approval for district formation. This approval was the result of the SWRCB adding the Gualala community to the list of eligible communities following the results of a 1987 pollution study. The existing GCSD wastewater treatment system was completed in 1993. At the time, no funding was allocated to Zones 3, 4, or 5. Zones 3 and 4 are within the CSD boundaries, however Zone 5 has not yet been annexed.

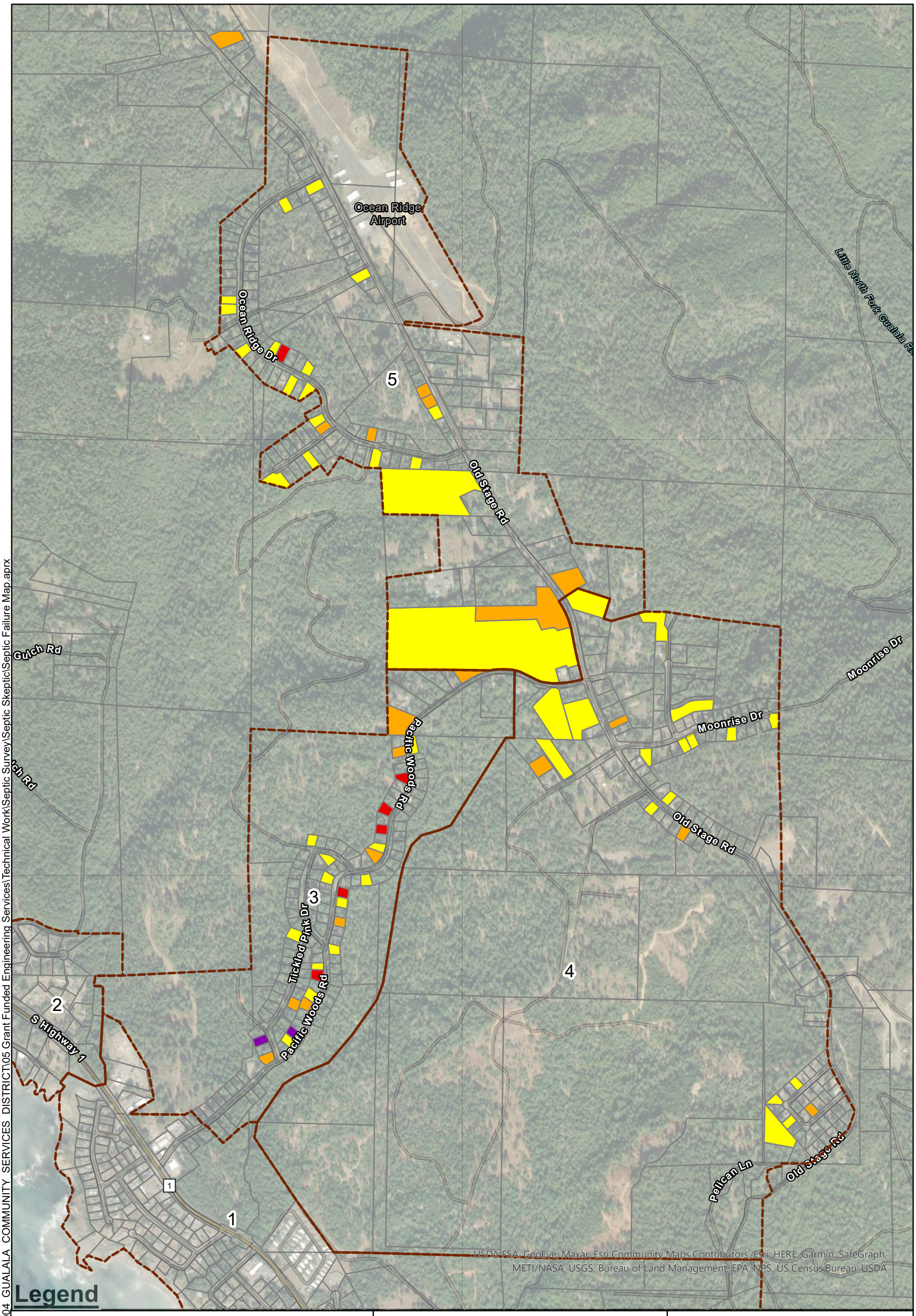
The need for future sewering of unsewered development in Zones 3, 4, & 5 is critical to remove the possibility of groundwater and surface water pollution by upgrading/replacing the current septic tanks into interceptor tanks. This would facilitate the treatment and disposal to the unsewered portions of the community which is experiencing a health risk and water pollution problems due to the failures of on-site septic systems. Current data collected by the company, as part of the grant funded study, shows the type of failures from 2005 to 2020. **Table 3.4.1-1** and **Figure 3.4.1-1** depict the number of failures each on-site septic system experienced between 2005 to 2020.

Table 3.4.1-1 Unsewered Area Septic System Failures in Zones 3, 4, & 5

Tank Structural Failure and/or Subsidence			Tank Inlet Piping Failure				Outlet Piping Failure					Leach Field/ Seepage Pit					
Structural	Subsidence	Other	Inlet Roots	Inlet Cracking	Inlet Grease	Inlet Shearing	Outlet Roots	Outlet Grease	Outlet Cracking	Outlet Shearing	Other Outlet Failure	Leach Field Plugged (non roots)	Leach Field Roots	High Water Table Water Table	DB Box failure	Lack of Footage (Leach Fields)	Other Leach Field Failure
9	0	5	13	0	0	3	14	0	0	2	8	1	55	0	2	0	4

Note:

1. Information provided by Septic Skeptic Company
2. In some cases there were multiple "failure modes" per home



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Legend

Zones
- Zones
- Parcels

Number of Failures
- 1
- 2
- 3
- 4

MC Engineering, Inc.
9294 Madison Ave
Orangevale, CA 95662
Tel: 916-223-3828
Fax: 916-860-1863
www.mc-engineers.com

Title:
GCSD WASTEWATER STUDY

N

Figure 3.4.1-1:
Non-Sewered Areas Septic Failures

0 500 1,000 2,000 Feet

3.4.2 Land and System Constraints (Hydrology, Geographic, Soils, Construction Std., Maintenance, and Vegetation

All specifications and design standards for septic systems in Gualala are per the Mendocino County Department of Public Health. Constraints are placed on the size and location of the septic tank, along with the amount and quality (perc-ability) of the soils, slopes, and other miscellaneous factors related to the terrain and geology for the installation and operation of the leach fields. It is important to note that the Winzler and Kelly (2003 Report) indicated that most of the soils within Zones 3, 4, and 5 are very impervious due to high clay concentrations and some of the existing lots are sloped greater than 30%. There is a significant amount of evergreens that also contribute to the potential high system failure rates as a result of root intrusion into the leach-line piping and trenching. **Appendix D** provides a copy of portions of the past study that indicate both hydrology-based limitations and geography-based limitations on the viability and efficacy of the existing septic systems.

3.4.3 Maintenance Records (Private and Public)

Septic system permit and maintenance records were acquired from the Mendocino County Department of Public Health. At the time of this report, records that were provided by the county and are still being requested and any additional records will be included in the subsequent versions of the report. Records acquired from the County include permit documents, pumping records, and results of sewage disposal studies. These documents are in **Appendix E**.

Skeptic Septic, a company who performs essentially all escrow required septic system surveys when a house sells, completed a spreadsheet for documenting any failures to the residential septic system. An example of the results of the information from Septic Skeptic is shown in **Table 3.4.1-1.** A complete spreadsheet is provided in the **Appendix E**.

3.4.4 Public Participation (PP)

As a result of findings within the report and upon approval of recommended projects, a public participation plan will be recommended. This public participation plan can be presented as one large plan or it can be broken into two smaller strategic plans, or a combination thereof, as noted below:

- PP Plan 1 – Financial plan for funding the proposed capital- improvements for the recommended projects
- PP Plan 2 - Rate study and required 218 hearing for rate stabilization

All public participation will include notification to all GCSD customers through a series of mailers and other public notifications. In regard to the 218 Hearings, the public notification requirements are already prescribed per state regulations and will be followed closely based on findings and recommendations within Section 8 of this report.

SECTION 4- SYSTEM ANALYSIS

4.1 INTRODUCTION

This section includes a summary of the rationale and methodology used for sizing and evaluation of each facility improvement as well as the basis of design for each critical WWTP process. All improvements do not warrant a detailed analysis; therefore, some items are not evaluated in this section. For instance, the need to upgrade lift stations is described more appropriately under Section 5 Deficiencies since there is limited analysis warranted. See subsequent sections for more detailed descriptions of the recommended improvements.

4.2 WWTP PROCESSES

4.2.1 INFLUENT FLOWS AND LOADING SCENARIOS

An analysis was performed for each process unit to identify deficiencies under various flows and loadings for the WWTP process train. The six loading scenarios are defined below in **Table 4.2.1-1** and referenced numerically throughout this section. Each flow scenario features average and high biochemical oxygen demand (BOD) and ammonia loadings for analysis of applicable process units.

As discussed, GCSD is currently pursuing an updated Waste Discharge Permit requiring improvements to achieve Title 22 compliance. Title 22 criteria related to unit processes are also introduced and incorporated into the analysis of this section. The intent of this section is to provide process analysis of each process unit. Other Title 22 criteria not specific to process requirements, where applicable, are identified and discussed within Section 5.

The build-out assumptions for each of the six scenarios are described below:

Scenario 1 – Existing Average Annual Influent Flows from GCSD and SRN:

Scenario 1 considers the existing average annual influent flow and loadings received from the SRN WWTP and the GCSD collection system based on historical data.

Scenario 2 – Potential flows from existing dwellings in Zone 3, Zone 4, and Ocean Ridge Drive:

This scenario considers expansion of the STEP system to include the flows and loadings associated with Zone 3, Zone, 4, and Ocean Ridge Drive in addition to the existing average annual influent flows from GCSD and the SRN community.

Scenario 3 – Full Future Build Out:

This scenario considers a complete buildout of both the expanded service area in Gualala and the vacant parcels within the SRN community.

Scenario 4 – High Inflow and Infiltration:

This scenario considers the flows from Scenario 2 in addition to the maximum inflow and infiltration received by the GCSD collection system less flows conveyed from the SRN facility. This scenario assumes that the pump facilities at the SRN have been upgraded such that operators can maintain adequate freeboard within the SRN primary pond and suspend pumping during days of

exceptional precipitation as discussed in Section 4.4.5. Conservatively, no other inflow and infiltration reductions from potential collection system improvements are considered.

Scenario 5 – Existing loadings with Septage Treatment:

This scenario considers the flows and loading from Scenario 1 with additional septage. The additional loadings produced by the septage tanks are assumed to be 6,500 mg/L for BOD_5, 13,000 mg/L for total suspended solids (TSS), and 100 mg/L for total kjeldahl nitrogen (TKN) as recommended within United States Environmental Protection Agency (US EPA) Guide to Septage Treatment and Disposal. Free ammonia was assumed to be 40% of the TKN. The septage tanks are assumed as 1,000 gallons each and are serviced once every 4 years, resulting in a flow of nearly 318 gal/day.

Scenario 6 – Expansion of Zones 3, 4, and Ocean Ridge Drive with Septage Treatment:

This scenario considers the flows and loadings of Scenario 2 but also includes disposal of the existing septage tank contents as described in Scenario 5.

Table 4.2.1-1 Influent Flow and Loading Scenarios

Scenario No.	Influent Flow		Average Loadings			High Loadings		
	mgd	gpm	BOD (mg/L)	Ammonium-N (mg/L)	TSS_0	BOD (mg/L)	Ammonium-N (mg/L)	TSS_0
1	0.071	49.3	170	25	90	255	38	108
2	0.102	71.0	180	25	85	270	38	102
3	0.154	106.6	180	25	75	270	38	90
4	0.231	160.6	100	14	113	150	21	137
5	0.072	50.0	200	25	147	250	38	176
6	0.103	71.7	200	25	125	250	38	150

4.2.2 Aeration Basin

Basin Capacity for Biological Treatment

The primary design parameter for an aeration basin is the volume of the basin. Adequate basin volume ensures an adequate SRT required to maintain a large inventory of active biomass for BOD and ammonia removal in addition to the benefits associated with extended aeration.

The basin SRT was analyzed by determining the daily wasting rate required to maintain a target total mixed liquor suspended solids (TMLSS) concentration within the basin.

Influent and activated sludge parameter assumptions are listed below as reported in Metcalf & Eddy as referenced on the right.

- VSS_0/TSS_0 = 0.8 — M&E 4th Ed. Page 186
- Endogenous Decay, b = 0.08 g VSS / g VSS d — M&E 5th Ed. Page 593
- Cell Debris Fraction, f_d = 0.125 g VSS / g biomass — M&E 5th Ed. Page 594
- Y = 0.6 VSS / BOD_5 — M&E 5th Ed. Page 593
- $NbVSS_0$ / BOD_5 = 0.2 — M&E 5th Ed. Page 603
- VSS/TSS = 0.9 — M&E 5thEd. Page 602
- Target MLSS = 2,000 mg/L
- WAS_{TSS} = 5,000 mg/L
- No solids or BOD_5 pass through secondary treatment

The secondary process analysis for the six scenarios under average loadings is presented in **Table 4.2.2-1**.

Table 4.2.2-1 Estimated SRT with Average BOD Loading Scenarios

Scenario	1	2	3	4	5	6
BOD_5 Removed, mg/L	170	180	180	100	200	200
Hydraulic Detention Time, d	5.1	3.5	2.3	1.6	5.0	3.5
Active Biomass VSS, mg/L	187	276	396	309	220	304
Cell Debris VSS, mg/L	348	341	313	169	324	317
Target TMLSS, mg/L	2,000	2,000	2,000	2,000	2,000	2,000
WAS Flow, gpd	970	1,459	2,285	3,308	1,225	1,731
WAS TSS, mg/L	5,000	5,000	5,000	5,000	5,000	5,000
MCRT	149	99	63	44	118	83

The secondary process analysis for the six scenarios under high loadings is presented in **Table 4.2.2-2**.

The minimum SRT for extended aeration is typically 20 days with no safety factor. A safety factor is typically used to facilitate a larger inventory of nitrifying bacteria to handle peak ammonia loadings. Common practice consists of increasing the minimum SRT by the ratio of peak to average ammonia loadings. Since a factor of 1.5 was applied to the average ammonia loadings to define the high loadings with the scenario definitions; the minimum SRT, with safety factor is taken as 30 days. Thus, all of the scenarios presented with average loadings provide an adequate SRT as shown in **Table 4.2.2-1** since they are all greater than 30 days. The SRTs in **Table 4.2.2-2** are adequate as well since the loadings are already considered as peak values and each SRT is greater than 20 days.

Table 4.2.2-2 Estimated SRT with High BOD Loading Scenarios

Scenario	1	2	3	4	5	6
BOD_5 Removed, mg/L	255	270	270	150	250	250
Hydraulic Detention Time, d	5.1	3.5	2.3	1.6	5.0	3.5
Active Biomass, mg/L	277	404	570	445	271	374
Cell Debris VSS, mg/L	419	395	343	195	343	332
Target TMLSS, mg/L	2,000	2,000	2,000	2,000	2,000	2,000
WAS Flow, gpd	1,194	1,849	3,000	4,115	1426	2033
WAS, mg/L	5,000	5,000	5,000	5,000	5,000	5,000
MCRT	121	78	48	35	101	71

Aeration Capacity

A spreadsheet was prepared to evaluate aeration requirements, the results for the average loadings are presented in **Table 4.2.2-3**. The analysis was also evaluated for high BOD and Ammonia loadings by applying a 1.5 factor to the average loadings the results of which are presented in **Table 4.2.2-4**.

Table 4.2.2-3 Average Loading Aeration Analysis Tabulation

Scenario	1	2	3	4	5	6
BOD, removed lb/d	101	154	231	193	120	172
Ammonia removed lb/d	15	21	32	27	15	22
lb O2 required per lb BOD removed	1.02	1.02	1.02	1.02	1.02	1.02
lb O2 required per lb ammonia removed	4.57	4.57	4.57	4.57	4.57	4.57
Oxygen required for BOD removal, lb	103	157	236	197	123	176
Oxygen required for Ammonia removal, lb	68	97	146	123	69	98
Total Oxygen required	171	254	382	321	191	275
Transfer Efficiency, lb O2 / hp-d	24	24	24	24	24	24
Aeration power required to remove BOD, hp	4.3	6.5	9.8	8.2	5.1	7.3
Aeration power required to remove Ammonia	2.8	4.1	6.1	5.1	2.9	4.1
Total Aeration power required, hp	7.1	10.6	15.9	13.4	8.0	11.4

Table 4.2.2-4 High Loading Aeration Analysis Tabulation

Scenario	1	2	3	4	5	6
BOD, removed lb/d	151	230	346	289	153	233
Ammonia removed lb/d	23	32	49	41	23	33
lb O2 required per lb BOD removed	1.02	1.02	1.02	1.02	1.02	1.02
lb O2 required per lb ammonia removed	4.57	4.57	4.57	4.57	4.57	4.57
Oxygen required for BOD removal, lb	154	235	354	296	157	238
Oxygen required for Ammonia removal, lb	103	148	222	185	104	150
Total Oxygen required	257	384	576	481	261	387
Transfer Efficiency, lb O2 / hp-d	24	24	24	24	24	24
Aeration power required for BOD removal, hp	6.4	9.8	14.7	12.3	6.5	9.9
Aeration power required for Ammonia removal, hp	4.3	6.2	9.3	7.7	4.3	6.2
Total Aeration power required, hp	10.7	16.0	24.0	20.0	10.9	16.1

The results of the tabulation presented above indicate the existing aeration capacity is sufficient during average flows and loadings (Scenario 1) but reaches it limit under high BOD and ammonia loadings. All other scenarios indicate an increase in aeration capacity.

Mixing Capacity

The variability in mixing performance is a function of both the basin geometry and mixer design. Horsepower requirements of 0.25 hp and 0.75 hp per 1,000 cf of volume mixed is assumed for the mixer and contribution by the aerators, respectively per Metcalf & Eddy 5th ed. A tabulation showing the mixing volume generated by the aerators and mixer is presented in **Table 4.2.2-5** below showing a deficiency of nearly 35,000 gallons not fully mixed.

Table 4.2.2-5 – Estimated Mixing Capacity

Scenario	Value
Volume Mixed by Mixer, cf	30,000
Volume Mixed by Aerators, cf	13,000
Total Volume Mixed, cf	43,000
Total Volume Mixed, gal	321,640
Existing Volume, gal	360,000

Equalization Capacity

Analysis of the basin's capacity for flow equalization was included by considering modifications to the weir located downstream of the aeration basin. The analysis was completed by developing a flow routing algorithm to simulate the potential cycling of Lift Station 4 under the existing max Inflow

and Infiltration flow of 200,000 gal/day at the plant. Since the run times of the pumps at LS 4 during historic events of I&I are not accessible by SCADA data. The model results, for varied weir lengths are presented in **Table 4.2.2-6**.

Table 4.2.2-6 Weir Model Results

Weir Length, inches	12 (existing)	9	6	4	3
Attenuation Time, minutes	41	50	65	86	100

The results show time required for steady state flow conditions to prevail dramatically increases with a narrower weir length, and thus the peak hour flow for the process units downstream of the aeration basin can be reduced significantly.

4.2.3 Secondary Sedimentation

A state point analysis for one of the two 24 ft diameter clarifiers was prepared to evaluate sedimentation capacity and is presented graphically in **Figure 4.2.3-1**. The analysis conservatively assumes a high Sludge Volume Index (SVI) of nearly 150 and the plant's target TMLSS concentration of 2,000 mg/L. The underflow rate assumes a 100% return rate for each scenario, the maximum capacity of the RAS pumps is nearly 0.288 MGD. Scenarios 5 and 6 were not included since they are representative of nearly the same flows in Scenarios 1 and 2, respectively. Refer to **Table 4.2.3-1** for clarifier state point analysis summary.

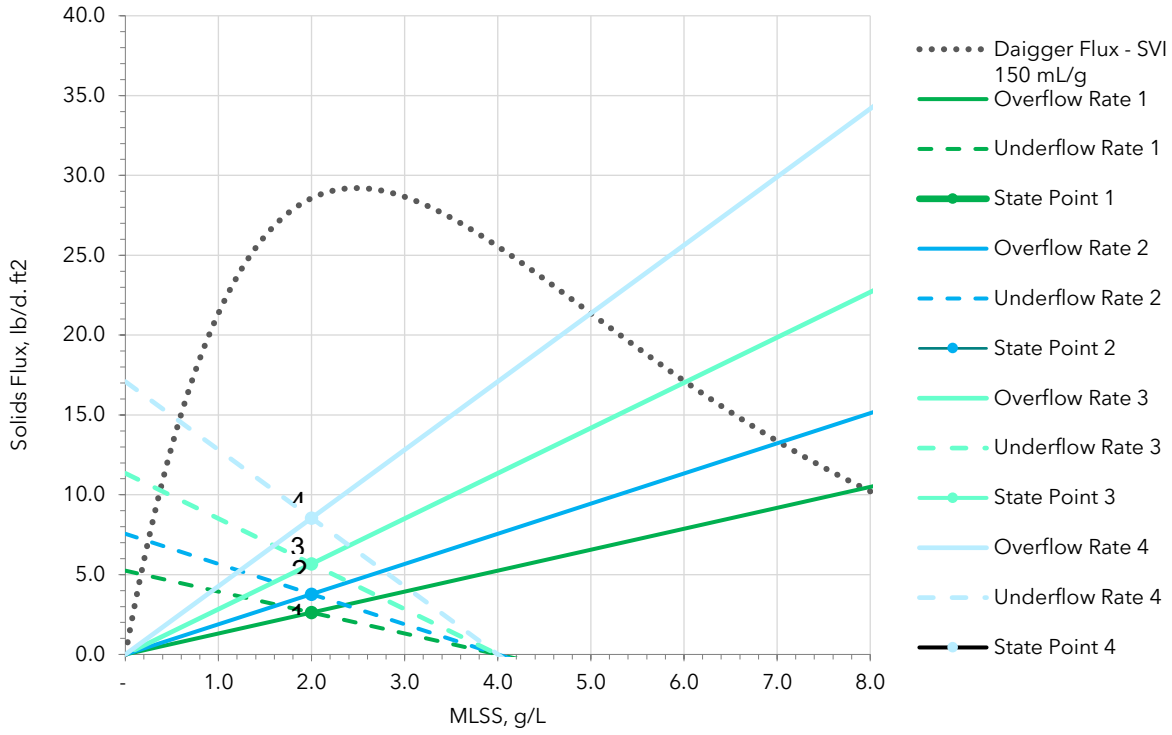

Figure 4.2.3-1 State Point Analysis – 24 FT Diameter Clarifier

Table 4.2.3-1 Clarifier State Point Analysis Summary

Scenario	1	2	3	4	Average	Peak
Clarifier Area, ft^2	452	452	452	452	-	-
MLSS, mg/L	2,000	2,000	2,000	2,000	-	-
Overflow Rate, gal / ft^2·d	157	226	339	512	200 - 400	600 - 800
Overflow Rate Flux, lb / ft^2·d	2.62	3.78	5.67	8.54	-	-
Total Flux, lb / ft^2·d	5.27	7.55	11.34	17.09	4.8 - 24	33.6

The state point analysis shows that the single clarifier in operation is more than sufficient under the hydraulic and solids loadings of the four scenarios considered. Typical design criteria for sedimentation following extended aeration by Metcalf & Eddy 4th ed. is shown on the right-hand side of the table.

Title 22 Requirements

Since each 24 ft diameter secondary clarifier is capable of treating the entire flow for each scenario, and an alarm is tripped whenever the flow is measured less than 15 gpm downstream of the RAS, the reliability requirements of Section 60345 are satisfied.

4.2.4 Tertiary Filtration

The existing capacity of the filters is presented in **Table 4.2.4-1**.

Table 4.2.4-1 Existing Filter Capacity

Scenario	Traveling Bridge Filter	Disk Filter
Surface Area, sqft	144	31.2
Title 22 Max Loading Rate, gpm/sqft	2	6
Max Loading, gpm	288	187
Max Loading, mgd	0.415	0.269

4.2.5 Disinfection

A tabulation of the resulting modal contact time under each scenario is presented in **Table 4.2.5-1**. The table also includes the minimum chlorine residual required to achieve a CT-Value of 450 mg-min/L per Title 22.

Table 4.2.5-1 Modal Contact Time

Scenario	1	2	3	4
Flow, gpm	49	71	107	161
Chamber Volume, gal	21,500	21,500	21,500	21,500
Theoretical Contact Time, min	465	321	213	142
Baffling Factor	1	1	1	1
CT, mg-min/L	450	450	450	450
Minimum Chlorine Residual Required, mg/L	0.97	1.41	2.12	3.18
Modal Contact Time, min	465	186	451.74	142

4.2.6 Tertiary Storage and Reclamation

The liner in Pond 1, and the related south slope, failed in 2017 during a period of heavy rainfall. Staff retained an outside contractor in an attempt to "armor" the slope by covering it with rip rap. Repairing the failed liner was flagged as a critical need by the General Manager. During the course of the study, GCSD staff and members of the MC Engineering team visited the City of Lincoln's wastewater treatment and reclamation facility (WWTRF) tertiary storage ponds that were constructed under the direction of MC Engineering team members, while employed by others, in 2003. It was found that the 60 mil liners appear to still be in relatively good condition despite what was originally projected as a 20-year life expectancy. Unlike the thin buried liner used at GCSD, the Lincoln WWTRF ponds were lined with the 60-mil material and left uncovered (**Figure 4.2.6-1**). As such, the liner not only serves as an impermeable barrier, it also is designed to provide slope protection to prevent erosion from wave action in high winds.

Figure 4.2.6-1 City of Lincoln Pond Lining

4.2.7 Sludge and Biosolids Facilities

The digester performance was analyzed by determining the amount of accumulated sludge within the basin over the course of a year assuming that 75% of the daily WAS flow could be returned as supernatant. The daily WAS rates are based on maintaining a target TMLSS of 2,000 mg/L within the aeration basin as previously determined in **Table 4.2.2-1**.

The digester analysis also considered the annual dry weight of biosolids produced by assuming a 35% volatile solids reduction (M&E 5TH Ed. Page 1545). The end of year pond volume and dry digested sludge weights for each scenario are presented below in **Table 4.2.7-1**.

Table 4.2.7-1 – Sludge Production Average Loading Scenarios

Scenario	1	2	3	4	5	6
WAS TSS, mg/L	5,000	5,000	5,000	5,000	5,000	5,000
WAS Flow, gpd	1,044	2,583	4,069	4,043	1,410	3,096
Influent Inorganic Solids (TSS_0-volatile suspended solids (VSS_0)), lb/d	11	14	19	43	17	21
Influent Non-Biodegradable VSS_0, lb/d	20	30	46	38	24	34
VSS, lb/d	12	57	94	79	16	66
VSS Reduction, lb/d	4	20	33	28	6	23
Digested Sludge Generated, Dry Weight, lb/d	38	82	126	132	55	99
Digested Sludge Produced, Dry Weight, tons/yr.	6.9	14.9	23.0	24.2	9.4	18.0
Supernatant Return, gpd	783	1,937	3,052	3,032	1,057	2,322
Annual Pond Volume, gal/yr.	95,237	235,728	371,295	368,932	128,623	282,474

Stabilized Sludge Dewatering and Biosolids Handling/Disposal

Since no dewatering or sludge handling facilities exist, no process analysis was performed. Deficiencies and analysis of potential project alternatives are presented in Section 5.2.6, respectively. As mentioned, there are no sludge dewatering facilities or storage areas for dewatered sludge at GCSD.

4.2.9 Yard Piping

Yard piping needs are analyzed for each separate process unit. An illustrative graphic of all yard piping can be found in Section 7.

4.2.10 Proposed Septage Receiving Facility

Section 5 lists deficiencies for the proposed septage receiving facility. The estimated potential flows and loads if GCSD were to accept all septage from the GCSD Service area is shown in **Table 4.2.10-1**.

Table 4.2.10-1 Estimated Potential Influent Flows and Loads from Septage Receiving

Septage from GCSD Service Area	Average Annual		
	mgd	mg/L	ppd
Flow	0.0003		
BOD		6,500	17
TSS		13,000	35
TKN		100	0

4.3 OPERATIONAL, ADMINISTRATIVE AND OTHER FACILITIES

4.3.1 Operations and Administration Buildings, Vehicle and Equipment Storage, and Chemical Storage Room

The analysis of the administration and operations buildings is limited to listing deficiencies associated with the existing facilities. Refer to Section 5 for additional detail.

4.3.2 Potable Water

Other than the bottled water that is delivered to the plant weekly in 5-gallon bottles, potable water has not been provided at the WWTP, therefore, in order to estimate demands, an analysis is warranted. This analysis is based on the premise that higher flows, such as those used for fire protection, will be provided via reclaimed water produced at the plant. Reclaimed water can also be used for the following:

- Toilet flushing
- Vehicle washing
- Outdoor irrigation
- Plant washdown and sprays

Potable water is needed, in ample supply, for the following:

- Drinking
- Showers
- Eye washes
- Cooking and kitchen use
- Sinks and hand washing
- Dishwasher

The analysis that follows has been simplified and can be used as a basis for estimating demands associated strictly with potable water.

There are various methods of analysis that could be used including the following:

1. A component of average per-capita demands based on local residential type flows: Residential per-capita flows are (anecdotally) on the order of 50 to 100 gpcd, and typically less than the state average, due in part to the high cost of water combined with the marine environment that results in less outdoor irrigation. Assuming there are an average of 3 to 4 staff at the plant daily, this would put the usage at 150 to 400 gpd.
2. Fixture counts and standards presented in the Uniform Plumbing Code (UPC): For the purpose of estimating future needs a brief analysis was prepared based on fixture counts. These are presented in **Table 4.3.2-1**.

Table 4.3.2-1 Fixture Counts for Existing and New Facilities

Building/Location	Fixture Type	UPC Fixture Units
Existing Lab	Lab Sink	0.5
Existing Lab	Bathroom Sink	0.5
Existing Lab	1 Toilet	0.5
New Admin. Bldg.	Men's Shower	1
New Admin. Bldg.	Women's Shower	1
New Admin. Bldg.	Men's Restroom Sink	0.5
New Admin. Bldg.	Women's Restroom Sink	0.5
New Admin. Bldg.	Kitchen Group	1.9
New Admin. Bldg.	Lunch Room Dishwasher	1.4
	Total:	7.8

The maximum supply rate can be estimated to be 12.6 gpm from the total of 7.8 UPC fixture units. A 2" supply line to the plant can be constructed which should maintain velocities and pressure losses to reasonable levels given the relatively low flow being conveyed.

The UPC criteria is typically applied for sizing source piping. Additional analysis is needed in order to estimate daily supply needs. For planning purposes, it is assumed that the average flow differs based on a peaking factor of 4.0. Accordingly, the average would thus be 12.6 / 4 = 3.2 gpm. Assuming the plant is staffed up to 8 hours per day, this represents a total daily volume of 1500 gpd. Flows into the building could be accommodated with ¾" plastic while the main conveyance line to the plant should be a minimum of 1.5" to limit velocities and headloss.

1. Anecdotal input from plant staff: The General Manager has indicated that very little water is needed at the plant and he has plans to meter current uses of reclaimed water in the near future. Since the outdoor sprays and washdowns are not separated, some discretion will be needed. Considering that the largest indoor use is typically toilet flushing, and that the goal would be to install dual plumbing systems, it is likely that the accuracy of any analysis of current uses will be limited. Regardless, this can still be performed as a backup to the other methods in the future and prior to final design.

2. Based on the application of engineering judgement, and with consideration of methods above, the 1,500 gpd flow from method 2 will be used for planning purposes with a peak flow of 12.6 gpm as previously noted.

3. The elevation at the entrance to the campground is approximately 55 feet MSL (based on Google Earth) versus an estimate elevation at the WWTP Admin Building of 305 feet, a difference of 250 feet ((108 psi). Flows of from 2 to 15 gpm were analyzed in an effort to determine the headloss from the point of connection to a tank located at the plant, a distance of approximately 3,200 LF. The losses were estimated at 18.4 feet at 15 gpm and only 0.44 feet at 2 gpm. To the extent the tank is filled over a 24-hour period, only 1 gpm could replenish the daily demand of 1,500 gallons.

4. It was determined that the HGL for the Sea Ranch water system supplying the campground was at 369.5 feet, as set by a full tank level near the Sea Ranch WTP. Given that the GCSD plant is at an elevation of 305+/-, there is a residual static head of 35.5' with the Sea Ranch tank full. To the extent the tank level does not drop significantly, and/or the dynamic losses from the Sea Ranch tank to the point of connection are not significant, the tank at the WWTP should, under most circumstances, fill by gravity. If necessary, the final elevation of the tank at the GCSD plant can be placed lower on the site during final design to improve flows.

4.3.3 Fire Protection Facilities

Required fire flows are typically assigned by the local fire official who, in this case is the Cal Fire representative. Similar criteria have been established for the Sea Ranch that were reportedly based on a minimum of 1500 gpm for 4 hours for "commercial areas". The GCSD WWTP could arguably be designated as similar to a commercial facility and is perhaps best characterized as a critical public facility. The required fire flow would require a minimum volume of 360,000 gallons. This amount of storage could be provided through a variety of options which are discussed separately in Section 6. The required flows and storage volumes should be confirmed with the designated fire official prior to detailed design.

4.3.4 Access Road

The existing plant road is vulnerable to wash-outs and deterioration that could make it impassable, particularly in the winter months. It is in need of paving in order to provide a reliable means of access while minimizing risks from erosion. Culvert crossings and drainage along the roadway should be analyzed and improved where appropriate in an effort to minimize future risks of damage due to excessive run-off. The vulnerability of the existing unpaved road and potential for rapid deterioration would be more concerning to the extent the plant becomes a viable site at which septage handlers are encouraged to dump. If the land disposal site in Point Arena becomes un-available in the future, the number of trips by GCSD associated with hauling septage could increase dramatically. Additional permitting and negotiations with Gualala Redwoods Timber Company could be required.

4.3.5 Emergency Access for Emergency Pipeline Repair

Refer to needs and deficiencies for the emergency access for repairs are discussed in Section 5.

4.4 COLLECTION SYSTEM

4.4.1 GCSD COLLECTION SYSTEM INFLOW AND INFILTRATION

Existing Conditions

The GSCSD maintains four lift stations. LS 2 accepts flows from LS 1. LS 4 accepts flows from LS 2 and LS 3. Flows from LS 4 are pumped directly uphill to the WWTP. Refer to the following schematic in **Figure 4.4.1-1** and to **Figure 3.3.1-1** for a map of lift station shed areas.

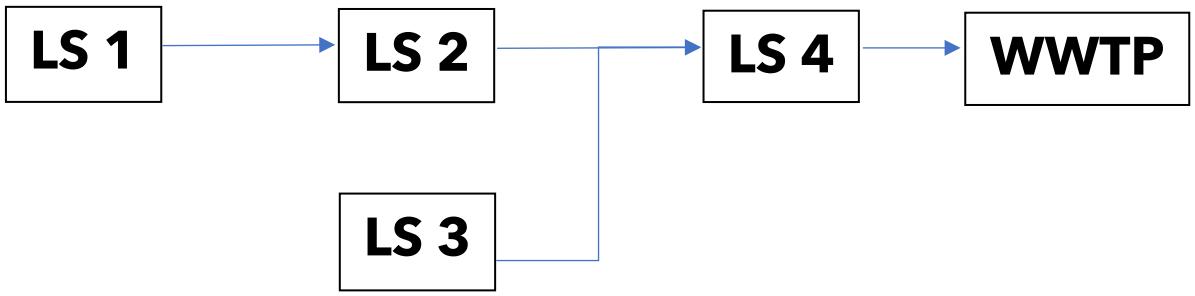

Figure 4.4.1-1- Schematic of GCSD Lift Stations

Data Collection

Hobo® Data Logging devices were installed on Pump 1 and Pump 2 at LS 1, 2, and 3 on January 25th, 2020. Starts and stops for each pump were recorded with a timestamp from January 26th, 2020 to February 5th, 2020 using the data loggers. The timestamp information was downloaded from Hobo ® software in .csv format.

A drawdown test was conducted to determine the pump flow rate at each lift station. At the beginning of the test, the wetwell water level was recorded. Both pumps were turned off. A timer was set for one minute, and the water level was measured again. The difference in depth to water was recorded. Next, Pump 1 was turned on and a timer was set for two minutes. After two minutes, the water level was recorded again. The difference in depth was recorded. The same procedure was repeated for Pump 2. At the end of the test, the wetwell water level was recorded and both pumps were turned off. A timer was set for one minute, and the water level was measured again. The difference in depth to water was recorded. The diameter of the wetwell was recorded at each lift station.

Daily precipitation summaries and plant influent flow summaries were obtained from GCSD records. A reliable source for hourly precipitation data in Gualala, or nearby coastal communities, was not found. The nearest hourly precipitation weather station is believed to be in Santa Rosa. Hourly precipitation data for Santa Rosa, California was obtained from www.wunderground.com. For the date of January 26th, 2020, the sum of the recorded Santa Rosa Precipitation is nearly the same as the total recorded precipitation at the GCSD rain gauge. The Gualala precipitation was estimated by subtracting three hours from the Santa Rosa precipitation data.

Simplifying Assumption:

It was assumed that coastal storms migrate inland and there is a three-hour lag between precipitation in Gualala and Santa Rosa.

Analysis Method

The pump starts and stop timestamp, drawdown test, and hourly precipitation data were processed and analyzed with the following methodology:

1. The change in depth of water, diameter, and total pump runtime at each lift station was utilized to calculate the flow rate for each pump. The flow capacity was calibrated by subtracting the total flowrate into the wetwell before and after measurements were taken.
2. The flow rate for Pump 1 and Pump 2 was averaged at each lift station.
3. Pump start and stop timestamps were utilized to calculate total pump runtimes per lift station per hour with using an Excel-based calculation.
4. Total lift station pump runtimes for each hour were multiplied by the average flowrate to determine the flow rate per hour for each hour.
5. The maximum precipitation day was determined (1/26/21 with 2.5" of rainfall)
6. A plot of hourly lift station flowrates and precipitation vs time was developed for each lift station for the date of 1/26/21.

Simplifying Assumptions:

- Pump 1 and 2 at each lift station produce the same flowrate.
- Both pumps (Pump 1 and 2) running in parallel will produce twice the individual pump flowrate.

Key Findings

The following figures illustrate the flow rate at each lift station during January 31st, 2021 which is considered a "typical" dry winter day. LS 1 exhibits a peak in flow rate around lunchtime and a second smaller peak later in the evening. **Figure 4.4.1-2** illustrates the flow rate at Lift Station 2 during the same "typical" dry winter day. LS 2 accepts flow from LS 1, and this contributes to accentuating the peaks at noon and 8 pm.

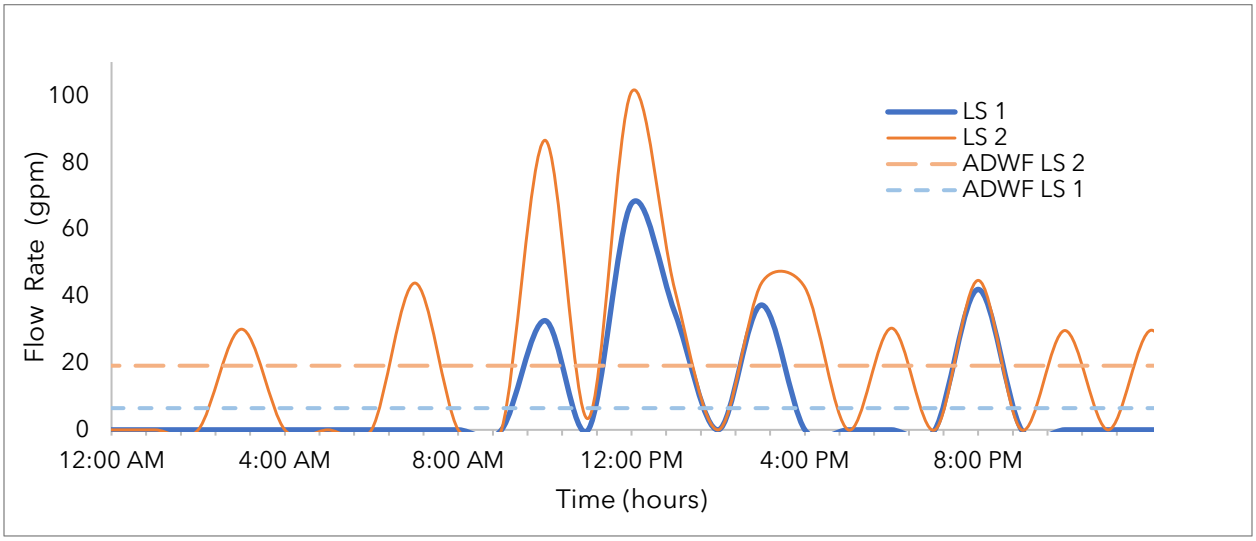

Figure 4.4.1-2 Typical Dry Day (January 31st, 2021) Lift Stations 1 and 2

Figure 4.4.1-3 illustrates the typical dry winter day flow at LS 3. LS 3 exhibits peaks in the morning, lunchtime, and late in the evening.

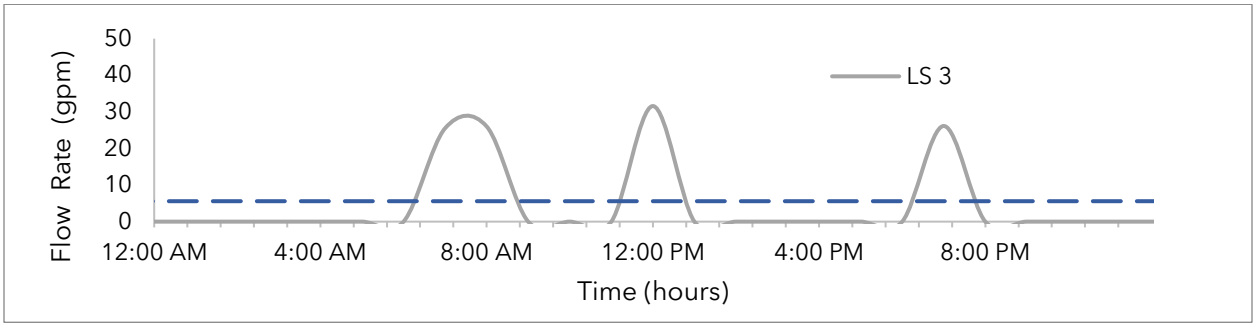

Figure 4.4.1-3 Typical Dry Day (January 31st, 2021) Lift Station 3

January 26th, 2020 had the largest storm of the analysis dataset with 2.5 inches of rain during a 24-hour period. The majority of the rainfall occurred between the hours of 9 pm and midnight. In order to better understand the increase in flow rate during a storm event, the calculated flow at each lift station has been plotted versus time in the following graphs. It can be seen in **Figure 4.4.1-4** that there is a dramatic spike in inflow at the same time as the estimated precipitation during the late evening of the 26th of January. LS 2 has a greater spike than LS 1, however this Lift Station also accepts the flows from LS 1. More detailed analysis would be required to further analyze the LS 2 shed alone. This graph can be interpreted to say that there is significant inflow at LS 1 and possibly LS 2.

Figure X.X-1 also illustrates more flow rate LS 1 the day after the storm than the day before the storm. There are six pump starts on the 27th after the storm and only three pump starts on the dry day before the storm. The higher flow following the storm event can be interpreted to mean that LS 1 also contributes to infiltration.

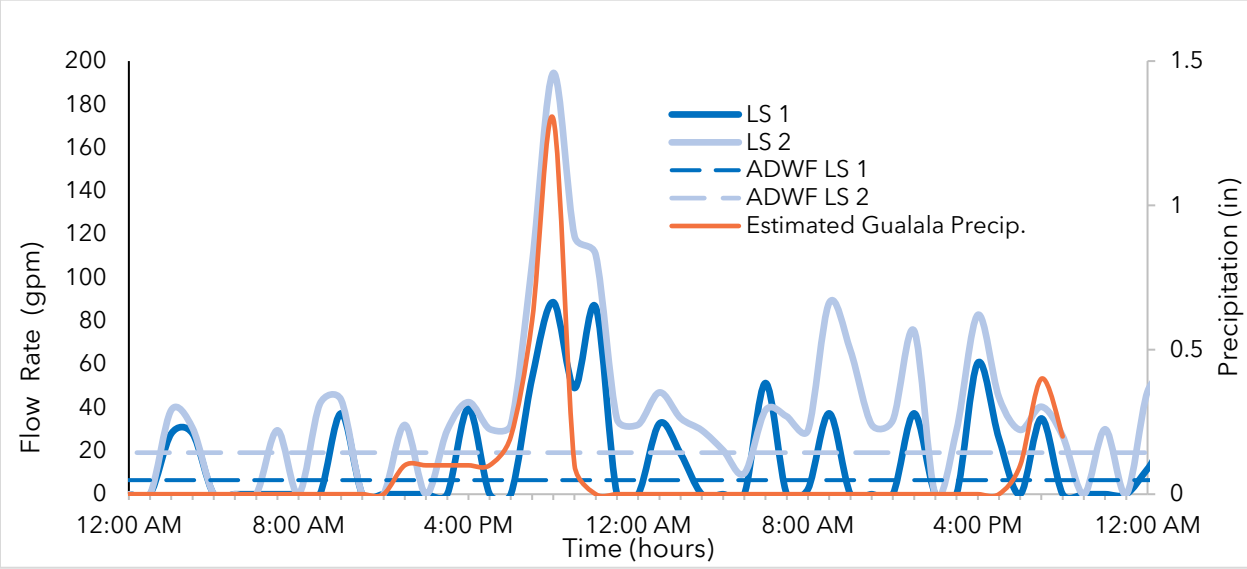

Figure 4.4.1-4 January 26th, 2021 through January 27th, 2021 Storm Event Flows at Lift Station 1 and 2 and Estimated Hourly Precipitation in Gualala

Figure 4.4.1-5 illustrates the calculated flow rate at LS 3 and the estimated precipitation in Gualala. LS 3 does not exhibit a significant spike in inflow during the storm event, however it appears that there is slow infiltration in the hours proceeding the storm. The infiltration can be interpreted from the fact that there is a greater pump run time and more pump starts on the 27th after the storm than on the 26th before the storm.

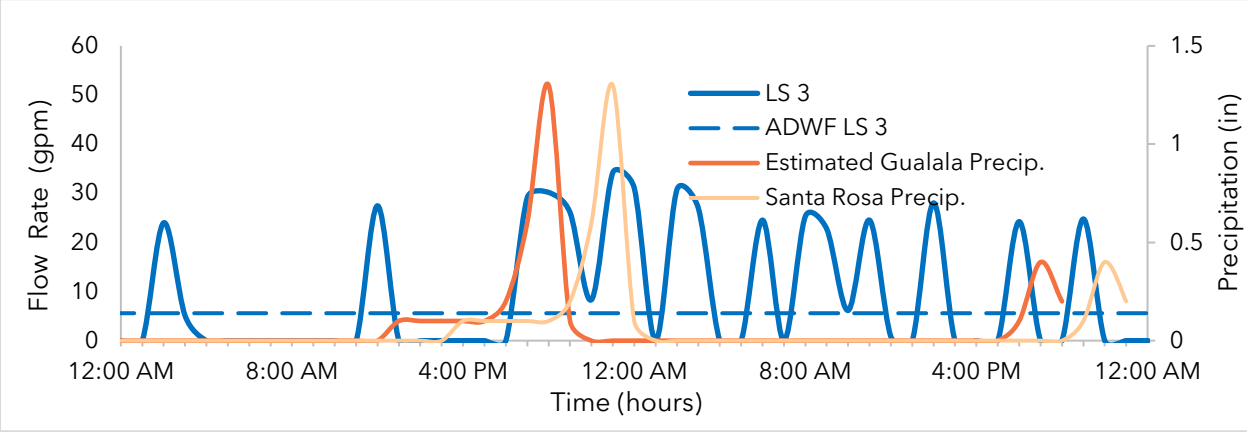

Figure 4.4.1-5 January 26th, 2021 through January 27th, 2021 Storm Event Flows at Lift Station 3 and Estimated Hourly Precipitation in Gualala and Actual Precipitation in Santa Rosa

Calculated daily and hourly peaking factors for the highest flows within this dataset have been illustrated in **Tables 4.4.1-1** and **Table 4.4.1-2**. From **Table 4.4.1-1**, it can be seen that the shed area of LS 1 contributes significantly to I&I. The LS 1 hourly peaking factor of 15.5 is significantly higher than LS 2 and 3. The hourly peaking factor for LS 1 (2.6) is also greater than the other lift stations.

Table 4.4.1-1 Peak Daily Flow and I/I Related Peaking Factors

Lift Station	Peak Daily Flow	Peaking Factor	Date
1	24,635	2.6	1/26/21
2	30,319*	1.1*	1/26/21
3	16,196	2.0	1/27/21

Table 4.4.1-2 Peak Hour I/I Related Flow and Peaking Factor

Lift Station	Peak Hour Flow (gpm)	Peaking Factor	Date and Time
1	100	15.5	2/1/21 3:00 PM
2	195*	10.1*	1/26/21 8:00 PM
3	46	8.2	2/4/21 7:00 AM

*Note: LS 2 hourly peak flow includes flow from LS 1. LS 2 daily peak flow total does not include the LS 1 flow totals for the day.

Conclusions and Recommendations

It can be concluded from this analysis that the LS 1 shed area contributes significantly to inflow and may contribute significantly to infiltration. LS 2 appears to contribute to inflow, however further flow analysis is recommended to differentiate between LS 1 and LS 2 flows. Further data collection and flow analysis is also required to characterize the LS 4 shed area. The LS 3 shed area does not contribute significantly to inflow but may contribute to infiltration.

The LS 1 shed area is designated as a priority for further investigations to locate the source of inflow. The LS 1 shed area contains 30 septic tanks, one manhole, and several cleanouts. This shed area contains approximately a half mile of 4" gravity mains and less than a quarter mile of 2" pressure lines. Please refer to **Figure 4.4.1-6** for a schematic of the LS 1 collection area. All parcels within this area are single-family residential.

Figure 4.4.1-6 Lift Station 1 Shed Area (Outlined in blue)

Further Hobo Data collection is recommended at all lift stations. Following the collection and analysis of additional Hobo Data Logger information, further investigative actions within the LS 1 shed area could include smoke testing, roof drain inspection, and flow isolation.

4.4.2 GCSD STEP Systems

The GCSD collection system currently serves 238 active accounts customers. **Table 4.4.2-1** depicts the type of assets found throughout the system. GCSD staff conducts annual inspections of the panels and tanks and notes deficiencies. A copy of the past inspection report was provided to the MC Engineering team for review and analysis. A breakout of issues is noted in **Table 4.4.2-2**. A prioritized list of proposed upgrades was developed based on a review of the past inspection records in order to develop generalized improvements that can be applied District-Wide. More detailed analysis and field inspections of each tank and control panel will be necessary during the

subsequent predesign phase. Deficiencies noted based on the existing reports as well as proposed improvements are discussed in subsequent sections.

Table 4.4.2-1 Existing Septage Interceptor Tank Assessment

Usage Type		STEP System Type			Interceptor Tank Description									
					Interceptor Tank Condition			No. of Tanks				Tank Type		
Commercial	Residential	Gravity From Intercept or Tank	Control Panels	GCSD Has Easement (Lot)	New	Original	Unknown Condition	1	2	3	Unk	Fiberglass	Concrete	Unk
61	177	103	135	103	3	232	3	210	15	3	10	45	2	191

Table 4.4.2-2 Identified Problems and Repairs/Replacements (11 years: 2010-2021)

Interceptor Tanks			Pumping System		E/C and Panels		Grease Trap Description		
No. of Influent Access Port	Leakage/Type	Past Improvements (Replace/Repair)	No. of Pumps Relaced/ Repaired	Pump Electrical Wiring Problems/ Repaired	No. of Panels/ Control problems	Comments	Grease Trap Installed	Grease Trap Problems (Y/N)	Type of Problems
72	Unk	Unk	50	Unk	107	N/A	10	6	N/A

4.4.3 GCSD Lift Stations

As described in Section 2, LS 1, 2, and 3 are in need of repair and upgrades. The details of the initial investigations are discussed in Section 2. Pump flow tests were performed as part of the I/I investigations. The pumps that could be ran appear to be operating near their expected operating points. Section 4.4.1 includes an analysis of pump station flows and a discussion of related wet weather analysis. It was noted that one pump at LS 2 was not operational and one of the large pumps at LS 4 was out of service. The other deficiencies at the lift stations are discussed in more detail in Section 5.

4.4.4 Septage Disposal Site

A site visit was conducted to review the septage disposal site as described previously in Section 2. No analysis of this site was performed other than to interview the site owner. The site appears to be in compliance based on the anecdotal input and no immediate needs to pursue an alternative septage disposal option were evident based on the limited review. An alternative to the Point Arena site is being considered with the option of utilizing the on-site septage receiving facility at the GCSD plant. The alternatives analysis for this is presented in Section 6.

4.4.5 Sea Ranch North Collection System and CSA 6 Facility

To better assess the capacity of the primary pond for flow attenuation a spreadsheet was developed to simulate the pond level during the period in early 2019 previously discussed. The spreadsheet was used to tabulate the amount of water accumulated within the basin by accounting for the record

flow data pumped to GCSD from SRN, record precipitation, and theoretical flows received from the SRN collection system.

The theoretical flows received from the SRN collection system were simulated by scaling the wet weather flows in excess of the average dry weather flow in proportion to the amount of rain received each day. This approach is sensible in that it conservatively assumes no attenuation of flows within the SRN collection system; that is, flows increase and decrease immediately with precipitation and are representative of potential peak flows received at the SRN facility.

The average pumping flow during this period less the average dry weather flow was nearly 51,900 gallons per day and is taken as the average amount of inflow and infiltration received per day. The average daily precipitation received, including dry days during this period, equated to nearly 0.35 inches per day. Therefore, for every inch of precipitation nearly 146,000 gallons of I&I were assumed in addition to the average dry weather flow of 31,500 gpd. The simulated primary pond level determined by the spreadsheet is presented graphically in **Figure 4.4.5-1.** As expected, the model shows that after the events of February 26th and 27th continuous pumping was required for the following two months to prevent the surface level of the pond from breaching the freeboard. It should be noted that the 36" inches or precipitation directly intercepted by the primary pond were not included within the volume of wet weather flows conveyed to GCSD and therefore the final level in the basin is shown nearly 36" higher than the initial level in late January with no consideration given to evaporation.

The spreadsheet was also expounded upon to include a simulated surface level of the pond by considering an increased pump capacity by 30 and 60 gpm to total capacity of 90 and 120 gpm, respectively. The results of the spreadsheet are presented graphically in **Figure 4.4.5-2.** The results show the maximum pond level reduced by nearly 17 inches for both 90 and 120 gpm pumping capacities. Further, the pond level was fully restored within 5 and 3 weeks after the events of late February for the 90 and 120 gpm capacities, respectively.

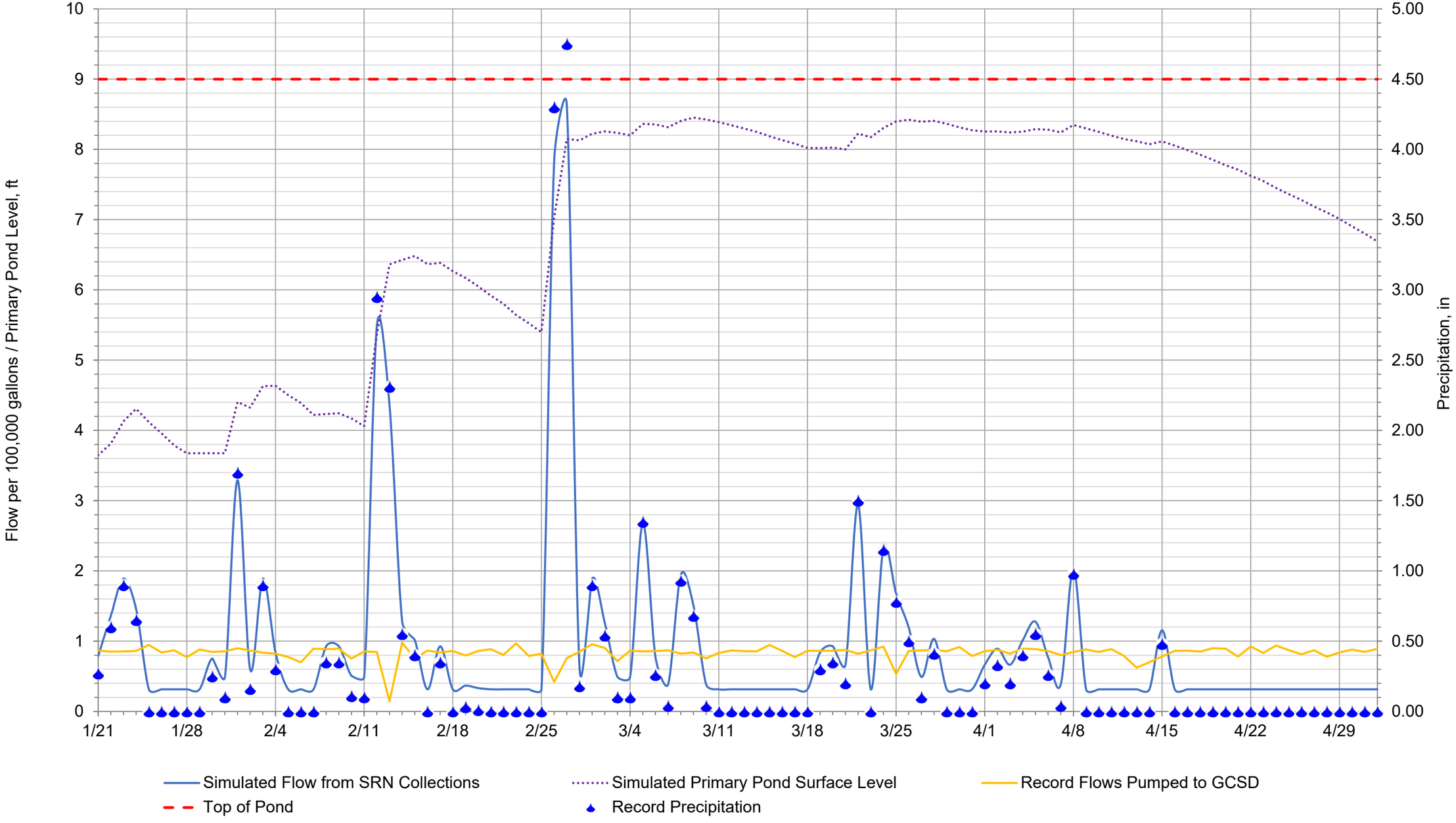

Figure 4.4.5-1 Simulated SRN Primary Pond Level for 2019 Wet Weather

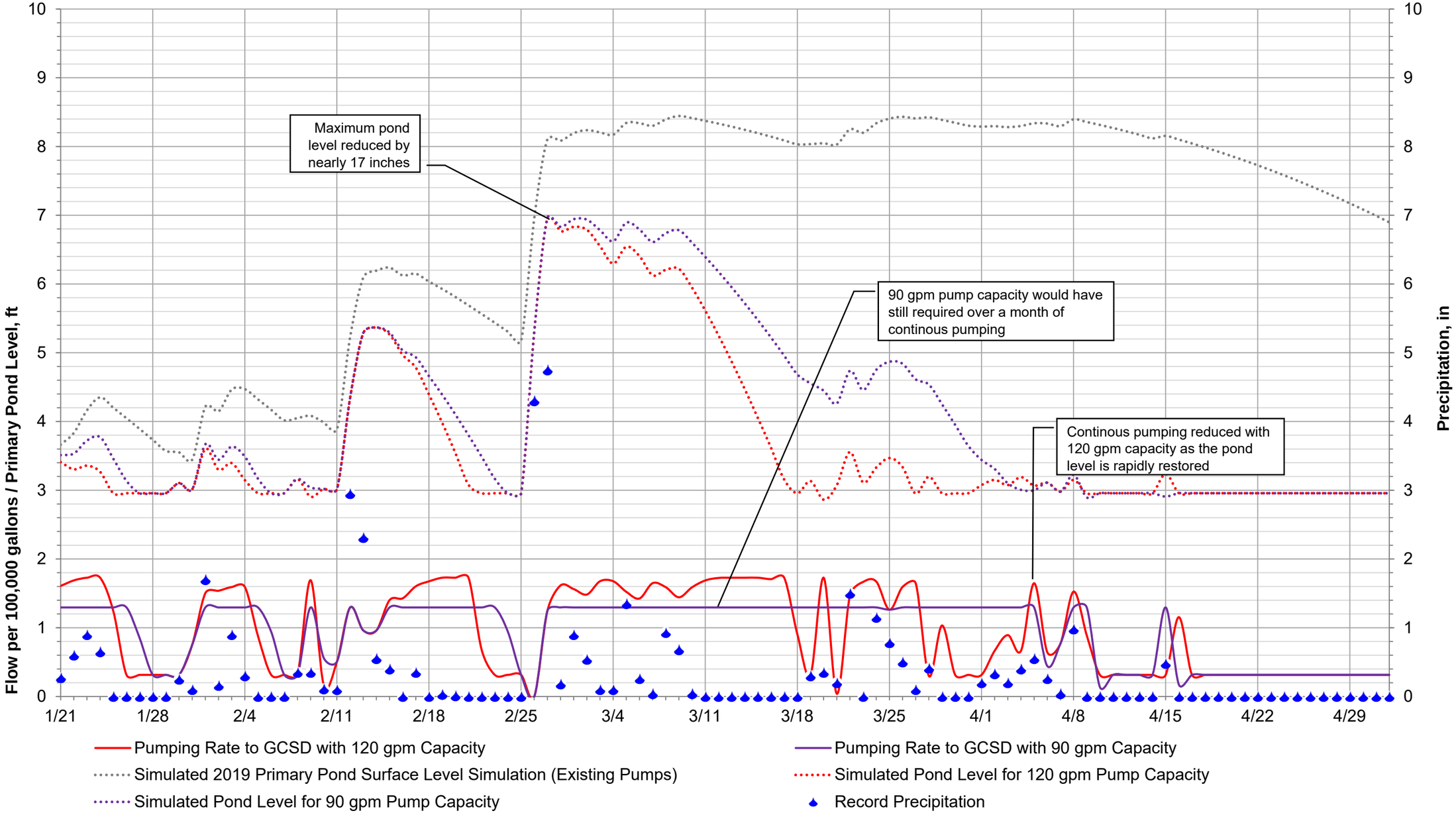

Figure 4.4.5-2 Simulated Primary Pond Level for 2019 Wet Weather w/ Increased Pump Capacity

4.4.6 SUMMARY OF 2018/2019 PEAKING FACTORS

Summary **Table 4.4.6-1** includes a general evaluation of the totalized flows with averages for the GCSD and SRN shed areas for 2018/2019. ADWF and AWWF period averages were calculated along with a peaking factor for each period. The ADWF period includes the average daily flow from each Agency for the months of June-September and the PWWF period includes the average daily flow from each Agency for the months of December-March. With this calculated data we also calculated the PF for each Agency's shed areas for the ADWF and PWWF periods. The Table below clearly indicates that the GCSD shed area has a serious daily potential PWWF inflow problem. The SRN shed may have infiltration problems. Due to flow equalization being utilized by the SRN it is difficult to calculate the potential peaking factor on a daily basis. As noted in Section 4.4.1, above Mc Engineering has isolated the potential contributing inflow to be within LS No. 1 shed area. Data was not available for the GCSD LS No. 4 shed, which may also have an inflow problem(s). It is recommended that the GCSD conduct a smoke program(s) that will isolate inflow sources. SRN's collection system will require follow-up flow metering and other I/I analysis.

Table 4.4.6-1 Summary of Peaking Factors for GCSD and SRN

Peaking Factors for Average Dry and Wet-Weather Flow for GCSD and SRN (Average Period Flows Based on 2018-2019 WWTP Influent Data)								
Agency	Total Flows (Dec-March)	Total Flows (June-Sept)	ADWF (June-Sept)	PWWF (Dec-March)	Seasonal Period PF	Peak Day Flow Avg. (June-Sept)	Peak Day Flow (Dec-March)	Peak Day - PF
GCSD	4,390,000	3,737,800	30,638	36,282	1.18	30,638	205,400	6.70
SRN	8,398,800	4,390,000	34,690	69,400	2.00	34,690	90,780	2.62

Note: Peak and ADWF flows were calculated using GCSD influent flow meter historical data from 2018-2019. Peak daily flow logs can be made available upon request.

4.5 UNSEWERED AREAS

4.5.1 EXISTING SEPTIC SYSTEM CONDITION ASSESSMENT

The only facilities that exist within the GCSD zones 3 and 4 and Ocean Ridge Drive are private septic systems. Prior studies and GCSD staff experience has shown that the seasonally high groundwater, root intrusions, and clay type soil conditions (see soils information above) have made it troublesome for individual on-site sewage disposal systems to function properly. During the peak of the rainy season, private landowners and GCSD staff have observed leach line effluent seeping to the surface, causing odors and public health concerns. Section 5 contains extensive information that was collected to evaluate the condition of the existing septic systems.

SECTION 5- EXISTING SYSTEM DEFICIENCIES AND FACILITY NEEDS

5.1 INTRODUCTION

This section summarizes the existing deficiencies based on the analysis presented in Section 4 and/or as identified by field inspections performed by the MC Engineering team in cooperation with GCSD staff. Potential alternatives for addressing the deficiencies described herein are evaluated in Section 6 while Section 7 provides more detail regarding the recommended improvement for each respective project.

5.2 WWTP PROCESS DEFICIENCIES

5.2.1 AERATION BASIN

Basin Capacity for Biological Treatment

The analysis presented in **Tables 4.3.2-1** and **4.3.2-2** indicate that the basin volume is adequate to provide a sufficient SRT for both BOD removal and nitrification under all the scenarios examined.

Aeration Capacity

The analysis presented in **Tables 4.3.2-3** and **4.3.2-4** indicate that the existing aeration capacity for BOD removal and nitrification is sufficient for existing flows and marginally sufficient for increased loadings. An increase in aeration capacity would be required under any scenario involving increases to flows and loadings. It is also likely that the lower depths of the basin are subjected to low dissolved oxygen (DO) concentrations since surface aerators are not effective in transferring air bubbles to lower depths without the use of aggressive mixing. In addition, there is no backup aerator available at the plant in the event of an aerator failure. Section 60345 of the CCR requires multiple treatment units, emergency storage, or disposal provisions.

Mixing Capacity

The analysis presented indicates that existing 7.5Hp mixer may be insufficient in maintaining the aeration basin as a complete mixed reactor. Historic plant operations have utilized both simultaneous and cyclic nitrification/denitrification processes. Recently, GCSD has found better pH control by implementing a cyclic process with longer anoxic cycles suggesting that the duration of the previous cycles is insufficient for denitrification as evidenced by the low pH associated with a dominant nitrification process.

Title 22 Requirements

The process reliability requirements of Title 22 Section 60345 require either multiple aeration units capable of treating the entire flow with one unit out of service, short-term storage retention or disposal provisions with replacement equipment, long-term storage, or disposal provisions, or automatically actuated long-term storage or disposal provisions. Since the GCSD facility relies on only one aeration basin, without any emergency storage or disposal provisions, the reliability requirements of Title 22 are currently cannot be met.

Summary of Aeration Basin Deficiencies

- Marginal Aeration Capacity for existing BOD demands, additional aeration would be required for system expansion and/or future growth
- Marginal mixing capacity for denitrification
- Reliability requirements to meet the California Code of Regulation and Title 22 is not fulfilled. Construction of either an additional aeration basin or a short-term retention (emergency storage basin) is required.

5.2.2 Secondary Sedimentation

The state point analysis results previously presented in **Figure 4.3.3-1** indicate that one of the two clarifiers in service alone can maintain solids separation for all of the scenarios presented assuming a TMLSS of 2,000 mg/L and a sludge volume index (SVI) of 120. The existing RAS capacity of 0.232 MGD (one of two pumps in service) is sufficient for all the scenarios assuming a 150% return rate except Scenario 4 which would require 0.347 MGD for RAS pumping capacity.

Title 22 Requirements

Both reliability and alarm requirements of Title 22 for Secondary Sedimentation are currently fulfilled and do not require additional improvements.

Secondary Sedimentation Deficiencies:

- No process deficiencies identified
- No Title 22 deficiencies identified
- Both of the existing centrifugal RAS pumps are nearing the end of their life expectancy
- Both sludge withdrawal lines for the two clarifiers are tied together outside of the RAS building with no provisions to isolate either line
- The piping within the RAS building is configured such that returned sludge, wasted sludge, scum, and digester supernatant flows are all handled by the two centrifugal RAS pumps requiring operators to manually configure the valves for each operation. Only one magnetic flow meter exists.
- Nearly one-quarter of the top clarifier wall (west clarifier) is at grade and features no handrails to prevent personnel from falling into the structure per Cal OSHA requirements.
- The wooden stairway leading down to the RAS building is nearing the end of its life expectancy and the treads do not provide adequate grip
- The path used to access the building from the road near the digester is undeveloped and inaccessible
- No isolation valves exist downstream of the secondary effluent pipe such that the effluent may be routed to the scum manhole for washing out the effluent trough or diverting substandard secondary effluent away from the tertiary filters

5.2.3 Tertiary Filtration

Title 22 Requirements

Since the reliability requirements of Title 22 stipulate that the maximum filtration capacity consider the highest capacity filtration unit offline, the maximum filtration capacity is limited to 0.180 mgd of the disc filter alone. Historically, flows in excess of 0.200 gpd have been received at the GCSD facility due to high levels of inflow and infiltration from the GCSD collection system alone. Repairs

made to the GCSD collection system in 2019 have shown a dramatic decrease in inflow and infiltration but since events featuring 4 inches in precipitation or greater have yet to occur since the collection system repairs have been made it is unknown whether inflow and infiltration flows have reduced below the capacity of the filtration units.

Summary of Tertiary Filtration Deficiencies

- Insufficient capacity considering historic wet weather flows
- Additional flow meter installation to monitor the surface loading rate of each filter separately when both units are in operations.
- SCADA HMI modifications to include flow rate monitoring with alarms
- Downstream sample ports for monitoring turbidity by grab samples

5.2.4 DISINFECTION

Title 22 Requirements

The primary design criteria for disinfection are governed by Section 60301.230 of Title 22 which always requires a minimum CT-value of 450 mg-min/L with a modal contact time of at least 90 minutes. As previously discussed, a baffling factor of 1.0 has recently been determined by the SWRCB for operation of the mixing manifold located at the chamber inlet. Scenarios 5 and 6 were not included since their flows are nearly equal to Scenarios 1 and 2, respectively.

The reliability requirements of Title 22 are interpreted to require redundant equipment with alarms to ensure full disinfection to Title 22 standards. Alarms are not installed on the recirculation pumps. Recently, GCSD has installed a second submersible pump on the downstream side of the chlorine contact chamber to provide system reliability. The CCC is capable of providing a sufficient CT value to satisfy the 450 mg-min/L Title 22 criterion.. At a minimum, two pumps should continue to be in service within Manhole C to ensure redundancy in achieving the CT criterion. Two additional backup pumps are required.

Summary of Disinfection Deficiencies:

- **Insufficient Title 22 Reliability Features –** Recirculation pumps not equipped with alarms to notify operators of failure.
- Minimum Contact Time of 90 minutes is satisfied based on current baffling factor of 1.0 based on peak hour flow analysis.
- CT value not monitored by SCADA, needs alarms, and additional magnetic flow meter to complete

5.2.5 TERTIARY STORAGE AND RECLAMATION

Tertiary Storage Liners

The existing liners that are installed in the GCSD ponds are relatively thin and reportedly on the order of a 6-mil material. MC Engineering reviewed failed sections of Pond 1 in January of 2020.

Photographs of a slope failure on the south side were taken along with samples of the failed liner. The liner is nearly 30 years old and has reached its life expectancy.

Tertiary Storage Capacity

The water balance results previously presented in **Table 4.3.6** indicate that the existing 28.4 MG of storage available (20 MG from GCSD and 8.4 from SRN) is insufficient for storing the tertiary effluent accumulated during a wet weather year with a 10-year return period. Approximately 3 MG in additional storage capacity is needed. An additional buffer is needed if the tertiary ponds are used for supplying treated effluent for fighting fires (i.e., 1,500 gpm for 4 hours would equate to approximately 0.4 MG). The balance also shows that up to 8.5 MG in additional storage would be required during a wet weather year with a 100-year return period.

Aside from an inadequate amount of storage,

SRGL Percolation Pond

With the exception of low pH, all of the contaminants historically measured have been below the primary and secondary MCLs showing no adverse impact on aerial groundwater. Again, this is most likely the result of precipitation diluting the GCSD effluent. For example, the nitrate effluent stored from October of 2018 to February 2019 averaged at nearly 43 mg/L while the effluent discharged to the percolation pond in March 2019 was measured to be 8.4 mg/L.

Tertiary Storage Deficiencies:

- Existing storage capacity is inadequate
- Pond 1 liner failed, end of life expectancy

5.2.6 Sludge, Septage receiving, and Biosolids Facilities

Aerobic Digester Capacity

The analysis in Section 4 indicates that the existing 360,000-gallon sludge storage/digestion basin is more than adequately sized to accommodate settled sludge wasted from the adjacent aeration basin for all nearly all scenarios except scenarios 3 and 4. Since scenario 4 is indicative of a peak day analysis this basin volume is ignored; the basin requirements for Scenario 3 indicate that the existing basin may not be adequate for full future build out of both the GCSD and SRN communities if GCSD intents to empty the basin on an annual basis.

There are no Title 22 requirements specific to sludge digestion or storage; however, the pathogen reduction requirements of EPA Part 503 Bio Solids rule require a minimum SRT of 40 days which is achieved as long as GCSD continues to dredge the sludge on an annual or biannual basis with provisions to not waste to the basin while dredging.

Summary of Aerobic Digester Deficiencies:

- **Hazardous Gases Within RAS Pump Station:** Since the digestor does not feature a decant mechanism, supernatant from the aerobic digester is returned to the aeration basin by spilling the supernatant from the piping within the RAS pump building to the floor drain within the building, potentially exposing operators to the hazards of methane gas. Per National Fire Protection Agency (NFPA) 820 "Standard for Fire Protection in Wastewater Treatment and Collection Facilities" the dry side of sludge pumping facilities must be physically separated from the liquid side or if not separated and unventilated, the electrical equipment must be classified as Class 1, Division 1.

- **Inability to drain aerobic digester:** As previously described the existing aerobic digester does not feature the necessary piping/valving to drain the basin for conveyance to dewatering facilities requiring the labor-intensive practice of managing the suction hose of a vactor truck and hauling the sludge on site, by truck, to the dewatering facilities. This practice is also inefficient in that much of the liquid removed consists of supernatant as well as sludge since the liquid is not removed directly off the floor of the basin.
- **No surface decant mechanism:** Supernatant returned to the aeration basin is taken from a mid-elevation of the digester and not the surface, thus limiting the capacity of the return when the pond fills above the supernatant outlet.
- **No designated pumps:** Only the RAS pumps or the In Plant Pump Station may be used to return supernatant to the aeration basin. No pumps are dedicated to supernatant return flow

Sludge Dewatering/Thickening Facilities

The lack of sludge dewatering facilities required prior to off haul has caused serious operational challenges for GCSD in the past which has only been exacerbated by the State's requirement to cease all sludge operations which include either dewatering the sludge directly on grade or burying the sludge on site.

Summary of Sludge Dewatering/Thickening Facilities Deficiencies

- Excessive hauling fees associated with the additional water content without any provisions to dewater biosolids
- Inability to apply polymer prior to sludge thickening: Due to the lack of direct piping between the sludge storage pond and the dewatering site, the installation and application of a polymer feed system is not possible since there is no proper location to inject polymer prior to dewatering. The absence of a polymer feed station would require excessive pumping of sludge leachate during the dewatering process.
- **No provisions for on-site land application:** As previously described, the past practice of applying the sludge on site for either dewatering or indefinite holding has been identified as an unacceptable practice by the Regional Board and the GCSD is required to haul all biosolids to a landfill permitted for the land application of biosolids per EPA Part 503.
- **Insufficient sludge dewatering facilities:** The current practice of dewatering the sludge within the unlined bermed area located on the lower west side of the facility has been identified as an unacceptable practice by the Regional Board. As part of the Biosolids Management Plan (a supplement to the pending Report of Waste Discharge), GCSD has indicated their intent to pursue the construction of sludge drying beds, complete with an underdrain system to convey leachate back to the aeration basin. The beds will also serve as a drying area to spread the dewatered sludge to reduce the moisture content further. Since tipping fees are primarily a function of the sludge weight, significant saving will be realized in dewatering and drying the sludge prior to hauling off site.

Biosolids Disposal

- The historic practice of storing and drying sludge directly on grade at the GCSD facility has been identified as an unauthorized practice and is not permitted within GCSD's Discharge Permit.

Summary of Biosolids Disposal Deficiencies

- The historic practice of storing and drying sludge directly on the ground at the GCSD facility has been identified as an unauthorized practice and is not permitted within GCSD's Discharge Permit.

5.2.7 YARD PIPING

A number of deficiencies exist throughout the site related to piping. These deficiencies are described in more detail within each process evaluation. An overall site plan depicting the various yard piping improvements is presented in Section 7.

5.2.8 PROPOSED FUTURE SEPTAGE RECEIVING FACILITIES

The plant currently has a rudimentary septage receiving system on the east side of the aeration basin. It consists of piping and two plastic tanks that can accommodate flows from septic tankers. The existing system is incapable of separating non-biodegradable items and solids such as rags, sanitary napkins, masks, prophylactics, etc. Other limitations with the existing system are the inability to meter flows, thus making it very difficult to charge a fee based on volume of material delivered. Equipment described in subsequent sections includes features to collect and filter out, sort, and dispose of undesirable items as well as pH monitoring to help identify potentially toxic substances prior to discharging into the aeration basin and potentially killing critical bacteria needed for the process. This deficiency is more closely evaluated within Section 6.2.6 and is considered a major component of the sludge and biosolids facilities.

5.3 OPERATIONAL, ADMINISTRATIVE AND OTHER FACILITY UPGRADES

5.3.1 OPERATIONS BUILDINGS, ADMINISTRATION, VEHICLE AND EQUIPMENT STORAGE, AND CHEMICAL STORAGE ROOM

Operations Building

Portions of the existing building are in a deteriorated state and are made of flammable material. The original siding and roofing appears to be as it was constructed in 1992. The siding is susceptible to wild-fire and should be replaced with less flammable materials given the high fire hazard area designation. The control building houses all the main controls and SCADA systems to operate the WWTP, including the standby/backup generator, laboratory, and chemical feed room. A photo of the Operations and temporary Administration buildings is shown in **Figure 5.3.1-1.**

Figure 5.3.1-1 Operations Building

As discussed previously, the operations building is considered a critical component for the on-going monitoring and control of the plant processes. The primary concern, identified to date, is that the building is highly susceptible to damage by fire. The building is in dire need of painting and exterior upgrades.

Administration Building

The existing modular Administration Building is inadequate and portions of it are not habitable for employees, due to structural deterioration, including holes in the floor and siding and leaks in the roof. There are various CalOsha and other building code violations currently within the structure. The existing temporary administration building lacks critical features and has reached the end of its useful life and is in-need of replacement. Not only is the exterior siding rotten and decaying, but the existing roof has also leaked in the past and resulted in damages to critical plant records. It was reported that on one occasion, a plant operator fell through the floor while attempting to access the back of the building. The photos in **Figure 5.3.1-2** depict the deteriorating siding, flashing, and overall exterior decay for the temporary administration building. In addition to the overall decay, the following deficiencies can be associated with the existing building:

- Inadequate office and/or rest space for District staff
- Inadequate storage
- Lack of a potable water supply for hand washing, showering, and drinking
- Highly combustible building materials that are susceptible to damage by fire
- Lack of clean and sanitary restroom facilities and showers
- Absence of clean and orderly dining and meeting areas

Figure 5.3.1-2 Existing Administration Building Deterioration

Vehicle Equipment and *Materials* Storage

Due to extreme corrosion and atmospheric conditions, the District's equipment is vulnerable to premature and on-going replacements.

This equipment includes and is not limited to the following:

- Septic Tank Pumper Truck
- Backhoe
- Service Trucks
- Compactors and Tools
- Replacement Pipes
- Backup Pumps
- Misc. Operational Equipment

The GCSD's current storage containers are leaking due to deterioration. Some equipment is stored on the grounds with no protection from the environment. To avoid accelerated deterioration, and potentially the inability to use equipment for both scheduled and emergency maintenance, it is imperative that the District construct a new storage facility.

A photo showing the condition of the existing storage container is shown in **Figure 5.3.1-3**.

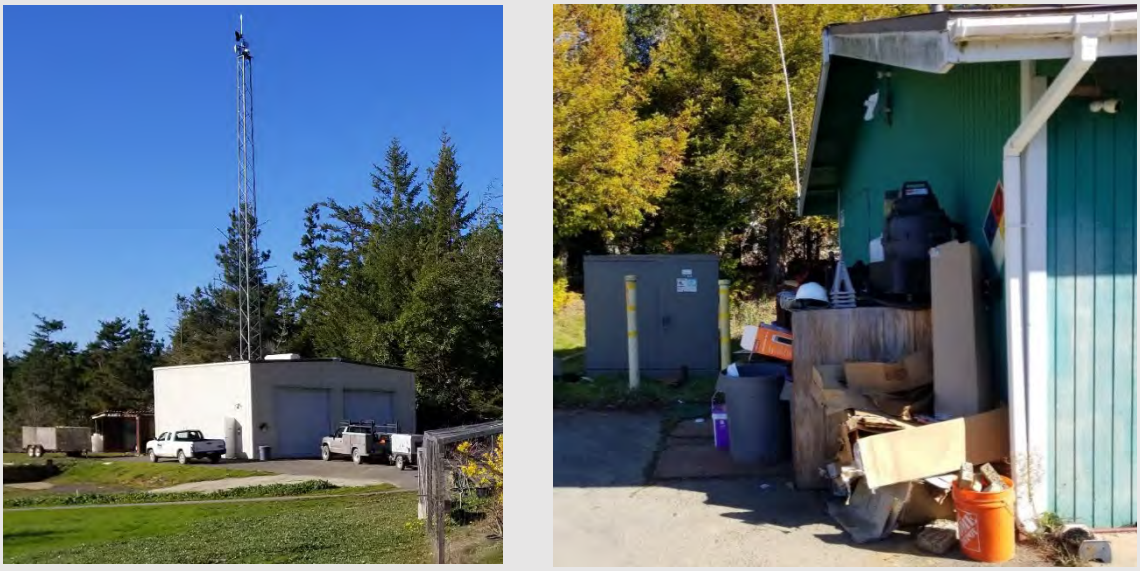

Figure 5.3.1-3 Existing Vehicle and Material Storage

Figure 5.3.1-4 Deteriorated Storage Facility/Container

Chemical Storage Room

Currently the operators of the WWTP store chlorine and other plant treatment chemicals in 50-gallon drums, located just outside of the existing control building. The exposed containers are susceptible to weather and vandalism. Proper chemical storage is critical to avoid adverse weather conditions, possible leaks and spills. A new chemical storage room/facility is highly recommended. Refer to Section 7 for a description of an approximately 144 SF building to store 50-gallon drums and other containers.

5.3.2 Potable Water

There currently is no potable water supply or plumbing at the WWTP. Some sinks are supplied by reclaimed water from the treated plant effluent and these connections should be terminated. There are considerable health and safety risks associated with the use of reclaimed water for handwashing and/or drinking (worse yet). It is imperative that a source of potable water be made available to supply critical plumbing fixtures for basic sanitary needs for operators and administration support staff.

Once the new administration building is in place, complete with new sinks, water closets, showers, etc. the water demand will increase. Demand projections in Section 4 were based on the assumption that the new building would contain dual plumbing so toilets could remain on reclaimed water. A preliminary alignment of the proposed supply line and additional details are presented in Section 7.

5.3.3 Fire Protection and Related Facilities

As described previously in Section 2, the existing plant is very vulnerable to wildfires. In general, the Gualala area has experienced several very hot and dry fire seasons with relatively high winds persisting well into the summer months and the marine layer and fog has been much less prevalent lately thus leading to drier conditions overall at the most critical times. The absence of any reliable means of fire suppression, and the proximity to the nearby high risk heavily forested lands, increases the risk considerably. Loss of the facility due to fire would inevitably result in unwanted discharges of raw or partially treated sewage to local waterways as well as corresponding permit violations and service disruptions throughout the business district and for local residences currently relying on the facility for accepting and treating discharges. As noted in Section 4, the minimum fire flow requirement is estimated at 1,500 gpm for 4 hours which would require a total storage volume of 360,000 gallons. Alternatives for increased fire protection are described and analyzed further in Section 6.

Other considerations for providing adequate fire flows include the WWTP's proximity to very steep wooded hillsides. Also, the travel time for fire-fighting trucks and equipment is estimated at 30- 40 minutes (another reason for access road improvements). The WWTP is considered very critical and an essential public service facility with various large wood structures and vital control buildings. Immediate and accessible facilities are crucial to preventing catastrophic damage and impacting water quality.

5.3.4 Access Road

The 3,300 LF by 15 foot +/- wide graveled access road to the plant is unpaved and portions have washed-out during storm events. This access is critical and requires improvements to allow for various types of vehicles to access WWTP, including and not limited to, backhoes, dump trucks, sewage pumper truck, service trucks, and other emergency vehicles. Access to the plant is required on-a-daily basis by the operators, including times when then wet weather is creating potential treatment challenges and associated water quality problems. Twenty-four hour daily access is required according to regulatory requirements. Portions of the graveled roadway require on-going maintenance due to inadequate drainage and lack of culvert capacity at various drainage crossings.

A more serious issue has been identified at an area of the road that included a small landslide in 2017 that completely washed out approximately 200 LF of the road, cutting off access to the WWTP. The photo below in **Figure 5.3.4-1** shows the existing road at the point of beginning near the campground.

Figure 5.3.4-1 Plant Unpaved Access Road and Wash-Out Area

5.3.5 Waste Discharge Permit

A variety of improvements are needed to comply with the proposed new waste discharge permit expected from the RWQCB. These requirements are discussed under each individual process throughout Section 5.

5.3.6 Emergency Access for Pipeline Repairs

Pipelines conveying both raw and treated sewage (ranging in size from 4-inches to 6-inches) to the existing WWTP and effluent pipelines from the WWTP (6-inch) to disposal locations, are both critical infrastructure components of the wastewater treatment facilities. These pipeline routes must be periodically monitored and maintained to avoid serious and costly main-line breaks that will have an adverse impact to the water quality of the region. In the event of mainline breaks, equipment and manpower must be dispatched to the portions of these pipelines that are constructed within cross-country terrain. Two cross-country pipeline sections are considered inaccessible for

construction equipment, thus significantly impacting the staff's abilities for making quick emergency repairs.

The lack of equipment access within these physically restricted areas could seriously and potentially impact water quality (Gualala River Basin). There are two specific sections of cross-country pipeline routes/locations that have limited and/or no access for accommodating construction equipment, including backhoes, pumper trucks and other critical emergency equipment. Each identified and problematic cross-country segment of pipelines(s) is either a single line or up to four lines within a common trench. Based on existing topography the lines are located within steep slopes as shown in **Figure 5.3.6-1.**

Figure 5.3.6-1 Cross-Country Pipeline Limited Access

5.4 COLLECTION SYSTEM DEFICIENCIES

5.4.1 GCSD Collection System (Mains)

No immediate replacements or upgrades are included at this time for the collection system pipelines. These pipelines range in size from 4inches to 8-inches in diameter, including manholes and cleanouts. An inventory of all existing collection lines is presented in Section 9 along with a long-term replacement strategy.

5.4.2 GCSD STEP Systems

The existing interceptor tanks, pumps and control panels constitute a significant on-going liability and cost for GCSD.

Several deficiencies were noted based on the limited field reviews, analysis of inspection reports, and discussions with GCSD maintenance staff including:

- Absence of risers on the inlet side of the tanks, thereby making monitoring and removal of accumulated septage very difficult and this is compounded by accumulation of grease particularly from food outlets, hotels, and restaurants
- Control panels are old and deteriorated as a result of excessive corrosion and age. Motor starters, and electrical connections have been the primary problem areas. Corrosion plays a significant role in the failures due to the exposure to wet conditions, inside the tank.
- Structural failures to vaults and tanks, including cracks and damage to connecting pipes associated with subsidence, particularly for interceptor tanks on slopes.
- The above conditions have led to a high priority being placed on repairing and upgrading existing tanks.

5.4.3 GCSD LIFT STATIONS

There are four (4) GCSD sewer lift stations that pump raw sewage form four (4) service areas collection basin zones. Each lift station was installed over 29 years ago and are all in need of modifications and upgrades to avoid serious and problematic raw sewage overflows. There have been some upgrades to the existing lift stations, including replacement of various panel components and new pumps.

Various components of the existing lift stations (Nos. 1, 2, 3, and 4) are deteriorating including the need to seriously replace and upgrade the electrical and control (E/C) equipment for lift stations nos. 1, 2, and 3. There are no flow metering devices at all of the lift stations that help identify excessive I/I and wet-weather flows. There is also the serious need to provide an emergency overflow bypass quick connects to prevent raw sewage overflows, in the event of catastrophic electrical and pump failures. Replacement of various other lift station components is required as-a-result of corrosion, due to proximity to Pacific Ocean., The components needing immediate repair and/or replacement include, vault hatches, wet-well guide rails, valves, and miscellaneous piping. **Table 5.4.3-1** illustrates a summary of deficiencies found at each lift station. Photographic evidence was also acquired showing the level of deterioration.

Table 5.4.3-1, Summary of Lift Station Deficiencies

LS #	Location	Date Installed	Pump Station Type	Flows: No. of Connections	Flows: Zones ID	Flows: PWWF	Pumps Information: Pumps	HP	Manufact.	Diameter	Speed	Age	Level Control Type: FM	Level Control Type: FT	Condition Assessment: Rank (1-5)	Generator	No. of Spare Pumps Available	Description of Deficiencies and Recommended Improvements	Panel: Location	Age	Last Upgrade	Condition Assessment: Rank	Description of Deficiencies and Recommended Improvements	Wet Well Storage/Alarms: Type	Rails	Valving: Gate or Butterfly Valves	Valving: Check Valve	Wet Well/Slide rails/Inlet-Outlet Piping: Diameter	Height	Effective Capacity (gallons)	Alarms/SCADA: Audio	Visual	SCADA	Emergency Quick Connect	Equipment/Vehicle Site Access	Rank	Description of Deficiencies and Recommended Improvements	NOTES	Building Pumphouse condition
1	37891 Old Coast HWY	1993	Submersible	30	2		2	3	Flygt	3	N/A	N/A		X	4	Potable Gen Port	1	Pumps have been periodically replaced by GCSD. Portions of the wiring from the pumps to the panels needs replacement due to corrosion and will be included within panel replacement project,	See Drawings	30	>20 years	3	**1)** Control Panel needs to be replaced due to excessive corrosion and deterioration **2)** Encountering periodic shorts and failures **3)** Moisture and odor problems/deteriorated panels	GV	X	(2) 3-inch	(2) 3"	4'	9'	845 gal (100 GPM)		X	X	No	Yes	2	**1)** Remove corroded and old and deteriorated guide rails required, **2)** Replace corroded discharge piping, **3)** Replace old and deteriorated check and gate valves **4)** Improve site access w/ paving and bollards (safety) **5)** Replace old/deteriorated	**1)** Well well was epoxy lined in 2019 due to excessive and on-going corrosion	NA
2	38101 Robinson Reef Dr	1993	Submersible	54	1 & 2		2	8	Flygt	3	N/A	N/A		X	4	Potable Gen Port		Pumps have been periodically replaced by GCSD. Portions of the wiring from the pumps to the panels needs replacement due to corrosion and will be included within panel replacement project,	See Drawings	30	>20 years	1	**1)** Control Panel needs to be replaced due to excessive corrosion and deterioration **2)** Encountering periodic shorts and failures	GV	X	(2) 3-inch	(2) 3"	5	13	1,908		X	X	No	Yes	3	**1)** Remove corroded and old and deteriorated guide rails required, **2)** Replace corroded discharge piping, **3)** Replace old and deteriorated check and gate valves **4)** Improve site access w/ paving and bollards (safety) **5)** Replace old/deteriorated vault hatches/doors **Note:** LS was epoxy lined in 2019.		NA
3	38600 Coral Ct	1993	Submersible	31	1		2	3	Flygt	3	N/A	N/A		X	2	Potable Gen Port		Pumps have been periodically replaced by GCSD. Portions of the wiring from the pumps to the panels needs replacement due to corrosion and will be included within panel replacement project,	See Drawings	30	>20 years	2	**1)** Control Panel needs to be replaced due to excessive corrosion and deterioration **2)** Encountering periodic shorts and failures **3)** Moisture and odor problems/deteriorated panels	GV	X	(2) 3-inch	(2) 3" ?	4	11	1,034		X	X	No	Yes	1	**1)** Remove corroded and old and deteriorated guide rails required, **2)** Replace corroded discharge piping, **3)** Replace old and deteriorated check and gate valves **4)** Improve site access w/ paving and bollards (safety) **5)** Replace old/deteriorated		NA
4	Old State HWY & S. HWY 1	1993		123	All Zones		2	10	Progressive Cavity		N/A	N/A		X	4	Perm Generator		Pumps have been periodically replaced by GCSD. Portions of the wiring from the pumps to the panels needs replacement due to corrosion and will be included within panel	See Drawings	30	>20 years	5	**1)** Control Panel needs to be replaced due to excessive corrosion and deterioration **2)** Encountering periodic shorts and failures **3)** Moisture and odor	GV	X		(3) 6" CV	8	12	4,510		X	X		Yes	5			
					All Zones		3	30	Moyno	6	N/A	N/A		X	2	Perm Generator		Check Valves need to be replaced on 2 pumps.	See Drawings	30	>20 years	4	**1)** Control Panel needs to be replaced due to excessive corrosion and deterioration **2)** Encountering periodic shorts and failures	GV	X		8" & 6"					X	X	No		4	Check Valves need to be replaced on 2 pumps.		

5.4.4 Sea Ranch North Collection System and CSA 6 Facility

As previously discussed, no prior investigations by MC Engineering of the SRN collection system have been made to identify sources of inflow and infiltration within the system. Analysis of the inflow and infiltration received at the SRN facility in Section 4 was strictly limited to precipitation data, totalized pump flows, and the geometry of the primary pond. The deficiencies identified here pertain only to SRN facility's capacity to equalize high flows generated within the collection system during wet weather and are not inclusive of other plant process or mechanical deficiencies.

Summary Flow Equalization Deficiencies:

- Pump Capacity
- Suction Intake

5.4.5 Existing Off-Site Septage Receiving Facilities

Currently all septage is hauled to property near Point Arena for disposal as described further in Section 2. The biggest drawback of reliance on the Point Arena site is the cost for trucking and tipping fees. GCSD spent a significant amount of time and expense, including wear and tear on the GCSD vactor/pumper truck and additional staff time. The hauling of wet sludge is required on an annual basis for over 250 interceptor tanks (STEP System). There are some commercial interceptor tanks that require quarterly pumping. Providing an on-site option at the plant would not only reduce these costs, but it would provide an alternate means of disposal in the event the Point Arena disposal site becomes unavailable.

Summary Off-site Septage Disposal Deficiencies:

- High Trucking Costs
- Tipping Fees
- Impacts to Staff Time
- Future Risk if Site Becomes Unavailable

5.5 UNSEWERED AREA DEFICIENCIES

5.5.1 Septic System Failure Rates (Surveys, Public and Private Records)

This purpose of this section of the report is to identify the potential health and safety effects from failing septic systems as-a-result. Identifying both the system failures and corresponding water quality impacts, included the following procedures: record search, field data, sampling, and testing. Other considerations included the evaluation of geographical, topographic, and physical characteristics of the soils, vegetation, and slopes as they relate to the operations of both the septic tanks and associated leach field(s). **Table 5.5.1-1** was prepared to summarize defects identified in the past from surveys required for Escrows and home sales. It should be noted that some of the problems have been, and will continue to be, reoccurring as a result of ground conditions including and not limited to; roots within the leach fields, ground water effecting proper leaching of liquids, old and dilapidated septic tanks with cracks and subsidence, and sub-standard plumbing.

Table 5.5.1-1 Unsewered Area Septic System Failures in Zones 3, 4, & 5

Tank Structural Failure and/or Subsidence			Tank Inlet Piping Failure				Outlet Piping Failure					Leach Field/ Seepage Pit					
Structural	Subsidence	Other	Inlet Roots	Inlet Cracking	Inlet Grease	Inlet Shearing	Outlet Roots	Outlet Grease	Outlet Cracking	Outlet Shearing	Other Outlet Failure	Leach Field Plugged (non roots)	Leach Field Roots	High Water Table Water Table	DB Box failure	Lack of Footage (Leach Fields)	Other Leach Field Failure
9	0	5	13	0	0	3	14	0	0	2	8	1	55	0	2	0	4

Note:

1. Information provided by Septic Skeptic Company
2. In some cases there were multiple "failure modes" per home

Inspection records from a local septic tank inspection company ranging from 2002 to present were analyzed. A total of 81 septic tank inspections in the Gualala community were included in the dataset. Of the 81 septic tank inspections, 52 of them were routine home sale/escrow related. It is assumed that the home sale inspections are a random sample that can represent the population.

From the results of this analysis, it can be projected that over 80% of septic systems in the Gualala area have failed. Refer to **Figure 2.5.2-1** for a map of recorded failures. The most common failure mode was roots and the most common failure location was the leach field. Many systems had multiple failures. Refer to **Figure 5.5.1-1** for failure locations and modes. The average septic system age was 38 years.

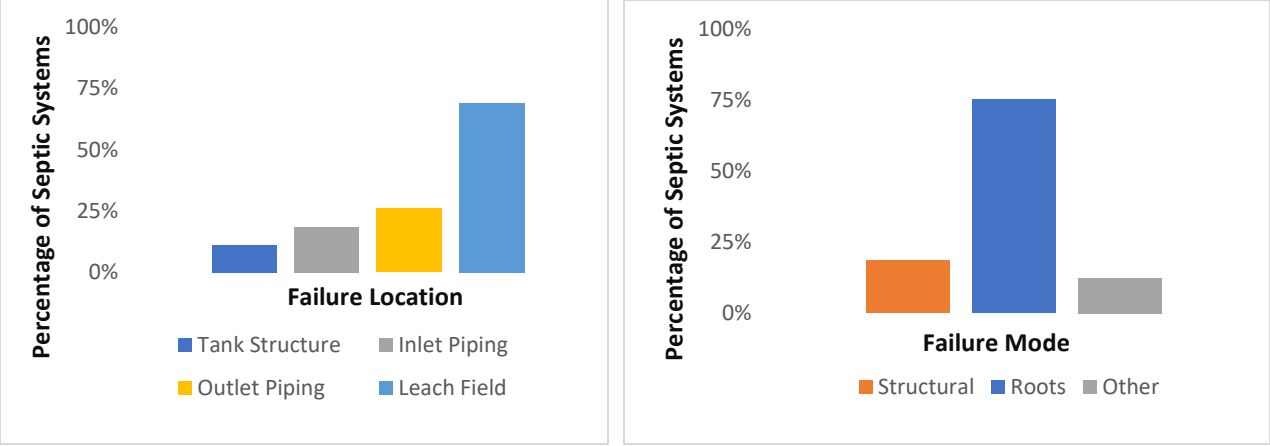

Figure 5.5.1-1 Septic Failure Location and Mode

5.5.2 Water Quality Sampling and Health and Safety Results

Results from the water sampling (stream) conducted by MC Engineers and GCSD staff are as indicated below and found within **Table 5.5.2-1**. These stream sampling stations were strategically chosen due to their proximity to both existing septic systems, within the Zones 3, 4, and 5 areas, including proximity to drinking water facilities (wells) that serve the Gualala Community depicted in **Figure 5.5.2-1** and **Figure 5.5.2-2**. The sampling was conducted in the late winter-spring period to account for effects of groundwater and surface run-off that would carry pollutants that are associated health and safety risks. Those pollutants include and are not limited to; nitrates and other harmful intestinal type pollutants, including disease carrying pathogens with coliform bacteria's (total and fecal) as "indicators". The results of the sampling program have indicated that there is a probability that the presence of high coliform and fecal coliform levels indicate the presence of potentially dangerous pathogens, which carry a variety of diseases and ultimately have significant and potential health and safety risks.

Table 5.5.2-1 Results of Water Quality Sampling

Sample Site	Date Collected	Total Coliform (MPN/100 ml)	Total Fecal	BOD_5 @ 20°C (mg/L)	Nitrate N (mg/L)
1	3/27/2019	> 1,600	> 1,600	< 5	< 0.20
2	3/25/2019	> 1,600	1,600	< 5	< 0.20
	3/12/2020	33	< 2		
	3/25/2020	920	2	< 5	< 0.20
3	3/25/2019	1,600	920	< 5	< 0.20
	3/12/2020	63	< 2		
	3/25/2020	> 1,600	> 1,600	< 5	< 0.20
4	3/25/2019	1,600	920	< 5	< 0.20
	3/12/2020	170	2		
5	3/27/2019	> 1,600	920	8.1	< 5
	3/12/2020	> 1,600	> 1,600		
6	3/27/2019	290	23	< 5	< 0.20
7	3/25/2020	130	33	< 5	< 0.20

Sample Site 6
Sample Site 1
Sample Site 4
Sample Site 7
Sample Site 5
Sample Site 3
Sample Site 2
5
3
2
4
1
Ocean Ridge Dr
Landing Rd
Bourns Gulch Rd
Glennen Dr
Big Gulch Rd
Big Gulch Rd
S Highway 1
California Coastal National Monument
Old Coast Hwy
Highway 1
Tickled Pink Dr
Pacific Woods Rd
Pacific Woods Rd
Old Stage Rd
Moonrise Dr
Moonrise Dr
North Fork Gualala River
North Fork Gualala River
Pelican Ln
Old Stage Rd
Gualala Rd
1
1
USDA FSA, GeoEye, Maxar, Esri Community Maps Contributors, Esri, HERE, Garmin, SafeGraph, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, US Census Bureau, USDA

Legend

- Sample Site 1
- Sample Site 2
- Sample Site 3
- Sample Site 4
- Sample Site 5
- Sample Site 6
- Sample Site 7
- Parcels
- GCSD Zones

MC Engineering, Inc.
9294 Madison Ave
Orangevale, CA 95662
Tel: 916-223-3828
Fax: 916-860-1863
www.mc-engineers.com

Title:
GCSD WASTEWATER STUDY

Figure 5.5.2-1:
Non-Sewered Area Watershed Sampling Site Locations

N

0 500 1,000 2,000 Feet

Document Path: M:\Clients\004_GUALALA_COMMUNITY_SERVICES_DISTRICT\GIS\Projects\GCSD editing map\GCSD editing map.aprx

Sample Site No. 1 Pipe Outlet

Sample Site No. 2-a Robinson Gulch

Sample Site No. 2-b Pumping Station

Sample Site No. 3 Big Gulch

Sample Site No. 4 Behind Concrete Bedrock

Sample Site No. 5-a Swale

Sample Site No. 5-b Septic Failure

Sample Site No. 6 Swale

Sample Site No. 7

Legend

Point of Sample Site Location

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Tel: 916-223-3828
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www.mc-engineers.com

Title:
GCSD WASTEWATER STUDY

Figure 5.5.2-2:
Non-Sewered Area Watershed Sampling Site Photos

5.6 PERMIT VIOLATIONS, HEALTH AND SAFETY ISSUES AND OVERALL NEEDS (SUMMARY)

This report included a conditional assessment of the GCSD assets, which can be found in **Appendix F**. The asset list was prepared form information gathered in the field with GCSD staff members, communications with staff, and review of all available documentation from the files of the GCSD and the CRWQCB. A second and important criteria was implemented as a part of the need's analysis, and it included a current revision to the GCSD Waste Discharge Permit. These proposed WD revisions have required a pro-active approach with the staff of both GCSD and the CRWQCB. Secondly, the CRWQCB has reviewed the first draft of the recently prepared Gualala Community Services District, Water Reclamation Treatment Facility and Recycled Water Use Areas; Title 22 Engineering Report, and as per letter dated July 7, 2021, from Ginachi Amah, D. Env, P.E, of the CRWQCB is in **Appendix G**.

5.6.1 PAST VIOLATIONS FROM 2000 TO PRESENT

As shown in **Table 5.6.1-1** is a list of past CRWQCB WD permit violations from 2000 to 2012. There were some serious violations that resulted in administrative and civil penalties in 2012. The District took action to comply with the order. See **Appendix H** to review the administrative civil liability fine assessed. **Table 5.6.1-2** lists notices of violation and/or emergency state-wide upgrades conducted to avoid violation between the years of 2010-2021.

Since 2012, the GCSD has taken a very pro-active role and has improved its operations and maintenance procedures, specifically by addressing needs and taking necessary and required actions by making improvements to various system facilities and appurtenances. Improvements have included:

1. SCADA upgrades
2. Clarifier modifications
3. New pumps and motors for lift stations

Table 5.6.1-1 CRWQCB WD Permit Violations between 2000-2012

Date	Violation Type	Description
6/22/2000	Effluent BOD violation	Average weekly limit is 15 mg/l, reported at 19 mg/l
6/30/2000	Reporting violation	Did not report Weekly Total Coliform for week ending 6/7/2000
6/30/2000	Reporting violation	Did not report Weekly Total Coliform for week ending 6/14/2000
6/30/2000	Reporting violation	Did not report Weekly Total Coliform for week ending 6/21/2000
6/30/2000	Reporting violation	Did not report Weekly BOD for week ending 6/7/2000
6/30/2000	Reporting violation	Did not report Weekly BOD for week ending 6/14/2000
6/30/2000	Reporting violation	Did not report Weekly BOD for week ending 6/21/2000
6/30/2000	Reporting violation	Did not report Weekly NFR for week ending 6/14/2000
6/30/2000	Reporting violation	Did not report Weekly NFR for week ending 11/21/2000
6/30/2000	Effluent BOD violation	Average monthly limit is 10 mg/l, reported at 11.7 mg/l
7/16/2000	Late self-monitoring report	June 2000 SMR due 7/15/2000, received 7/21/2000. Total of 6 days late
11/16/2003	Reporting violation	Did not report Weekly Total Coliform for week ending 11/16/2003
11/16/2003	Reporting violation	Did not report Weekly NFR for week ending 11/16/2003
7/3/2005	Effluent BOD violation	Average weekly limit is 15 mg/l, reported at 20 mg/l
2/19/2006	Effluent BOD violation	Average weekly limit is 15 mg/l, reported at 16 mg/l
3/3/2006	Late 2005 annual report	Report due 1/30/2006, received 2/2/2006. Total of 2 days late.
3/5/2006	Effluent BOD violation	Average weekly limit is 15 mg/l, reported at 17 mg/l

Table 5.6.1-2 Recent Notice of Violations and/or Emergency System-Wide Upgrades to Avoid Violations

Facility Process Description	Component Description	Project Need	Project Cost	Project Completed	CRWQCB Notice of Violation
Clarifier	ClearStream	Title 22 Requirement and Compliance	$750,000	2017	Avoided
Aeration Basin	Aqua Aerobics Mixer 7.5 HP	Did not have a mixer just a surface aerator WD Permit	$12,000	2018	Avoided
Aeration Basin	DO Probe Hach	Replace old DO Probe WD Compliance	$2,500	2017	Avoided
Aeration Basin	Ph Probe Hach	Added a PH Probe for process control - WD Compliance	$2,500	2017	Avoided
CL2 Disinfection	CL2 Analyzer-MHB Hach	Effluent - Title 22 and WD Permit Compliance	$2,500	2016	Avoided
CL2 Disinfection	CL2 Analyzer-MHB Hach	Influent - Title 22 and WD Permit Compliance	$2,500	2016	Avoided
CL2 Disinfection	1720E NTU-Inf Analyzer Hach	Filter Inf - Title 22 and WD Permit Compliance	$3,500	2017	Avoided
CL2 Disinfection	1720E NTU- Eff Analyzer Hach	Filter Eff- Title 22 and WD Permit Compliance	$3,500	2017	Avoided
CL2 Disinfection	CCC Inf Mixing Pump 3HP	MHC- Title 22 and WD Permit - Compliance	$2,500	2020	Avoided
CL2 Disinfection	CCC Eff Mixing Pump 3HP	MHB -RW Gate - Title 22 and WD Permit Compliance	$2,500	2020	Avoided
CL2 Disinfection	6" Auto Slide Gate Pond#1	MHB -RW Gate - Title 22 and WD Permit Compliance	$7,500	2020	Avoided
CL2 Disinfection	8"Auto Slide Gate Pond#2	MHB -RW Gate - Title 22 and WD Permit Compliance	$7,500	2020	Avoided
CL2 Disinfection	6" Auto Slide Gate Pond#3	MHB -RW Gate - Title 22 and WD Permit Compliance	$7,500	2020	Avoided
RAS/WAS PS	4"Mag Meter Rosemount	WD Permit Compliance	$3,000	2018	Avoided
RAS/WAS PS	Motor No. 1 -3PH 460V 2HP	Replace existing motor -old and deteriorated- WD Permit Compliance	$5,000	2018	Avoided
RAS/WAS PS	Motor No. 2 -3PH 460V 2HP	Replace existing motor -old and deteriorated - WD Permit Compliance	$5,000	2018	Avoided
INF Filter Meter	8" Mag Meter Rosemount	Added INF Filter meter - measure flow into filters- WD Permit Compliance	$8,000	2018	Avoided
Disc Filter	Metal Structure/Components	Title 22 and WD Permit Compliance	$60,000	2014	Avoided
Disc Filter	Disk Filter Package - NOVA	Title 22 and WD Permit Compliance	$250,000	2014	Avoided
Disc Filter	Concrete Structure	Title 22 and WD Permit Compliance	$40,000	2014	Avoided
Traveling Bridge Basin	Backwash Pump 2.4 HP Flyght	Replace existing pump/motor -old/ deteriorated WD Permit Compliance	$25,000	2017	Avoided
Traveling Bridge Basin	Media Replacement	Replace media - WD Permit Compliance	$30,000	2017	Avoided
Traveling Bridge Basin	Sand Mixing Pump 1.7 HP Flyght	Old and deteriorated - WD Permit Compliance	$20,000	2017	Avoided
Traveling Bridge Basin	Carriage Assembly Motor TEFC 1/4HP	Old and deteriorated - WD Permit Compliance	$15,000	2017	Avoided
2-W Water System	Booster Pump 3 HP	Health and Safety	$3,000	2000	Avoided
Chemical Feed Room	CL2 Generator De Nora	Replace .08% CL2 Solution Generator Upgrade	$55,000	2020	Avoided
Chemical Feed Room	CL2 Lead Pump ProMinent	Added for Title 22 Redundancy- WD Permit Compliance	$5,500	2020	Avoided
Chemical Feed Room	CL2 Lag Pump Stenner	Added for Title 22 Redundancy - WD Permit Compliance	$2,000	2018	Avoided
Chemical Feed Room	CL2 Backup Pump Stenner	Added for Title 22 Redundancy - WD Permit Compliance	$2,000	2018	Avoided
Chemical Feed Room	Lead Coag Pump Stenner	Added for Title 22 Redundancy - WD Permit Compliance	$2,000	2018	Avoided
Chemical Feed Room	Lag Coag Pump Stenner	Added for Title 22 Redundancy - WD Permit Compliance	$2,000	2018	Avoided
Influent Pipeline & Headworks	Influent Bypass Valve	Replace old 6-inch BF valve- WD Permit Compliance	$4,000	2018	Avoided
Influent Pipeline & Headworks	Influent Mag Meter- Rosemount	Replace old 6-inch mag meter - WD Permit Compliance	$8,000	2018	Avoided
Control Room & Shop/Lab	SCADA PLC Control Panel A. Bradley	Need of upgrade by Aqua Sierra Contract - WD Permit Compliance	$225,000	2018	Avoided
Control Room & Shop/Lab	SCADA Server Main Del	Added for Title 22 Redundancy	$5,000	2018	Avoided
Control Room & Shop/Lab	SCADA Server Backup Del	Added for Title 22 Redundancy	$5,000	2018	Avoided
Control Room & Shop/Lab	IDEXX Coliform Sealer IDEXX	Needed for Lab Accreditation - WD Permit Compliance	$6,000	2018	Avoided
Control Room & Shop/Lab	Incubator Weber	Needed for Lab Accreditation - WD Permit Compliance	$4,000	2018	Avoided
Control Room & Shop/Lab	Oven Weber	Needed for Lab Accreditation - WD Permit Compliance	$4,000	2018	Avoided
Control Room & Shop/Lab	NTU Benchtop Analyzer Hach	Process Control - WD Permit Compliance	$6,000	2015	Avoided
Maintenance Building	Vehicle Lift	Required for repairs on all vehicles - Operational/Maintenance Efficiency	$50,000	2008	Avoided
		Sub-Total Costs (2010-2021)	**$1,656,000**		

5.6.2 Summary of Overall System Needs

The wastewater treatment and reclamation facility were inspected with significant input being provided by the District staff. **Table 5.6.2-1** is a summary of all apparent deficiencies as identified within the wastewater facilities. It is important to note that a pro-active approach was taken in the system evaluation. The Teams initial attempt was to focus in on new revised waste discharge permit along with aggressively evaluating the potential water quality problems associated with raw sewage form unsewered zones within the District. It became apparent during our inspections of the existing wastewater facilities, including the WWTP, lift stations, collection system, pump stations and individual STEP systems, that there were significant operational and maintenance issues that pose as existing potential water quality and health and safety issues and violations. Most of which were associated with system-wide age and deterioration. A second health and safety issue involved the employees of the wastewater facilities due to and related to Cal OSHA and ADA violations and hazards, specifically at the wastewater treatment plant.

Table 5.6.2-1 Summary of WWTP Deficiencies

Wastewater facility component	Report Section	Rule Violation Type (Potential and/or Existing)	Identified Deficiency	Described Need/Solution
Aeration Basin	5.2.1	1. WD Permit No. 92-120 (Current) WWTP - Tertiary 2. WD Permit No. 2006-0003 - DWQ 3. WD Permit No. 92-120 (Proposed) 4. Title 22 DHS Recycled Water 5. WD Permit No. 92-121 6. New Proposed WD Permit	1. Marginal and Restricted Aeration Capacity for existing BOD demands 2. Marginal and Restricted mixing capacity for denitrification 3. Reliability requirements to meet the California Code of Regulation and Title 22 is not fulfilled-Critical Title 22 Irrigation Compromised	1. Additional aeration would be required for system expansion and/or future growth 2. Construction of either an additional aeration basin or a short-term retention (emergency storage basin) is required 3. Conformance w/ New Proposed WD Permit (Pending)
Secondary Sedimentation	5.2.2	1. WD Permit No. 92-120 (Current) WWTP - Tertiary 2. WD Permit No. 2006-0003 - DWQ 3. WD Permit No. 92-120 (Proposed) 4. Title 22 DHS Recycled Water 5. WD Permit No. 92-121 6. New Proposed WD Permit	1. No process deficiencies identified 2. No Title 22 deficiencies identified 3. Both of the existing centrifugal RAS pumps are nearing the end of its useful life 4. Both sludge withdrawal lines for the two clarifiers are tied together outside of the RAS building with no provisions to isolate either line 5. The wooded stairway leading down to the RAS building is nearing the end of its life expectancy 6. The path used to access the building from the road near the digester is undeveloped and inaccessible 7. No isolation valve exist downstream of the secondary effluent pipe	1. Replace both of the existing centrifugal RAS pumps 2. Replace the wooded stairway leading down to the RAS building 3. Improve the path used to access the building from the road near the digester 4. Install isolation valve downstream of the secondary effluent pipe
Tertiary Filtration	5.2.3	1. WD Permit No. 92-120 (Current) WWTP - Tertiary 2. WD Permit No. 2006-0003 - DWQ 3. WD Permit No. 92-120 (Proposed) 4. Title 22 DHS Recycled Water 5. WD Permit No. 92-121 6. New Proposed WD Permit	1. Either filtration unit must be manually brought online by operation of the isolation valve up and downstream of the units resulting in the conveyance of substandard effluent during a process failure	1. Install magnetic flow meter and turbidity meter 2. Program existing slide gates to prevent substandard effluent
Disinfection	5.2.4	1. WD Permit No. 92-120 (Current) WWTP - Tertiary 2. WD Permit No. 2006-0003 - DWQ 3. WD Permit No. 92-120 (Proposed) 4. Title 22 DHS Recycled Water 5. WD Permit No. 92-121 6. New Proposed WD Permit	1. Insufficient Title 22 Reliability Features: No backup pump to automatically take lead during a pump failure to maintain the baffling factor within the chamber 2. Minimum Contact Time of 90 minutes not achieved under the full build out scenario. Contact time achieved for other scenarios (including peaking factor)	1. Install additional circulation manifold with pump within manhole "B" to increase the baffling factor to satisfy the minimum 90-minute modal contact time 2. Install magnetic flow meter
Tertiary Storage and Reclamation	5.2.5	1. WD Permit No. 92-120 (Current) WWTP - Tertiary 2. WD Permit No. 2006-0003 - DWQ 3. WD Permit No. 92-120 (Proposed) 4. Title 22 DHS Recycled Water 5. WD Permit No. 92-121 6. New Proposed WD Permit	1. Existing storage capacity is inadequate 2. Pond 2 liner failed, end of life expectancy	1. Reline pond 2 with a new 60 mil liner 2. If deemed necessary, a portion of the slope can include a concrete access ramp and the bottom can be over-layed with a soil cover
Sludge and Biosolids Facilities	5.2.6	1. WD Permit No. 92-120 (Current) WWTP - Tertiary 2. WD Permit No. 2006-0003 - DWQ 3. WD Permit No. 92-120 (Proposed) 4. Title 22 DHS Recycled Water 5. WD Permit No. 92-121 6. New Proposed WD Permit	1. Hazardous gases within RAS pump station 2. Inability to drain aerobic digester 3. No surface decant mechanism 4. No designated pumps 5. Excessive hauling fees associated with the additional water contend without any provisions to dewater biosolids 6. Inability to apply polymer prior to sludge thickening 7. No provisions for on-site land application 8. Insufficient sludge dewatering facilities 9. The historic practice of storing and drying sludge directly on the ground at the GCSD facility has been identified as an unauthorized practice and is not permitted within GCSD's Discharge Permit	1. The construction of sludge drying beds, complete with an underdrain system to convey leachate back to the aeration basin 2. Constructing new paved drying beds with dewatering bags, is recommended on the basis that dewatering bags and paved drying beds provide a low capital cost and low maintenance approach to sludge dewatering
Yard Piping	5.2.7	1. WD Permit No. 92-120 (Current) WWTP - Tertiary 2. WD Permit No. 2006-0003 - DWQ 3. WD Permit No. 92-120 (Proposed) 4. Title 22 DHS Recycled Water 5. WD Permit No. 92-121 6. New Proposed WD Permit	1. A number of deficiencies exist throughout the site related to piping as a result of old and deteriorated pipelines and appurtenances	1. Replace identified pipeline segmented, including valves and fittings/A
Proposed Future Septage Receiving Facilities	5.2.8	1. WD Permit No. 92-120 (Current) WWTP - Tertiary 2. WD Permit No. 2006-0003 - DWQ 3. WD Permit No. 92-120 (Proposed) 4. Title 22 DHS Recycled Water 5. WD Permit No. 92-121 6. New Proposed WD Permit	1. The existing system is incapable of separating non-biodegradable items and solids such as rags, sanitary napkins, masks, prophylactics, etc. 2. limitations with the existing system is the inability to meter flows, thus making it very difficult to charge a fee based on volume of material delivered	1. An alternative receiving facility at the plant is recommended
Operations Buildings, Administration, Vehicle and Equipment Storage, and Chemical Storage Room	5.3.1	1. WD Permit No. 92-120 (Current) WWTP - Tertiary 2. WD Permit No. 2006-0003 - DWQ 3. WD Permit No. 92-120 (Proposed) 4. Title 22 DHS Recycled Water 5. WD Permit No. 92-121 6. New Proposed WD Permit	1. The operations building is highly susceptible to damage by fire and in dire need of painting/exterior upgrades 2. The administration building provides inadequate office and/or rest space for staff 3. Lack of a potable water supply for hand washing, showering, and drinking 4. Vehicle equipment and materials storage has extreme corrosion due to atmospheric conditions 5. The exposed containers are susceptible weather, vandalism, and possible leaks/spills	1. The District is must construct a new storage facility 2. A new chemical storage room/facility is highly recommended
Potable Water	5.3.2	1. WD Permit No. 92-120 (Current) WWTP - Tertiary 2. WD Permit No. 2006-0003 - DWQ 3. WD Permit No. 92-120 (Proposed) 4. Title 22 DHS Recycled Water 5. WD Permit No. 92-121 6. New Proposed WD Permit	1. No potable water supply or plumbing available at the WWTP	1. Once the new administration building is in place, complete with new sinks, water closets, showers, etc.
Fire Protection and Related Facilities	5.3.3	1. WD Permit No. 92-120 (Current) WWTP - Tertiary 2. WD Permit No. 2006-0003 - DWQ 3. WD Permit No. 92-120 (Proposed) 4. Title 22 DHS Recycled Water 5. WD Permit No. 92-121 6. New Proposed WD Permit	1. The absence of any reliable means of fire suppression, and the proximity to the nearby high risk heavily forested lands, increases the risk considerably 2. Loss of the facility due to fire would inevitably result in unwanted discharges of raw or partially treated sewage to local waterways as well as corresponding permit violations and service disruptions throughout the business district and for local residences currently relying on the facility for accepting and treating discharges	1. Implement an aggressive program to increase the defensible space around the plant by removing trees a minimum of 100 feet laterally from all structures 2. Improve the exterior of the existing building by installing metal roofs and "Hardi Board" cement siding materials 3. Install hydrant that is fed from the chlorine contact channel in order to supplement the engine driven pump in the interim
Access Road	5.3.4	1. WD Permit No. 92-120 (Current) WWTP - Tertiary 2. WD Permit No. 2006-0003 - DWQ 3. WD Permit No. 92-120 (Proposed) 4. Title 22 DHS Recycled Water 5. WD Permit No. 92-121 6. New Proposed WD Permit	1. The 3,300 LF by 15 foot +/- wide graveled access road to the plant is unpaved and portions have washed-out during storm events 2. Portions of the graveled roadway require on-going maintenance due to inadequate drainage and lack of culvert capacity at various drainage crossings	1. It is recommended that GCSD regrade portions of the WWTP access and repair a serious washout area, along with adding a concrete headwall prior to an existing 36-inch storm drain 2. Repair existing landslide area new drainage and reinforce slopes
Waste Discharge Permit	5.3.5	1. WD Permit No. 92-120 (Current) WWTP - Tertiary 2. WD Permit No. 2006-0003 - DWQ 3. WD Permit No. 92-120 (Proposed) 4. Title 22 DHS Recycled Water 5. WD Permit No. 92-121 6. New Proposed WD Permit	1. A variety of improvements are needed to comply with the proposed new waste discharge permit expected from the RWQCB	See all items within Chapter 5 (where applicable)
Emergency Access for Pipeline Repairs	5.3.6	1. WD Permit No. 92-120 (Current) WWTP - Tertiary 2. WD Permit No. 2006-0003 - DWQ 3. WD Permit No. 92-120 (Proposed) 4. Title 22 DHS Recycled Water 5. WD Permit No. 92-121 6. New Proposed WD Permit	1. The lack of equipment access within these physically restricted areas could seriously and potentially impact water quality (Gualala River Basin). Cannot perform routine maintenance and emergency repairs if existing non-encased 6-8-inch pipeline cracks or breaks	1. Clear and grub the inaccessible alignments of both identified pipeline segments to allow for required maintenance equipment to gain access

5.6.3 (Existing) Collection System Pipelines and Lift Stations (Gravity)

The following table describes the specific needs to eliminate potential health and safety issues in regards water quality and human resources. The project needs, if not corrected can lead to and pose as a significant health and safety risk to the public. Described within this report system deficiencies were noted which pose as either an acute and/or chronic risk to public health. **Table 5.6.3-1** describes each deficiency and a recommended solution.

Table 5.6.3-1 Gravity Pipeline Deficiencies and Recommended Solutions

Report Section	Wastewater Facility Component	Identified Deficiency	Described Need/Solution
5.4.1	**GCSD Collection System (Mains)**	**1.** No immediate replacements or upgrades are included at this time for the collection system pipelines	**1.** Recommended improvements associated with the tanks and pump systems are discussed in **Chapter 7, Section 7.4.1**
5.4.3	**GCSD Lift Stations**	**1.** All lift stations are in need of modifications and upgrades to avoid serious and problematic raw sewage overflows **2.** A serious need to replace and upgrade the electrical and control (E/C) equipment **3.** Immediate repair and/or replacement include, vault hatches, wet-well guide rails, valves	**1.** Install new bypass quick connects, meter and meter vaults are proposed for lift stations 1, 2, and 3 **2.** Existing piping, Valving, and access hatches should be replaced along with the wet-well guide rail systems **3.** New control panels are proposed for all-of the lift

5.6.4 (Existing) Collection System Pipelines (Step System and Tanks)

The following table describes the specific needs to eliminate potential health and safety issues in regards water quality and human resources. The project needs, if not corrected can lead to and pose as a significant health and safety risk to the public. Described within this report system deficiencies were noted which pose as either an acute and/or chronic risk to public health. **Table 5.6.4-1** describes each deficiency and a recommended solution.

Table 5.6.4-1 Existing Collection System Pipelines (Step System and Tanks)

Wastewater Facility Component	Report Section	Rule Violation Type (Potential and/or Existing)	Identified Deficiency	Described Need/Solution
GCSD STEP Systems (Interceptor Tanks)	5.4.2		**1.** Absence of risers on the inlet side of the tanks **2.** Control panels are old and deteriorated as a result of excessive corrosion and age **3.** Structural failures to vaults and tanks, including cracks and damage to connecting pipes associated with subsidence, particularly for interceptor tanks on slopes	**1.** New access hatches for pumper truck access are needed on most of the tanks **2.** Other various repairs, replacement, and upgrades including, pumps, electrical and even tank replacements are included

5.6.5 Unsewered Areas (Septic Systems)

The following table describes the specific needs to eliminate potential health and safety issues in regards water quality and human resources. The project needs, if not corrected can lead to and pose as a significant health and safety risk to the public. Described within this report system deficiencies were noted which pose as either an acute and/or chronic risk to public health. **Table 5.6.5-1** describes each deficiency and a recommended solution.

Table 5.6.5-1 Unsewered Area Deficiencies and Recommended Solutions

Wastewater Facility Component	Report Section	Identified Deficiency	Described Need/Solution
Sea Ranch North Collection System and CSA 6 Facility	**5.4.4**	**1.** GCSD's ability to attenuate high I/I flows from the SRN collection system is constrained by both the existing pump capacity and the existing inlet configuration at the SRN primary pond	**1.** Installation of a floating decant located on the west end of the basin is recommended to minimize the amount of sludge and settled solids collected when the full capacity of the SRN pumps are required to lower the basin level after, or in anticipation, of wet weather events
Existing Off-Site Septage Receiving Facilities	**5.4.5**	**1.** The biggest drawback of reliance on the Point Arena site is the cost for trucking and tipping fees, which impacts staff time. **2.** Future risk off-site septage receiving facilities becomes unavailable	**1.** Providing an on-site option at the plant would not only reduce these costs, it would provide an alternate means of disposal in the event the Point Arena site becomes unavailable
Septic System Failure Rates (Surveys, Public and Private Records)	**5.5.1**	**1.** potential health and safety effects from failing septic systems as-a-result of both record search, field data, sampling, and testing **2.** ground conditions including and not limited to; roots within the leach fields, ground water effecting proper leaching of liquids, old and dilapidated septic tanks with cracks and subsidence, and sub-standard plumbing	**1.** Construction of new septic tank effluent pump (STEP) and septic tank effluent gravity (STEG) systems is recommended for all existing failing septic systems for **Zones 3, 4, & 5** **2.** It is important to note that installation and long-term O&M of all new STEP and STEG systems will require permanent easements
Water Quality Sampling and Health and Safety Results	**5.5.2**	**1.** Those pollutants include and are not limited to; nitrates and other harmful intestinal type pollutants, including disease carrying pathogens with coliform bacteria's (total and fecal) as "indicators" **2.** The results of the sampling program have indicated that there is a probability that the presence of high coliform and fecal coliform levels indicate the presence of potentially dangerous pathogens, which carry a variety of diseases and ultimately have significant and potential health and safety risks	**1.** Retorfit or replace existing setic tanks and leach field in non-sewered areas

SECTION 6- PROJECT ALTERNATIVES AND ANALYSIS

6.1 INTRODUCTION

This section identifies and evaluates various project alternatives that are intended to address and correct the deficiencies identified in Section 5. Projects that solve or mitigate each deficiency are considered along with the costs (annualized/current life cycle), benefits, and drawback associated with taking no action. Operational efficiency, design and constructability, and financial viability are also considered for the projects evaluated. A life-cycle cost analysis comparison (**Table 6.6-1**) was prepared for select projects, with consideration of costs and benefits, and is included for deficiencies with more than one project alternative (aside from a no-project option.)

Various alternative evaluations are based on an annualized cost comparison basis with consideration of manpower, energy usage, climate change, and overall benefit to GCSD. No net change in energy usage for all alternatives as listed were discovered. Energy usage had minimal influence on the selection of recommended alternatives. A net present value (useful life) evaluation was considered for all recommended alternatives and is shown in **Appendix I**. Annualized cost comparison tables (**Table 6.6-1**) were based on an interest rate of 6% for a period of 20 years. Certain annualized costs related to sludge facilities were calculated separately. These can be found in the Biosolids Management Plan (**Appendix J**).

An abbreviated description of each deficiency is described. Deficiencies are outlined in further detail in Section 5 of this report.

ENERGY EFFICIENCY, CLIMATE CHANGE CONSIDERATIONS, AND SECTION 65041.1 COMPLIANCE

The project includes installing new monitoring and control capabilities for the lift stations. This will help facilitate energy efficiency by providing alarms when pumps are operating inefficiently, and by allowing staff to monitor I/I contributions that affect energy usage. Monthly bills should be reviewed regularly and compared to the total flows in an effort to identify and track the kWH/MG pumped so appropriate action can be taken to minimize energy use.

Climate change was a consideration in the alternative evaluation. It is important to note that "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. Continued emission of greenhouse gasses (GHGs) are expected to cause further warming and long-lasting changes in all components of the climate system. The Intergovernmental Panel on Climate Change (IPCC) states that "a large fraction of both terrestrial and freshwater species face increased extinction risk under projected climate change during and beyond the 21st century". Wildfires, which are an important control mechanism in many ecosystems, have become more severe and more frequent, threatening communities and making it difficult for native plant species to repeatedly re-germinate. Wildfires emit large quantities of carbon dioxide and greenhouse gasses.

All project alternatives were evaluated for their effects on climate change resulting in sea level rise, water supply depletion, water supply quality, flooding/storm surges, drought, and wildfire. Additionally, the ongoing effects of climate change on each alternative was considered. Certain project alternatives would negatively impact climate change, (ex; vehicle emissions from sludge hauling). The overall footprint of each alternative's impact on climate change is small but was considered.

Certain project alternatives had a marginal effect on the impact to climate change, as noted in Section 6.2.6 (Sludge, Septage Receiving, and Biosolids Facilities), specifically as it relates to vehicle emissions from hauling of sludge off-site (Alternatives 1 and 2 -Septage Receiving Facilities). Other alternatives take into consideration the effects of climate change on its implementation. As noted in Section 6.3.3, fire protection facilities will aid in the prevention of wildfires and will positively affect climate change. A "no project alternative" in this section would not address the wildfire potential due to climate change. The environmental impact document, as being prepared by AES of Sacramento, will further address the environmental impacts of each alternative.

Please refer to **Appendix N** for a matrix that evaluates each project alternative as they relate to compliance with Government Code Section 65041.1.

6.2 WWTP PROCESS UPGRADES

6.2.1 AERATION BASIN

DEFICIENCY: Additional aeration would be required for system expansion and/or future growth.

Project Alternative A1: - Purchase a new permanent aerator. Install conduit and electrical appurtenances to accommodate additional future surface aerators, continue treatment as is. This alternative is estimated to cost $25,000 (**Table 7.2.1-1**).

Project Alternative A2 – No Project: (RECOMMENDED) This alternative would result in no immediate impacts to plant performance if the influent flows and loadings remain consistent with historical data. However, any expansion which would increase the flows and loadings would compromise the ability to remove BOD and oxidize ammonia and nitrite.

DEFICIENCY: Marginal Mixing Capacity

Project Alternative B1: Replace the existing 7.5 hp floating mixer with a 10 hp floating mixer and continue cyclic nitrification/denitrification process control. Replacing the existing mixer with a larger 10 hp mixer at this time would assume that no additional mixing capacity will be gained if additional aerators are installed within the basin. Although the primary purpose of an aerator is to deliver dissolved oxygen into the aeration basin, there is also a notable gain in mixing capacity.

Project Alternative B2 – No Project: (RECOMMENDED) This alternative implies that the existing 7.5 hp mixer will continued to be used for partial mixing during the anoxic phase of cyclic process control. As previously mentioned, the future installation of an additional aerator will provide additional mixing and the total capacity of mixing should be evaluated at that time.

DEFICIENCY: There are no provisions to satisfy the Title 22 reliability/redundancy requirements for biological treatment.

Project Alternative C1: Construct an additional aeration basin complete with aeration and mixing equipment similar to the existing aeration basin. The construction of an additional aeration is an alternate pathway to satisfying the reliability requirements of Title 22; however, this approach would only satisfy the reliability needs for secondary treatment and also require that an additional aeration basin be maintained. This alternative is not recommended since the reliability requirements could be satisfied by use of a short-term retention basin without the need to maintain an additional aeration basin.

Project Alternative C2: Construct a new short-term retention basin. Construction of a new short-term aeration basin would relieve GCSD staff from having to maintain an additional aeration basin and also provide reliability requirement compliance for other process units such as filtration. This alternative is not recommended since construction of a new basin would be better suited accommodating a new sludge storage/digestion basin.

Project Alternative C3: **(RECOMMENDED) –** Furnish a standby aerator ($25,000) and repurpose the existing sludge storage basin as a short-term biological treatment process. This recommendation stems from the fact that the Title 22 short-term retention basin requirement stipulates a minimum of 24 hours of storage. The existing sludge storage basin features a total volume of 361,000 gallons and is adequately sized to store a days' worth of flow (including wet weather) and is recommended to be repurposed for use as the new short-term retention basin. Construction of a new basin for short-term retention would require that the existing sludge storage basin be rehabilitated to address many of the facilities and appurtenances it is currently lacking. Meanwhile the existing sludge storage basin features many of the facilities and appurtenances needed to convert to a short-term basin. For this reason any new basin construction should be preserved for sludge handling.

Project Alternative C4 – No Project: **-** Continue to operate the facility with no provisions to take the aeration basin out of service. This would imply that GCSD would be unable to fulfill the California Code of Regulations for recycled water requirements as specified in Title 22 and compliance with the GCSD waste discharge permit would remain in a pending status.

6.2.2 Secondary Sedimentation

Deficiency: One of the two existing RAS centrifugal pumps is nearing the end of its life expectancy. Furthermore, the sludge lines out of each clarifier are tied together and operators are unable to isolate them. In addition, secondary effluent piping is routed directly to filtration with no provisions to reroute flows back to the aeration basin. The clarifier structure is lacking a handrail per Cal OSHA requirements and a deteriorating stairway limits safe access to the RAS building. The access road to the RAS building is undeveloped and relatively inaccessible.

Project Alternative 1: **(RECOMMENDED) -** Address high priority needs by replacing the RAS pump, separating the sludge effluent lines of each clarifier, modifying the effluent piping to allow flow diversion to the scum manhole, and installing handrails where necessary to prevent personnel from falling into the clarifier.

Project Alternative 2: Address all the deficiencies listed above with complete improvements. This alternative is not cost- effective. Only the most critical portions will be addressed.

Project Alternative 3 – No Project: This alternative would ultimately lead to a process failure by which suspended solids would pass over the effluent weir of the clarifier since a half capacity RAS rate would be insufficient during high flow events. With no improvements made to the effluent piping, a process upset would also compromise the filters downstream of the clarifier requiring a complete plant shutdown while jeopardizing the plant's ability to maintain effluent quality within the limits of the waste discharge permit.

6.2.3 TERTIARY FILTRATION

DEFICIENCY: Potentially insufficient capacity relative to historic wet weather flows. Only the total flow entering both filters is monitored, thus the individual surface loading rates are not monitored when both filters are in service. Individual effluent sample ports not available for collecting turbidity grab samples. No provisions for routing substandard effluent to short term emergency storage basin.

Project Alternative 1: Install additional flow meter immediately upstream of either unit to monitor flow in addition to effluent sample ports and program PLC to divert substandard effluent to emergency short-term storage basin, Section 6.2.1. Install additional disc filter to increase plant capacity.

Project Alternative 2: **(RECOMMENDED) –** Pursue improvements described in Alternative 1 with exception of installing an additional disc filter and instead investigate sources of inflow and infiltration by installing flow meters at each lift station and conducting an inflow and infiltration study. In addition to identifying and reducing inflow and infiltration, a wet weather operations plan should be developed and implemented for managing the SRN primary pond levels to fully utilize the volume of the pond for flow equalization during peak wet weather days.

Project Alternative 3 – No Project: The "no project" alternative would imply that the reliability, monitoring, and capacity requirements of Title 22 are left unsatisfied and the facility may be unable to treat the high wet weather flows generated by inflow and infiltration should it happen that the travelling bridge filter fails and all filtration relies on the disc filter.

6.2.4 DISINFECTION

DEFICIENCY: Title 22 reliability requirements are not being met without replacement disinfection equipment and alarms. A new magnetic flow meter will be required upstream of the CCC.

Project Alternative 1: **(RECOMMENDED) –** This project consists of satisfying Title 22 reliability requirements by using a short-term retention basin to automatically cut-off flows at the effluent manhole and divert influent into the storage basin when substandard effluent occurs due to disinfection process failure. This project also includes the installation of a centrifugal pump for replacement purposes, an additional magnetic flow meter upstream of the CCC, and alarms for minimum CT-value, minimum contact time, and pump failure**.**

Project Alternative 2 – No Project: Neglecting the improvements needed to satisfy the reliability requirements of Title 22 would imply that failure of the centrifugal pump would result in substandard effluent leaving the processes train in violation of GCSD's anticipated Waste Discharge Permit.

6.2.5 TERTIARY STORAGE AND RECLAMATION

DEFICIENCY: The liner on Pond 1 is damaged and the south slope is compromised.

Project Alternative 1: Reline/rehab. the entirety of Pond 1 with 60 mil hypalon lining. This alternative would require that a contractor remove all existing rip rap and soil cover, lay a new liner over the

Sludge Dewatering Facilities-6.2.6b (Also Refer to 7.6.6 b)

DEFICIENCY: No sludge dewatering facilities currently exist. Sludge has historically been buried on site. The RWQCB has issued a letter requiring GCSD to cease current practices and provide a long-term plan for sludge disposal.

Project Alternative 1: Belt filter press installation. A Belt Filter Press (BFP) uses a combination of drainage and compression through a continuous belt to dewater solids. In a BFP, solids are fed to a conditioning unit with the addition of polymer. The conditioned solids flow out onto a continuous porous belt followed by high pressure dewatering zones. Solids are retained on the belt and conveyed to a hopper, while free liquid is collected in a drain and fed back into the treatment process. Wash water is used to clean the belt and help prevent fouling. BFPs can dewater biosolids to 10% to 15% total solids utilizing about 10 to 15 pounds of polymer per dry ton of biosolid. Belt filter presses are typically stored within a building to control odors and protect the equipment from the environment.

Project Alternative 2: Dewatering screw press installation. A dewatering screw press utilizes a rotating screw within a fixed screen to separate solids from liquid. The variable speed screw rotates slowly and conveys the solids from the inlet to the discharge end of the screw press. A screw press is capable of producing 15% to 20% total solids with 15 to 20 pounds of polymer per dry ton of biosolids. Dewatering screw presses are typically stored within a building to control odors and protect the equipment from the environment.

Project Alternative 3: (**RECOMMENDED** – Refer to Section 7.2.6 b and Biosolids Management Plan) Install Dewatering Bags at sludge drying beds. A dewatering bag is essentially a large bag constructed from permeable geotextile fabric. Polymer is injected into the bag along with the solids to be dewatered. The polymer reacts with the solids to free water and over time the water drains from the bag and the solids are compressed by gravity. When the bag is completely full, they are typically cut open and the contents allowed to air dry on drying beds. Once dried sufficiently, the biosolids can be hauled away. A dewatering bag is capable of producing 10% to 15% total solids with 10 to 15 pounds of polymer per dry ton of biosolids. Higher solids contents may be reached by leaving the bags open in the sun to evaporate for several weeks after drainage., Bags would be purchased by the GCSD staff and would not be a part of the initial capital improvements.

Project Alternative 4 – Dewatering with On-Site Composting Facilities – Same as Alternate 3 above, but with composting facilities on-site. On-site composting was not a cost-effective alternative. Please refer to **Appendix K** for further information.

Project Alternative 5 – No Project: The "no project" alternative would assume that none of the digested sludge within the sludge storage basin is dewatered and the GCSD continues to pay the high hauling costs and tipping fees associated with disposing the bulk liquid within the basin in addition to the digested sludge.

An annualized cost comparison, as shown in **Table 6.6.1**, was developed for Alternatives 3 and 4 above. Costs for the continued hauling of wet sludge were evaluated with results found within the Biosolids Management Plan, dated May 10, 2021, and contained in **Appendix J.**

Annualized Cost for **Project Alternative 3** *(Sludge Dewatering and Hauling) = $ 63,739*

Annualized Cost for **Project Alternative 4** *(Sludge Dewatering and Composting) = $ 97,691*

Septage Receiving Facility (Also Refer to 7.2.8)

DEFICIENCY: The existing septage receiving facility at the WWTP is very primitive and cannot be used to effectively meter delivered flows or separate solids and other screenings prior to discharge into the aeration basin. As described below, costs for hauling and disposing of wet solids offsite is cost prohibitive when considering tipping fees, vehicle wear and tear, fuel costs, and labor.

Project Alternative 1: Do nothing and continue to haul and dispose of solids offsite. For annualized cost comparison, refer to **Table 6.6-1.**

Project Alternative 2: **(RECOMMENDED)** Construct an onsite septage receiving facility to replace the existing outdated facility. The new facility will meter discharges and may allow the GCSD to generate additional revenue from other septage haulers.

An annualized cost comparison, as shown in **Table 6.6.1**, was developed for Alternatives 1 and 2, above. Costs for continued hauling of wet sludge was evaluated with results found within the Biosolids Management Plan, dated May 10, 2021. The Biosolids Management Plan can be found in **Appendix J**. The annualized cost comparisons can be summarized as follows:

Annualized Cost for **Project Alternative 1** *(Continued Hauling) = $ 114,368*

Annualized Cost for **Project Alternative 2** *(Septage Receiving Facility) = $ 54,137*

6.2.7 YARD PIPING

DEFICIENCY: Existing yard piping throughout the WWTP facility has been evaluated and certain portions of the process piping are deteriorating at a rapid pace, along with certain process piping improvements being required to enable the WWTP to function properly and meet specific recommended waste discharge requirements.

Recommended Project:

The yard piping is considered integral to the various processes and is not subject to a separate alternative analysis. Some considerations can be made for alternative pipe materials during design and subsequent bidding to select the most cost-effective materials (i.e., ductile iron vs. plastic for example). In general, PVC will be selected for buried pipe and above ground pipe will either be steel or ductile iron with appropriate provisions for corrosion protection in the coastal environment. An overall site plan depicting the various yard piping improvements is presented in Section 7.

6.3 OPERATIONAL, ADMINISTRATIVE, AND OTHER FACILITY UPGRADES

6.3.1a CONTROL/OPERATIONS BUILDING W/ LAB

DEFICIENCY: The control/operations building is considered integral to the overall WWTP operations and is located within a fire hazard area with no fire hydrants and an inadequate water supply/flow (pressure and flow rate).

Recommended Project:

Improvements such as fire-retardant siding (Hardi-Board) are recommended for the building and are not subject to a separate alternative analysis. Additional alternative materials can be considered during the design phase of this project. Potable water retrofits are required as described further in Section 7.

6.3.1b ADMINISTRATION BUILDING

DEFICIENCY: Portions of the existing building are not habitable for employees due to structural deterioration including holes in the floor, deteriorated siding and damage from a leaking roof. Health and safety (Cal OSHA) issues require that a new facility be constructed.

Several alternatives can be considered for replacement including:

a) A factory-built modular structure.
b) A site-assembled prefabricated metal building.
c) Masonry building with metal roof
d) Wood stick framed structure

A preliminary floorplan for the proposed Administration building is included in Section 7. A detailed assessment of the costs associated with the alternatives presented above will be prepared during the predesign phase. Other alternatives that must be considered can be re-visited in subsequent phases including:

- Preferred site location for the new administration building:
  - Replace in existing location
  - Re-locate admin building to another preferred location
- Final determinations regarding floor plan and related building spaces including:
  - Number of bathroom facilities, shower, and locker needs.
  - Final size of conference room and office spaces.
  - Storage space requirements.

6.3.1c VEHICLE AND EQUIPMENT STORAGE FACILITY

DEFICIENCY: Due to extreme corrosion and adverse atmospheric conditions, the equipment owned by the GCSD should be protected.

Constructing a new storage structure is recommended. The proposed new storage area includes a 50' x 50' covered structure with the westerly 15' fully enclosed to replace the deteriorated containers. No alternative analysis was conducted on this required and recommended project. A "no project" alternative is not recommended.

6.3.1d CHEMICAL STORAGE ROOM/BUILDING

DEFICIENCY: Chemicals are stored in 50-gallon drums outside the control building. The drums are exposed to the weather and susceptible to vandalism. These chemicals include chlorine disinfection products which can pose a threat to health and safety if not handled properly.

Recommendations include constructing a new chemical storage building adjacent to existing chemical feed room that is currently housed within the existing control building to contain all chemical drums.

6.3.2 POTABLE WATER

DEFICIENCY: Currently, operators have only recycled water available at the water plant, which includes the restroom and lab, and eyewash facilities. There are up to five employees at a time who

work out of the administration building, and this presents health risks, violations of existing codes, and a serious and potential liability to the GCSD. Potable water is required for employee use and safety.

Various alternatives were evaluated for providing potable water to the site. Options/Alternatives under consideration include:

Project Alternative 1: New pipeline and metered connection supplied by the Sea Ranch Water Company. This project would include installation of over 3,500 LF of 2-inch main. This alternative is not cost-effective based on an annualized cost analysis as noted under Alternative 3.

Project Alternative 2: **(RECOMMENDED)** Trucking in water and filling a 5,000-gallon tank, which includes replumbing facilities to use potable water. A small pump and a bladder tank would still be required at the tank site. The existing 5,000-gallon tank is adjacent to the existing WTP Operations Building but is currently not connected and may require replacement.

Project Alternative 3: Do nothing and continue to rely on bottled water and reclaimed water. Given the critical nature of the GCSD plant it is recommended that, ultimately, a permanent water line be installed for supplying potable water without having to rely on water being trucked in. However, budget constraints have resulted in a preference from GCSD staff to defer the supply line while pursuing more critical needs with the limited funding available. For the near-term, GCSD staff have expressed a preference for trucking in water. New short-term improvements will include the on-site tank, bladder tanks, pumping, and plumbing to the proposed new building and plumbing retrofits for the existing lab. The "do-nothing" option is not considered feasible since, at a minimum, a clean continuous supply of potable water is needed for handwashing, showering, etc. and the quality of life for staff is reduced in the absence of a safe, reliable supply of potable water.

An annualized cost comparison, as shown in **Table 6.6.1**, was developed for Alternatives 1 and 2, above.

Annualized Cost for **Project Alternative 1** *(Supply Line from Off-Site Source) =$ 76,212*

Annualized Cost for **Project Alternative 2** *(Truck Water to 5000- gal Tank) = $ 16,349*

6.3.3 FIRE PROTECTION FACILITIES

DEFICIENCY: Providing Fire protection and suppression capabilities is deemed a critical need for the GCSD WWTP.

Project Alternative 1: Construct a new 6 or 8-inch water main form Sea Ranch North along with construction of new booster station. This alternative may require use of the existing poly tank (5,000 gal) or construction of a large storage tank.

Project Alternative 2: **(RECOMMENDED)** Utilize existing tertiary pond 1 with a dedicated engine driven portable pump, and 8-inch supply pipelines and with fire hydrants (2)**.**

Project Alternative 3: No Project. This alternative is not acceptable, since the existing WWTP is in a very vulnerable and within a forested location. The nearest fire fighting equipment (Agency) is over 20 minutes away and currently the WWTP has no fire lines or hydrants.

An annualized cost comparison, as shown in **Appendix I**, was developed for Alternatives 1 and 2, above.

Annualized Cost for **Project Alternative 1** *(Provide Water from Sea Ranch- Offsite) = $ 52,694*

Annualized Cost for **Project Alternative 2** *(Pump Water from Tertiary Pond) = $ 12,762*

6.3.4 Access Road

Deficiency: The 3,339 LF by 15-foot-wide access road to the plant is unpaved and portions of it have washed out during storm events. This access is critical and requires improvements to allow for all types of vehicles to access WWTP.

Project Alternative 1: Paving: Provide a minimum of 12′ wide pavement section with 2″ of AC over 6″ to 8″ of AB, or as recommended based on future engineering evaluations. This alternative also includes repairing and improving culverts and inlet structures. A locked gate with would also be included.

Project Alternative 2: **(RECOMMENDED)** - Refurbish and maintain existing aggregate base section: This alternative assumes on-going annual maintenance by repairing potholes, cleaning drainage crossings, as well as placing, grading, and compacting fresh sections of aggregate base (AB) on a recurring basis as needed. A locked gate would also be included.

Project Alternative 3: Do-nothing. This alternative assumes that road continues to degrade and could ultimately lead to catastrophic section failures.

An annualized cost comparison, as shown in **Table 6.6.1**, was developed for Alternatives 1 and 2, above.

Annualized Cost for **Project Alternative 1** *(Pave complete access road with other improvements) = $ 106,594*

Annualized Cost for **Project Alternative 2** *(Modifications and improvements to portions of road with new gate) = $ 26,628*

6.3.5 Emergency Access for Pipeline Repairs

Deficiency: Portions of the main interceptor pipeline are constructed within cross-country reaches and non-accessible areas, thus significantly impairing access for inspections and emergency repairs.

Project Alternative 1: No Project. This alternative is not recommended because it fails to address the potential violations associated with mainline breaks.

Project Alternative 2: **(Recommended)** This alternative would consist of clearing and grubbing the inaccessible alignments of critical pipeline segments to allow for required maintenance equipment to gain access. This alternative is significantly more cost-effective than Alternative 3.

Project Alternative 3: Re-route existing lines that are currently in cross-country alignments with difficult access by placing them in existing roadways. The added pipeline length and cost to re-route was not considered cost-effective given the current budget and funding constraints. No additional detailed analysis for this alternative is included in this report.

6.4 COLLECTION SYSTEM UPGRADES (EXISTING FACILITIES)

6.4.1 GCSD Collection System

Deficiency: Refer to Section 5.

A cursory analysis was conducted related to the existing collection system, not including the lift stations. Staff input and data collected in the field indicated little evidence of issues since the system is primarily made up of very small diameter gravity sewers and force-main sewer lines. See Section 9 for an inventory and recommended short and long-term needs and improvements. There were no alternatives developed for the existing collection system. Recommendations in Section 9 include future follow-up flow monitoring and smoke testing.

6.4.2 GCSD STEP Systems

Deficiency: There are over 180 existing interceptor tanks that require rehabilitation, including replacement of old and deteriorated pumps, repairs on access hatches, and relocation of corroded electrical pull boxes currently located within the effluent tanks.

Alternatives:

Alternatives are presented below for addressing failing and deteriorated small interceptor tank pump stations and limited access for pumping out the interceptor raw sewage tanks. The options range from full replacement to retrofitting existing facilities. Site-specific requirements will ultimately need to be developed by the GCSD staff for each STEP system account with known deficiencies following a system-wide field review and inventory of all tanks and panels which have not been included at this stage due to cost and time constraints. Various inspections on certain and problematic existing STEP systems (interceptor tanks and pumps) were made as part of the evaluation. It is recommended that a majority of the interceptor tanks be properly retrofitted with a new manhole access for effective pumping to remove the solids from the tanks. Currently, the District's pumper truck cannot gain full access to the solids compartment within the tanks. A second construction recommendation, includes replacing various old and deteriorated small STEP System pumps which also includes properly sealing the vulnerable electrical junction boxes for each of the pumps. Problems associated with corrosion are exacerbated since GCSD is within a highly corrosive environment. Current staff limitations consisting of two (2) full-time operators limits the ability for timely on-going repair and maintenance of these facilities.

6.4.3 GCSD Lift Stations

Deficiency: Components of the existing Lift Stations 1, 2, and 3 have deteriorated. Necessary upgrades include replacing the existing piping, valving, and electrical control equipment. There are no flow metering devices at the Lift Stations 1, 2, 3, and 4 to monitor wet weather flows in order to identify excessive I/I. There is also a critical need to provide an emergency overflow bypass quick connect at each lift station to prevent raw sewage overflows. Replacement of various other lift station components is required as a result of corrosion. In addition, Lift Station 4 has no viable means of handling wet-well overflows, other than bringing in pumper trucks, in the event of a catastrophic pump and/or electrical failure.

Recommended Project:

Total lift station replacements are not considered cost-effective due in part to the fact that there have been some improvements made by the GCSD staff over the last ten (10) years. The cost of

retrofitting and upgrading existing facilities was deemed more appropriate by inspection and no additional alternatives were evaluated. A major component of the lift station evaluations included vulnerability to system overflows and spills, operational needs, and safety requirements.

Lift station improvement costs are shown in Section 7 of this report and include, among other things, piping, valves, vaults and hatches, wiring, and E/C control systems.

6.4.4 SONOMA COUNTY CSA 6 COLLECTION SYSTEM

DEFICIENCY: GCSD's ability to attenuate high I/I flow from the SRN collection system (Sonoma County CSA 6) is constrained by both the existing pump capacity and the existing inlet configuration at the SRN primary pond.

Project Alternative 1: **(RECOMMENDED)** Install a floating decant on the west end of the basin farthest from the headworks outlet to minimize conveyance of sludge and suspended solids. Rely on CSA 6 for other improvements noted above. This alternative is recommended because it eliminates high algae and duckweed concentrations which affect the primary and secondary treatment processes at the WWTP.

Project Alternative 2- No Project: Continue to operate the facility with limited attenuation capacity at the SRN pond risking a spill at the primary pond or exceeding the GCSD facility 's capacity. As previously noted within the analysis of Section 3, GCSD's ability to treat the high volume of I/I generated in both the GCSD and SRN collection system is limited. The current approach is contingent upon the operational strategy of preserving enough freeboard within the SRN primary pond to allow 1 or more days of raw sewage to be stored within the basin without conveying any flows to GCSD during times of wet weather when the GCSD facility is operating at capacity from the GCSD collection system flows alone.

6.5 SERVICE AREA EXPANSION

6.5.1 STEP/STEG SYSTEM

DEFICIENCY: Refer to Section 5.

Recommended Project:

An alternative to the STEP system includes providing gravity sewers for the new system to eliminate septic tanks, minimizing the number of lift stations designed to pump raw sewage, and treating all raw sewage at the WWTP. Elimination of the septic tanks would require extensive retrofits to the existing residential systems. A gravity sewer system with raw sewage flowing into the plant is not considered cost-effective and would require a new headworks and other facilities that are beyond the scope of the current project and not consistent with the existing STEP system.

Due to existing collection system design and operations, geographical constraints, and location of the existing wastewater collection and transport facilities, it was recommended that all the unsewered areas (Zones 3, 4, and 5) be designed to rely on the continued use of an interceptor tank for solids and constructing small gravity or force mains form the tank to the mainline within the existing county road R/Ws. There will be various small wastewater lift stations required to convey all STEP system flows to existing GCSD LS No. 4.

All costs associated the STEP system recommendation(s) is shown within Section 7.5.1.

6.5.2 LIFT STATIONS (UNSEWERED AREAS)

DEFICIENCY: Refer to Section 5.

Recommended Project:

All new pump stations serving the expansion areas would include submersible pumps in precast concrete wet wells. Other alternatives could include fiberglass wet wells and vertical turbine pumps. Experience has shown that submersible pumps with concrete wet wells are the preferred alternative, and no additional analysis is included. Details regarding sizing, controls, etc. would be developed during predesign. Site specific requirements such as providing appropriate easements, access, and maintenance features, will be developed during predesign as well.

Due to existing collection system design and operations, geographical constraints, and location of existing wastewater collection and transport facilities it was recommended that all the unsewered areas (Zones 3, 4, and 5) be designed with use of an interceptor tank for solids and small gravity sewers or force mains form the tank to the mainline within the existing County Road R/Ws. There will be various small wastewater lift stations required to convey all STEP System flows to the existing GCSD LS No. 4.

All costs associated the STEP System recommendation(s) is shown within Section 7.5.2.

6.5.3 COLLECTION SYSTEM (UNSEWERED AREA)

DEFICIENCY: Refer to Section 5.

Currently Zones 3, 4, and 5 are unsewered and existing homeowners are utilizing on-site treatment and disposal (septic tank/leach field) methods. Over time, these systems can be problematic with untreated or partially treated wastewater causing potential health and safety issues. Pathogenic bacteria can find its way into surface waters and/or groundwater if not properly treated and disposed of. This study evaluated both the condition of the existing septic systems, including evaluation of existing septic system problems and repair history (refer to Section 5.5).

Recommended Project:

In an effort to mitigate the on-going septic system failures and resulting pollution impacts, a preliminary design was completed for a new collection system (gravity/force main), small lift stations, STEP systems (interceptor tank and pumps), service lines from the tank to the street (gravity or force main), manholes and other appurtenances. Other design considerations included the location of the existing septic tanks in conjunction with the proposed gravity mains. Geographical considerations were also examined to provide gravity flow where possible and to limit the amount of mainline pumping. Main-line interceptors were designed to provide transport of effluent from interceptor tanks to the existing GCSD collection system. There were two points of connection to the existing collection system: 1) Pacific Woods Road and 2) Old Stage Road. There were five (5) small lift stations ranging in size from 5 hp to 7.5 hp that were required due to geographic limitations on gravity flow. There are a total of 339 STEP systems required, of which 155 required small pumps (1/2 to 2 hp) with the remainder being gravity flow from the interceptor tank to the street main. **Table 7.5.3-1** includes a detailed cost breakdown of the project costs to provide a sewer collection system with individual STEP systems. It was assumed that 50% of the existing septic tanks can be reused. The actual number will need to be confirmed during the predesign stage.

6.6 ALTERNATIVES ANALYSIS SUMMARY (LIFE-CYCLE COST/ANNUALIZED COMPARISON)

Certain alternatives were evaluated as a part within this section that included a life cycle and annualized cost comparison. Alternatives are summarized in **Table 6.6-1**.

It is important to note that Section 9 of this report contains a draft "Asset Management Plan", which includes a more detailed component useful life breakdown for both short-term and long-term type projects for future budgeting. It includes an inventory of all recognized system-wide components and facilities, along with future costs for replacement, and an annual cost for setting necessary funds aside to replace those system facilities and components prior to catastrophic failure.

Table 6.6-1 WWTP Useful Life Analysis

Alternative Description	Project Alternative	Section Reference	Capital Cost	Annualized Construction Cost (20 YRS w/ i=6%)	Annual O&M - Labor Costs	Net Annualized Life Cycle Cost	Comments
Drying Beds/Dewatering (Dry) and Dispose Sludge to Landfill Class B)	Alt. 3	*6.2.6*	$707,926	$43,325	$20,414	$63,739	Recommended
Drying Beds/Dewatering On-site Composting (Class A)	Alt .4	*6.2.6*	$817,926	$50,057	$47,634	$97,691	Refer to Biosolids management Plan for Capital costs - **Appendix A**
Hauling Wet Sludge to Landfill/Disposal -	Alt.1	*6.2.6*	$90,000	$5,508	$108,860	$114,368	Refer to Biosolids management Plan for Capital costs - **Appendix A**
New Septage Receiving Facility -	Alt. 2	*6.2.6*	$551,034	$33,723	$20,414	$54,137	Recommended
Potable Water System - (From Sea Ranch)	Alt. 1	*6.3.2*	$583,039	$35,682	$17,012	$52,694	
Potable Water System - (On-site w/Tank)	Alt. 2	*6.3.2*	$41,745	$2,555	$10,207	$12,762	Recommended
Fire Low Facility - (Off-site Pumping)	Alt. 1	*6.3.3*	$1,161,903	$71,108	$5,104	$76,212	
Fire Flow Facility - (Pump from Pond @ WWTP)	Alt. 2	*6.3.3*	$242,121	$14,818	$1,531	$16,349	Recommended
Paved Acess Road w/ Automated Gate	Alt. 1	*6.3.4*	$1,729,217	$105,828	$766	$106,594	
Site Specific Access Road Improvements w/Auto. Gate	Alt. 2	*6.3.4*	$400,335	$24,501	$2,127	$26,628	Recommended

SECTION 7- RECOMMENDED PROJECTS AND PROJECT SCHEDULE

7.1 INTRODUCTION

This section describes recommended projects based on the needs and deficiencies identified in Section 5 along with various alternatives evaluated in Section 6. Where appropriate, preliminary drawings, tables, and figures are presented along with a more detailed description of the recommended improvements. Related documents were prepared for the Gualala Community Services District's Report of Waste Discharge including a Title 22 Engineering Report for the Water Reclamation Treatment Facility and Recycled Water Use Areas. The WWTP recommendations in this section will consider the new proposed regulations, as required by the CRWQCB and may be subject to change based on final permit requirements.

The following concerns and needs were also considered in the development of recommended alternatives:

- Historical collection system raw sewage spills
- Poor water quality from septic STEP system failures
- Cal/OSHA violations
- Lack of wild-fire suppression facilities
- Deficient emergency access to WWTP
- Excessive premature corrosion concerns

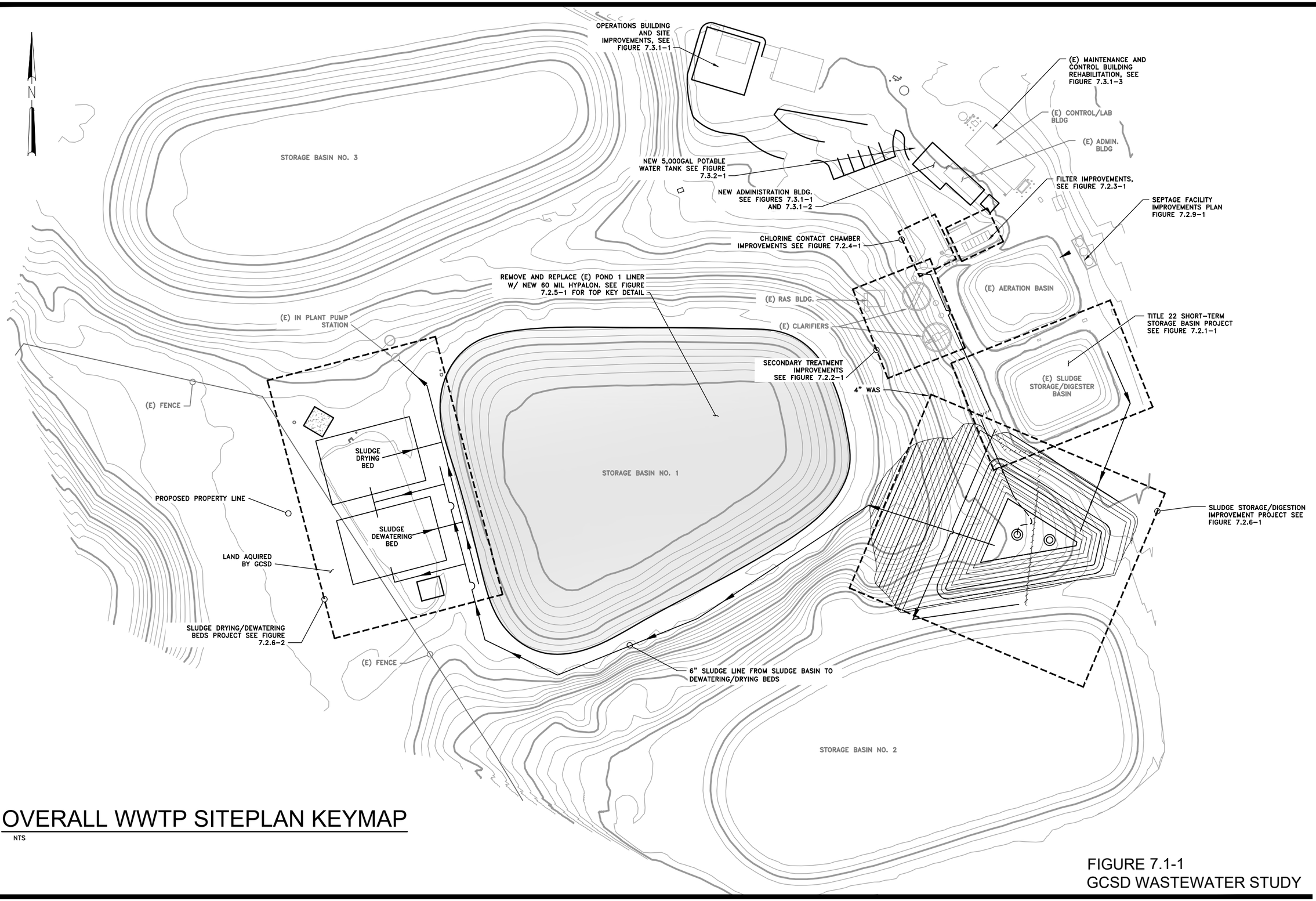
A summary of the "Engineer's Estimate of Probable Construction Cost" for each individual project is included in **Table 7.1-1**. A preliminary project schedule is included at the end of this section and is contingent upon funding acquisition, among other things. The overall site plan and key map referring to each respective improvement location is presented in **Figure 7.1-1**.

Table 7.1-1 Recommended Projects List – Engineer's Opinion of Probable Construction Costs

Component	Report Section (Reference)	Component Description	Component Construction Cost	Soft Cost (26.5%)	Sub-Total	Contingency (10%)	Total Cost
(E) WWTP	7.2.1	**Aeration Basin**					
		Short-Term Title 22- Aeration and Sludge Storage Improvements [3]	$ 65,000	$ 17,225	$ 82,225	$ 8,223	$ 90,448
						Sub-Total	**$ 90,448**
	7.2.2	**Secondary Sedimentation**					
		RAS Pump Station w/ Handrails	$ 131,500	$ 34,848	$ 166,348	$ 16,635	$ 182,982
						Sub-Total	**$ 182,982**
	7.2.3	**Tertiary Filtration**					
		Metering w/ Turbidimeter and Programming	$ 59,000	$ 15,635	$ 74,635	$ 7,464	$ 82,099
						Sub-Total	**$ 82,099**
	7.2.4	**Disinfection**					
		Disinfection (Metering)	$ 33,000	$ 8,745	$ 41,745	$ 4,175	$ 45,920
						Sub-Total	**$ 45,920**
	7.2.5	**Tertiary Storage/Reclamation**					
		Pond 1 Liner	$ 272,950	$ 72,332	$ 345,282	$ 34,528	$ 379,810
						Sub-Total	**$ 379,810**
	7.2.6.a	**Sludge Storage Basin**					
		New Sludge Storage Basin	$ 405,900	$ 107,564	$ 513,464	$ 51,346	$ 564,810
						Sub-Total	**$ 564,810**
	7.2.6.b	**Sludge Dewatering Facilities (Dring Beds-Bags)**					
		Drying Beds (Bags) and Hauling to Landfill **(OPTION/ALTERNATIVE 3)**	$ 529,750	$ 140,384	$ 670,134	$ 67,013	$ 737,147
		Drying Beds (Bags) and Composting **(OPTION/ALTERNATIVE 4)**	$ 618,750	$ 163,969	$ 782,719	$ 78,272	Not Cost-effective Refer to Table 6.6-1
						Sub-Total	**$ 737,147**
	7.2.8	**Septage Receiving Facility**					
		Hauling to Landfill (Existing) **(OPTION/ALTERNATVE 1)**	Not Cost effective				Not Cost-effective Refer to Table 6.6-1
		Septage Receiving **(OPTION/ALTERNATVE 2)**	$ 396,000	$ 104,940	$ 500,940	$ 50,094	$ 551,034
						Sub-Total	**$ 551,034**
	7.3.1	**Operations Building, Administration, Vehicle and Equipment Storage, and Chemical Storage Room**					
	7.3.1a	Upgrade/ Replace Siding on (E) Control Building (1800 SF)	$ 54,600	$ 14,469	$ 69,069	$ 6,907	$ 75,976
	7.3.1b	(N) Administration Building	$ 402,750	$ 106,729	$ 509,479	$ 50,948	$ 560,427
	7.3.1c	(N) Vehicle/Equipment Storage (2925 SF)	$ 609,500	$ 161,518	$ 771,018	$ 77,102	$ 848,119
	7.3.1d	(N) Chemical Storage Room (120 SF)	$ 14,400	$ 3,816	$ 18,216	$ 1,822	$ 20,038
						Sub-Total	**$ 1,504,559**
	7.3.2	**Potable Water**					
		Portable Water Line (E) 2" Main from Sea Ranch WWTP (OPTION/ALTERNATVE 1)	$ 419,000	$ 111,035	$ 530,035	$ 53,004	Not Cost-effective Refer to Table 6.6-1
		Potable at WTWTP with Use of Existing 5000 Gallon Tank **(OPTION/ALTERNATIVE 2)**	$ 30,000	$ 7,950	$ 37,950	$ 3,795	$ 41,745
						Sub-Total	**$ 41,745**
	7.3.3	**Fire Protection Facilities**					
		Fire Flow and Domestic Use (Off-sire) **(OPTION/ALTERNATVE 1)**	$ 835,000	$ 221,275	$ 1,056,275	$ 105,628	Not Cost-effective Refer to Table 6.6-1
		Emergency Fire Flow at Plant **(OPTION/ALTERNATIVE 2)**	$ 174,000	$ 46,110	$ 220,110	$ 22,011	$ 242,121
						Sub-Total	**$ 242,121**
	7.3.4	**Access Road**					
		Paved Access Road W/ Gate **(OPTION/ALTERNATVE 1)**	$ 1,242,700	$ 329,316	$ 1,572,016	$ 157,202	Not Cost-effective Refer to Table 6.6-1
		Road Improvements, only **(OPTION/ALTERNATIVE 2)**	$ 262,700	$ 69,616	$ 332,316	$ 33,232	$ 365,547
						Sub-Total	**$ 365,547**
	7.3.5	**Emergency Access for Pipeline Repairs**					
		1065 LF Clearing and Grubbing of (E) FM Sta. 39+36 to 45+35 and from Sta. 67+96 to 72+50 WWTP	$ 50,000	$ 13,250	$ 63,250	$ 6,325	$ 69,575
						Sub-Total	**$ 69,575**
(E) STEP System Rehabilitation	7.4.2	**GCSD STEP Systems (Interceptor Tanks)**					
		Rehabilitation of (E) STEPs	$ 753,200	$ 199,598	$ 952,798	$ 95,280	$ 1,048,078
						Sub-Total	**$ 1,048,078**
(E) Collection System Pump Station Upgrades	7.4.3	**GCSD Lift Stations**					
		Lift Station No. 1	$ 218,000	$ 57,770	$ 275,770	$ 27,577	$ 303,347
		Lift Station No. 2	$ 168,000	$ 44,520	$ 212,520	$ 21,252	$ 233,772
		Lift Station No. 3	$ 248,000	$ 65,720	$ 313,720	$ 31,372	$ 345,092
		Lift Station No. 4	$ 296,000	$ 78,440	$ 374,440	$ 37,444	$ 411,884
						Sub-Total	**$ 1,294,095**
(E) Sea Ranch North Improvements	7.4.4	**Sea Ranch North Collection System and CSA 6 Facility**					
		Sea Ranch North Aeration/Pond/Pump Improvements[1]	$ 60,000	$ 15,900	$ 75,900	$ 7,590	$ 83,490
						Sub-Total	**$ 83,490**
						PROPOSED COST FOR EXISTING FACILITY IMPROVEMENTS	**$ 7,283,459**
(N) STEP Systems w/ Collection System	7.5.1	**STEP/STEG System (Unsewered Areas)**					
		Zone 3	$ 2,181,737	$ 529,930	$ 2,711,667	$ 271,167	$ 2,982,834
		Zone 4	$ 4,907,917	$ 1,230,638	$ 6,138,555	$ 613,856	$ 6,752,411
		Zone 5	$ 3,820,149	$ 950,859	$ 4,771,008	$ 477,101	$ 5,248,109
						Sub-Total	**$ 14,983,353**
						PROPOSED COST FOR FUTURE PHASE UNSEWERED AREAS	**$ 22,266,812**

Notes:

1. Sea Ranch improvements consists of increasing the pumping capacity to 120 gpm and modifying the suction side of the pumps at the pond
2. $1.20 per sqft for hypalon and a concrete key at the top along the perimeter is $30,000
3. Add a 5 hp aerator torpedo model. This is assuming they have a place in their MCC to plug it in
4. Includes Eeasement acquisistion cost



OVERALL WWTP SITEPLAN KEYMAP

NTS

FIGURE 7.1-1
GCSD WASTEWATER STUDY

7.2 WWTP UPGRADES

7.2.1 AERATION BASIN

DEFICIENCY:

Additional aeration would be required for system expansion and/or future growth.

Recommendation:

No project is recommended. Additional aeration capacity could be necessary at a later date.

DEFICIENCY:

Marginal Mixing Capacity

Recommendation:

No project is recommended. This alternative implies that the existing 7.5 hp mixer will continued to be used for partial mixing during the anoxic phase of cyclic process control. As previously mentioned, the future installation of an additional aerator will provide additional mixing and the total capacity of mixing should be evaluated at that time.

The basin's installed mixing capacity is sufficient for both BOD removal and nitrification under the existing WD and NPDES Permits, even though the mixer is slightly undersized. Under GCSD's current permit, there are no limits for effluent nitrate concentrations and thus there is no current need to assess the amount of additional denitrification that may be gained by ensuring a complete mixed basin during anoxic cycles. However, it is expected that the new waste discharge permit will include effluent nitrate limits at which point a revised process evaluation of the aeration basins nitrification/denitrification process control may be required to address new limits.

DEFICIENCY:

There are no provisions to satisfy the Title 22 reliability/redundancy requirements for biological treatment.

Recommendation:

GCSD intends to achieve part (b) of Section 60345 reliability requirements by use of short-term retention basin improvements in addition to furnishing one standby aerator equivalent to existing for emergency replacement purposes.

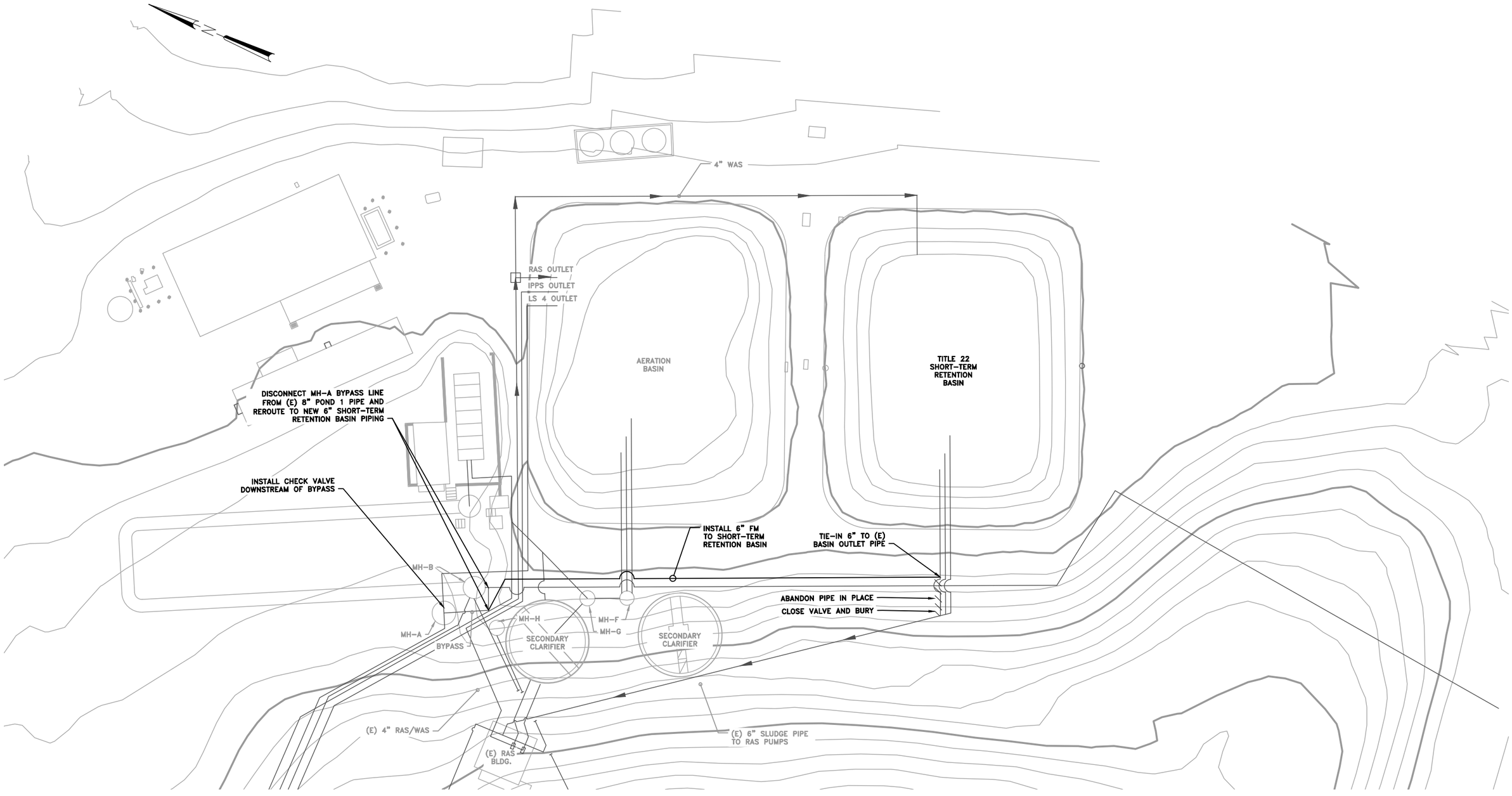
It is recommended that the existing sludge storage basin be repurposed as a short-term retention basin (Project Alternative 3) while a new sludge storage basin is being constructed (see Section 7.2.6.a). Alternative 2 was not selected because the construction of a new basin for short-term retention would require much of the piping and mechanical components which the existing sludge storage basin already features.

Re-purposing the existing sludge storage basin will require piping modifications to convert the existing sludge basin into a short-term retention basin and would consist of installing a new 6" force-main from manhole "A" to the southwest side of the basin to connect to the existing 6" outlet piping. Actuators have already been installed on the effluent slide gates at Manhole "B" and an actuator already exists in Manhole "A" such that during a process upset when substandard effluent is detected, the slide gates in the effluent manhole "B" will close, preventing flow from exiting the

process train while the actuator in manhole "A" will route influent flows to the short-term retention basin. Refer to **Table 7.2.1-1** for an Engineer's Opinion of Probable Construction Cost for the final recommended project. The location of the new 6" force main and basin connection is presented in **Figure 7.2.1-1**.

Table 7.2.1-1 Aeration Basin Recommended Project – Engineer's Opinion of Probable Construction Costs Add new revised

Item	Qty.	Units	Unit Price	Labor		Total
				Hours	Rate	
Division 1 - General Requirements						
Mobilization	1	LS	3,500	Included		3,700
Division 11 - Equipment						
Standby 5 HP Aerator	1	LS	25,000	Included		25,000
Division 15 - Mechanical						
Install Check Valves	1	EA	4,500	Included		4,500
Miscellaneous Piping and Tie-ins	1	LS	15,000	Included		15,000
Install 6-inch Force-main Pipeline	120	LF	140	Included		16,800
Construction Subtotal						**$65,000**



SITE PLAN
NTS

TITLE 22 SHORT-TERM STORAGE BASIN IMPROVEMENT PROJECT

FIGURE 7.2.1-1
GCSD WASTEWATER STUDY

7.2.2 SECONDARY SEDIMENTATION

DEFICIENCY:

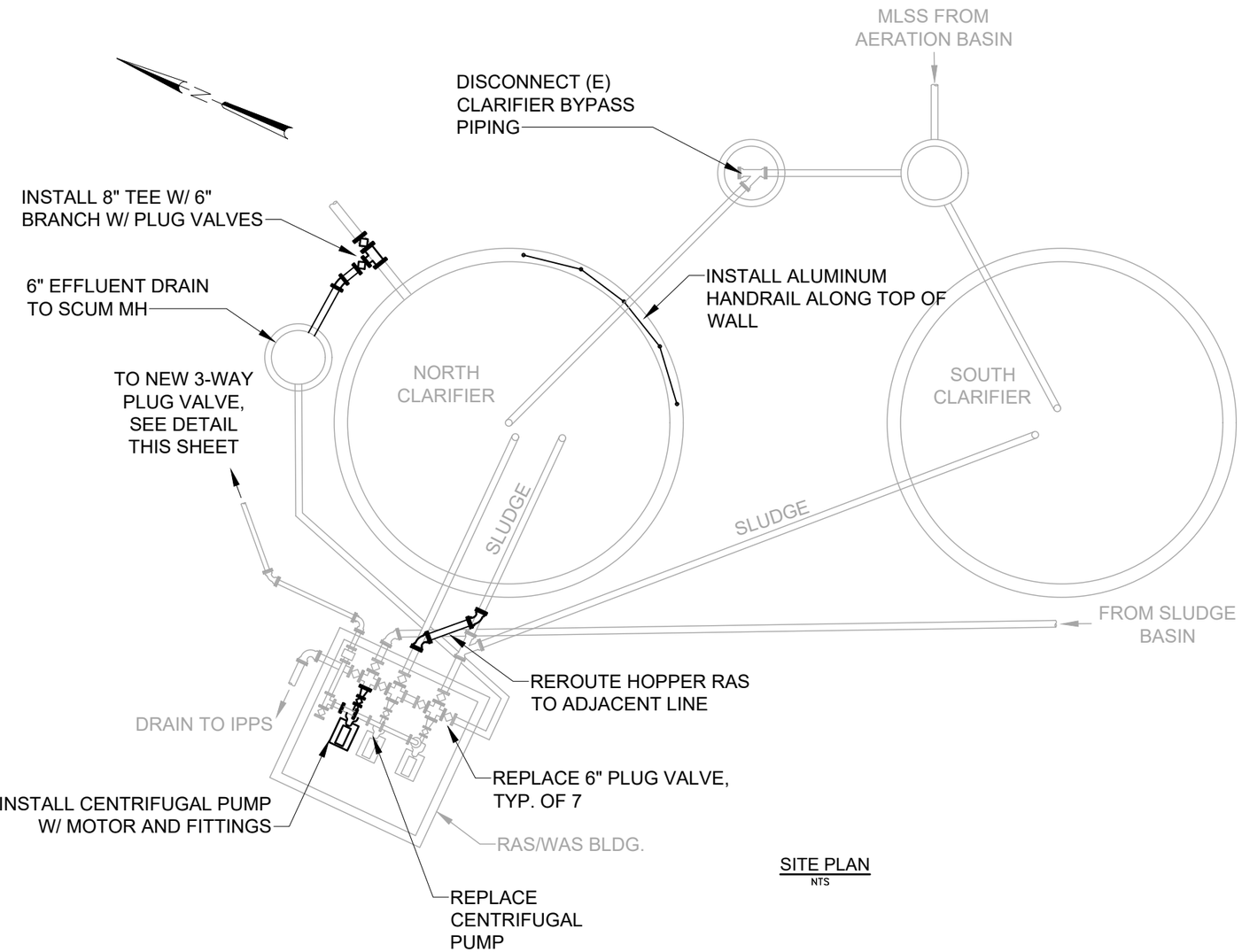
One of the two existing RAS centrifugal pumps is nearing the end of its life expectancy. Furthermore, the sludge lines out of each clarifier are tied together and operators are unable to isolate them. In addition, secondary effluent piping is routed directly to filtration with no provisions to reroute flows back to the aeration basin. The clarifier structure is lacking a handrail per Cal OSHA requirements and a deteriorating stairway limits safe access to the RAS building. The access road to the RAS building is undeveloped and relatively inaccessible.

Recommendation:

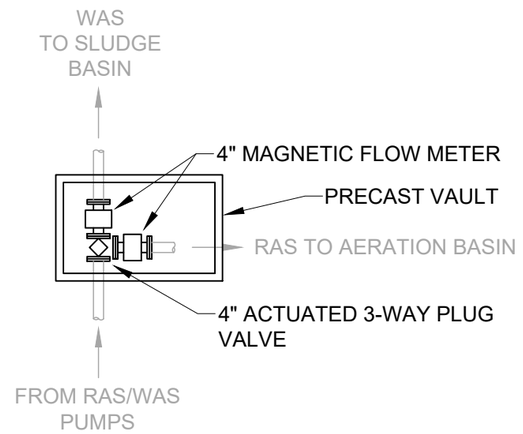
Alternative No. 1 includes replacing the RAS pump, installing separate sludge effluent lines for each clarifier, modifying the effluent piping to allow flow diversion to the scum manhole, and installing handrails where necessary to prevent personnel from falling into the clarifier. Other related projects include the replacement of a wooden stairway leading to the RAS building, and earthwork and new pavement for improved building access. The secondary sedimentation improvements, as described under Project Alternative 1, are presented in **Figure 7.2.2-1**. Refer to **Table 7.2.2-1** for an Engineer's Opinion of Probable Construction Cost for the final recommended project.

Table 7.2.2-1 Secondary Sedimentation Recommended Project – Engineer's Opinion of Probable Construction Costs

Item	Qty.	Units	Unit Price	Labor		Total
				Hours	Rate	
Division 1 - General Requirements						
Mobilization	1	LS	10,000	included		8,500
Division 2 - Earth Work						
Rough Grading, Subgrade Prep	1	LS	25,000	included		25,000
Division 3 - Concrete						
Slab on Grade	8	YD	1,000	included		8,000
Division 11 - Equipment						
RAS Pump-2 hp	1	EA	25,000	included		25,000
Division 15 - Mechanical						
Aeration basin connection	1	LS	5,000	included		5,000
Mag Meter	1	LS	10,000	included		10,000
Piping and Fittings w/ 7 Plug valves	1	LS	20,000	included		20,000
Handrails	1	LS	10,000	included		10,000
Division 16 - Electrical and Instrumentation						
Pull boxes connect to existing MCC and PLC	1	LS	20,000	Included		20,000
Construction Subtotal						**$131,500**



SITE PLAN
NTS



RAS TO WAS VALVE DETAIL
NTS

SECONDARY SEDIMENTATION IMPROVEMENTS

FIGURE 7.2.2-1
GCSD WASTEWATER STUDY

7.2.3 TERTIARY FILTRATION

DEFICIENCY:

Potentially insufficient capacity is available relative to historic wet weather flows. Only the total flow entering both filters is monitored, thus the individual surface loading rates are not monitored when both filters are in service. Individual effluent sample ports not available for collecting turbidity grab samples. No provisions exist for routing substandard effluent to short term emergency storage basin.

Recommendation:

Program existing slide gates (Project Alternative 2) to prevent substandard effluent from escaping the process train. This programming of the slide gates located in the effluent manhole will force them to close upon detecting substandard effluent and will reroute influent flows to a short-term retention basin. Recommendations also include installation of a magnetic flow meter immediately upstream of the travelling bridge filter or disc filter in addition to installing sample ports on the effluent lines of each process unit. The tertiary filtration improvements, as described under Project Alternative 2, are presented in **Figure 7.2.3-1**. Refer to **Table 7.2.3-1** for an Engineer's Opinion of Probable Construction Cost for the final recommended project.

Installation of a new disc filter is not recommended at this time; however, the additional items are recommended to assess the potential for excessive inflow and infiltration flows generated in the GCSD collection system beyond the existing disc filters capacity:

- Install meters at all lift stations (scheduled as part of general lift station improvements)
- Identify most problematic sheds based on data review and analysis
- Implement mitigation/repairs to reduce I/I after locating sources of inflow and infiltration by smoke testing, septic tank surveys, and flow isolation

Excessive inflow and infiltration flows generated by the SRN collection system should also be minimized by managing the primary pond to better and to utilize flow equalization by pursuing the following:

- Sludge management and removal
- Floating decant intake for suction side of booster pumps
- Algae management and removal
- Develop operations plan specific to scheduling the conveyance of primary effluent from SRN to GCSD during wet weather

Table 7.2.3-1 Tertiary Filtration Recommended Project – Engineer's Opinion of Probable Construction Costs

Item	Qty.	Units	Unit Price	Labor		Total
				Hours	Rate	
Division 15 - Mechanical						
Installation of Flange couplers and piping modifications	1	LS	32,000	included		32,000
Division 16 - Electrical and Instrumentation						
8" Magmeter Install	2	LS	9,000	included		18,000
Turbidity Meter Install	1	EA	4,000	included		4,000
System Integration and SCADA Screens	1	LS	15,000	included		5,000
Construction Subtotal						**$59,000**

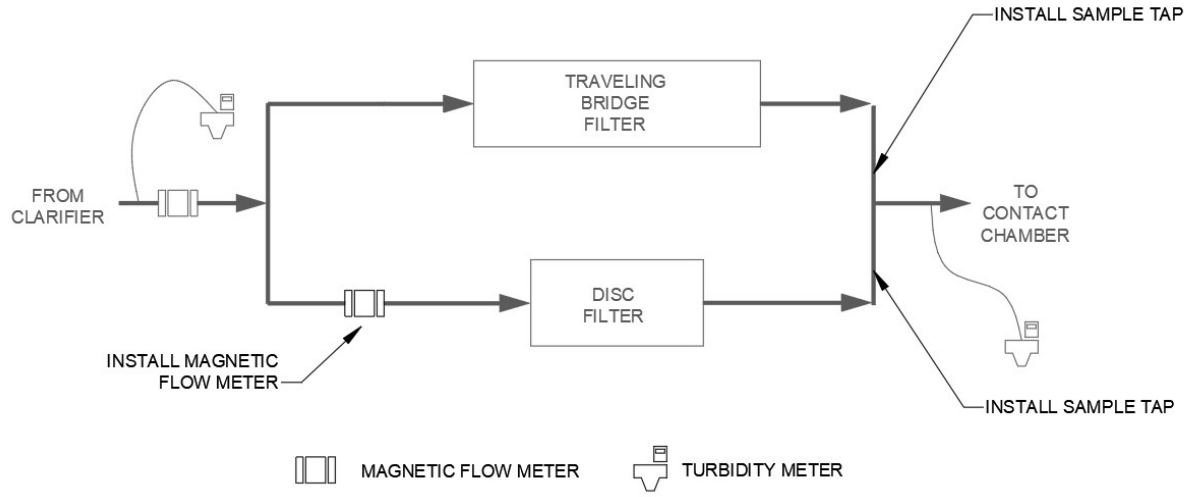


Figure 7.2.3-1 Tertiary Filtration Improvements Schematic

7.2.4 DISINFECTION

DEFICIENCY:

Title 22 reliability requirements are not being met without replacement of disinfection equipment and programming new alarms. A new magnetic flow meter will be required upstream of the CCC.

Recommendation:

Furnish spare recirculation pumps, along with a method to accurately monitor flows. This will include installation of an additional magnetic flow meter directly upstream of the CCC along with modifications to the existing PLC and SCADA HMI to monitor the CT-values and to compute contact time (Project Alternative 1). Additional discrete signals, PLC programming, and SCADA interface modifications will need to be made for alarms and monitoring of CT-values and contact time. A disinfection system improvement schematic is presented in **Figure 7.2.4-1.** Refer to **Table 7.2.4-1** for an Engineer's Opinion of Probable Construction Cost for the final recommended project.

Table 7.2.4-1 Disinfection Recommended Project – Engineer's Opinion of Probable Construction Costs

Item	Qty.	Units	Unit Price	Labor		Total
				Hours	Rate	
Division 1 - General Requirements						
Mobilization	1	LS	1,000	included		1,000
Division 11 - Equipment						
Spare Recirculation Pumps	2	LS	6,000	included		6,000
Division 15 - Mechanical						
Install 8" Magmeter, pipe modifications	1	EA	15,000	included		15,000
Division 16 - Electrical and Instrumentation						
Power and control conduits	1	LS	4,000	included		4,000
SCADA	1	LS	7,000	included		7,000
Construction Subtotal						**$33,000**

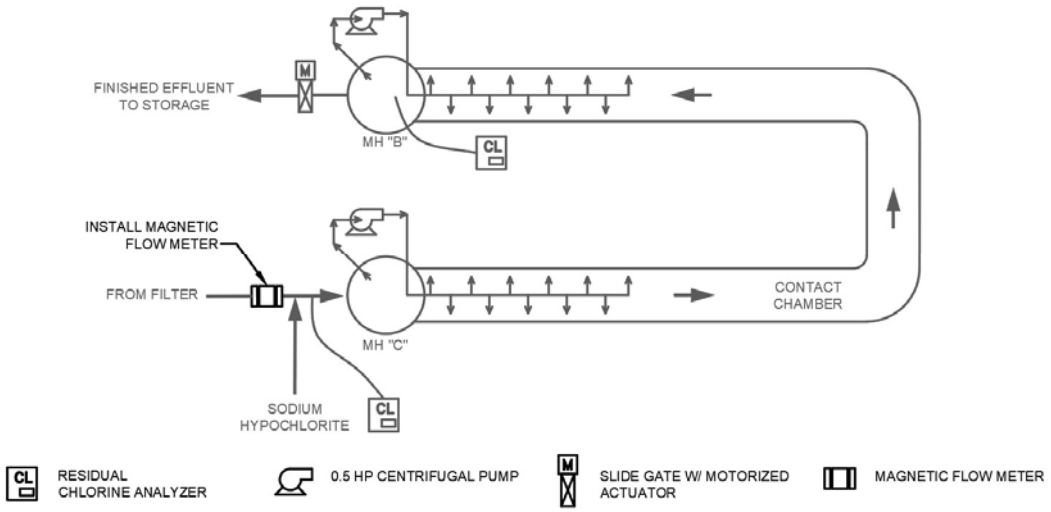


Figure 7.2.4-1 Disinfection System Improvements Schematic

7.2.5 TERTIARY STORAGE AND RECLAMATION

Deficiency:

The liner on Pond 1 is damaged and the south slope is compromised.

Recommendation:

To prevent groundwater degradation, it is recommended that the liner be entirely replaced with a new 60 mil liner (Project Alternative No. 2). The drainage issues contributing to failures at Pond 1 should be re-visited during design to mitigate and route flows away from the basin as much as practical. The rock slope protection should be removed, the damaged slope re-graded, and a new liner would be replaced over the existing earthen slopes. If deemed necessary, a portion of the slope can include a concrete access ramp and the bottom can be overlaid with a soil cover. Final details for the new liner would be determined during a subsequent pre-design phase. This approach can be followed for the other ponds as additional funding becomes available and needs arise in the future. GCSD should continue to pursue land for a future elevated storage pond. The liner should be keyed in at the top as depicted in **Figure 7.2.5-1.** Refer to **Table 7.2.5-1** for an Engineer's Opinion of Probable Construction Cost for the final recommended project.

Table 7.2.5-1 Tertiary Storage and Reclamation Recommended Project – Engineer's Opinion of Probable Construction Costs

Item	Qty.	Units	Unit Price	Labor		Total
				Hours	Rate	
Division 1 - General Requirements						
Mobilization	1	LS	5,000	included		5,000
Removal of existing liner and disposal	1	LS	10,000	included		10,000
Division 2 - Earth Work						
Excavation	200	YD	20	included		4,000
Fill	200	YD	30	included		6,000
Division 15 - Mechanical						
Install Hypalon Liner	82,650	SQFT	3	included		247,950
Construction Subtotal						**$272,950**

Table 7.2.5-1 Tertiary Storage and Reclamation Recommended Project – Engineer's Opinion of Probable Construction Costs

Item	Qty.	Units	Unit Price	Labor		Total
				Hours	Rate	
Division 1 - General Requirements						
Mobilization	1	LS	5,000	included		5,000
Removal of existing liner and disposal	1	LS	10,000	included		10,000
Division 2 - Earth Work						
Excavation	200	YD	20	included		4,000
Fill	200	YD	30	included		6,000
Division 15 - Mechanical						
Install Hypalon Liner	82,650	SQFT	3	included		247,950
Construction Subtotal						**$272,950**

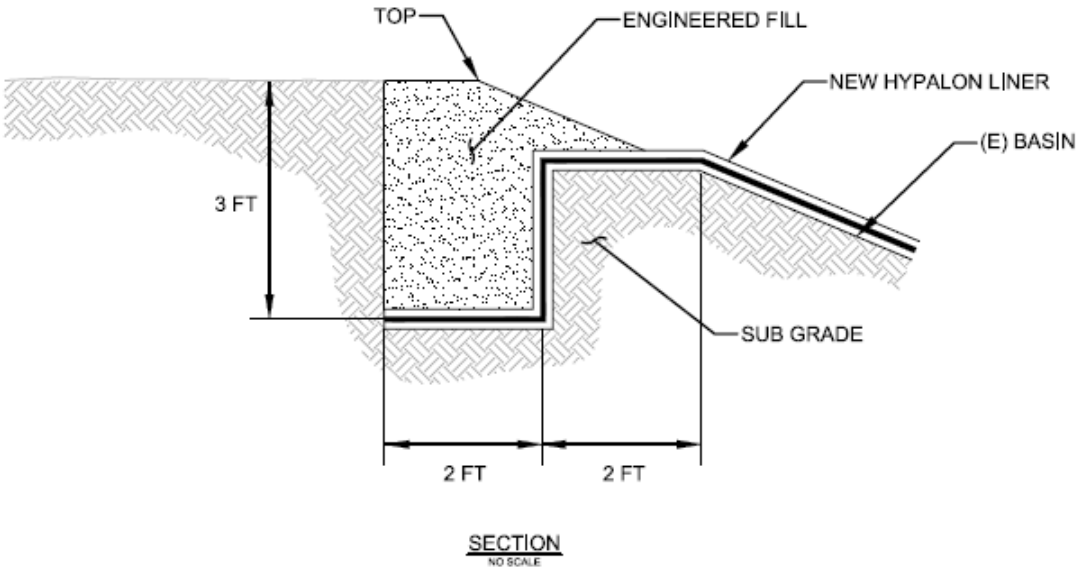


Figure 7.2.5-1 Tertiary Storage Basin Liner Detail

7.2.6.A SLUDGE STORAGE BASIN

DEFICIENCY:

The sludge storage basin lacks serval key elements typically used to manage the sludge process. These include lack of a decant mechanism to collect supernatant, no wet well to convey supernatant back to the aeration basin, and no floor drain or piping system to dredge digested/settled sludge.

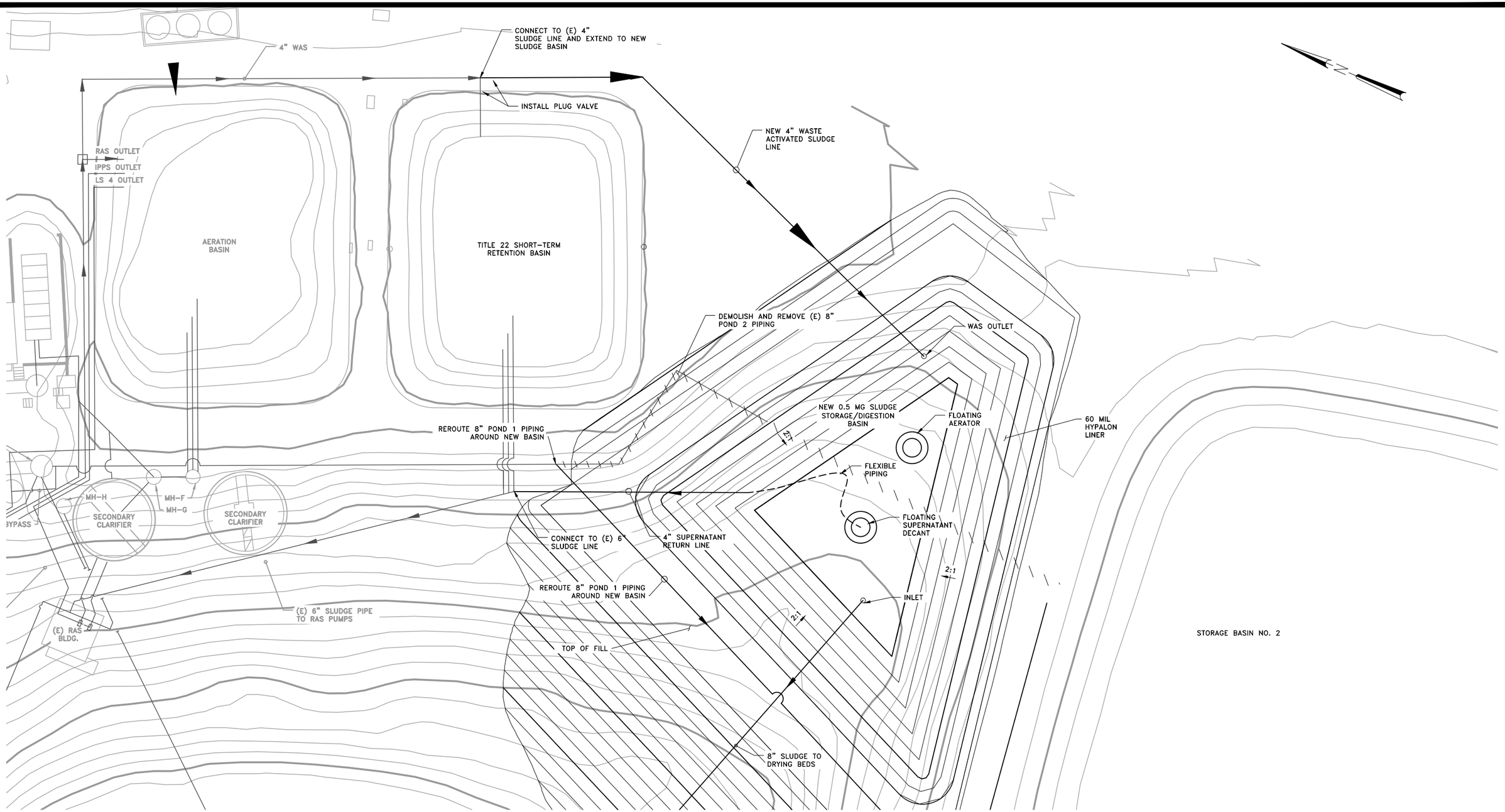
Recommendation:

It is recommended that the GCSD constructs a new sludge storage basin. The proposed improvements are depicted in **Figure 7.2.6.A-1** (Project Alternative No. 2). Modifying the existing sludge basin would ultimately require relining the entire basin to accommodate the new piping penetrations. It should also be noted that the recommended short-term retention basin project, previously discussed in Section 7.2.1, includes re-purposing the existing sludge storage basin as a

short-term retention basin since only the piping outside of the basin would need to be modified without any significant modifications to the basin itself. Improvements also include additional piping and valving. Refer to **Table 7.2.6.A-1** for an Engineer's Opinion of Probable Construction Cost for the final recommended project. An annualized cost comparison is provided within Section 6 of this report. Detailed information on various other alternatives can be found within the Biosolids Management Plan - **Appendix J**.

Table 7.2.6.A-1 Sludge Storage Basin Recommended Project – Engineer's Opinion of Probable Construction Costs

Item	Qty.	Units	Unit Price	Labor		Total
				Hours	Rate	
Division 1 - General Requirements						
Mobilization	1	LS	10,000	included		10,000
Division 2 - Earth Work						
Cut	500	YD	10	included		5,000
Fill w/ Compaction	3000	YD	25	included		75,000
Division 3 - Concrete						
Concrete Curb w/ Hypalon Ledger	500	LF	30	included		15,000
Division 9 - Finishes						
Painting (above grade piping)	1	LS	20,000	included		20,000
Division 11 - Equipment						
10 hp Surface Aerator	1	EA	20,000	included		20,000
DO Probe	2	EA	3,000	included		6,000
Division 15 - Mechanical						
4" C900 WAS	200	LF	110	included		22,000
6" C900 Sludge to Beds	500	LF	140	included		70,000
8" C900 Supernatant return	240	LF	165	included		39,600
6" Raw in	120	LF	140	included		16,800
Clean Outs	3	EA	1,200	included		3,600
DI Fittings Allowance	1	LS	10,000	included		10,000
Hypalon	15,000	SQFT	3	included		45,000
Division 16 - Electrical and Instrumentation						
Power and Control Conduits	200	LF	100	included		20,000
Pull Boxes and Appurtenances	1	LS	10,000	included		10,000
SCADA & System Integration & Startup	1	LS	17,900	included		17,900
Construction Subtotal						**$ 405,900**



SITE PLAN
NTS

SLUDGE STORAGE BASIN IMPROVEMENT PROJECT

FIGURE 7.2.6.A-1
GCSD WASTEWATER STUDY

7.2.6.B SLUDGE DEWATERING FACILITIES

DEFICIENCY:

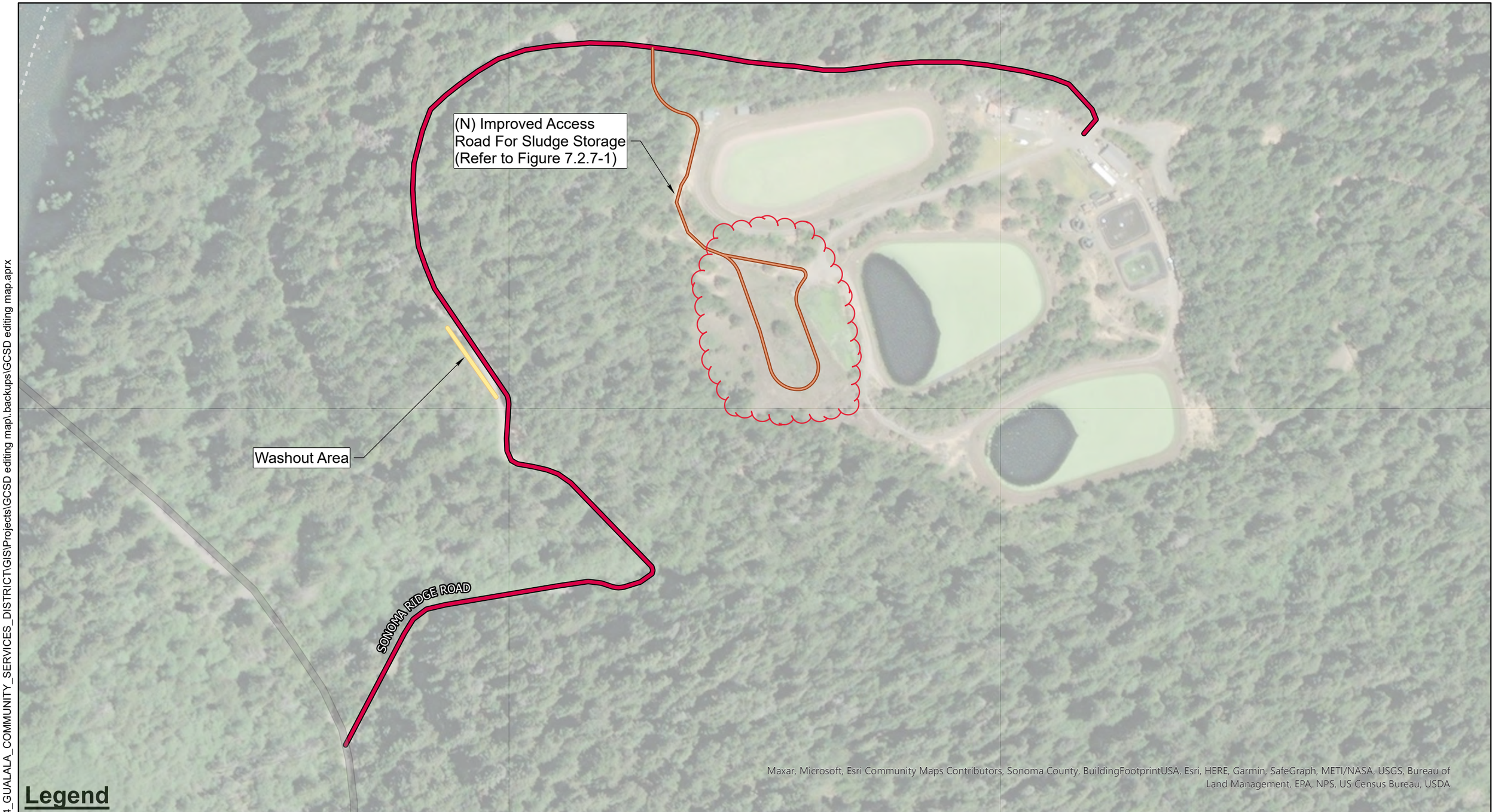
No sludge dewatering facilities currently exist. Sludge has historically been buried on site. The RWQCB has issued a letter requiring GCSD to cease current practices and provide a long-term plan for sludge disposal.

Recommendation:

Constructing new paved drying beds with dewatering bags is recommended on the basis that dewatering bags placed on paved drying beds provide a low capital cost and low maintenance approach to sludge dewatering. Since both the belt press and screw press would require construction of an expensive building to house the equipment, a cost analysis for those alternatives is not warranted. The dewatering bags will require less maintenance than the belt and screw press alternatives since the only mechanical components that would need to be maintained would consist of a portable polymer feed station. The bags would be stored on a drying bed consisting of an asphalt pad enclosed by a concrete stem wall featuring an underdrain system to route leachate to a drain system where it would ultimately be returned to the aeration basin. Included within this cost estimate is the required property acquisition of approximately 1.4 acres along with improvements to the existing access road as shown on **Figure 7.2.6.B-1.**

A secondary cost evaluation and comparison was performed on the methods to handle dried solids. Alternatives were evaluated (refer to **Table 6.6-1**) to process dried sludge. The recommended Alternative 3 included dewatering solids with bags and drying (Class B level) with disposal of solids directly to a landfill, while the other alternative, Alternative 4, includes using bags to partially dry and then composting to Class A level.

After a period of time, the sludge dewatering bags will be cut open and the sludge spread to further dry, with the water content being reduced with the use of a front loader to periodically turn over the solids on the paved beds in the summer. Land acquisition and improved access is also included in the proposed project. A layout of the proposed drying beds is presented in **Figure 7.2.6.B-2**. Refer to **Table 7.2.6.B-1** for an Engineer's Opinion of Probable Construction Cost for the final recommended project.



Legend

- Access Road Improvements (3,339 LF)
- Washout Area
- New Improved Road (1,264 LF)

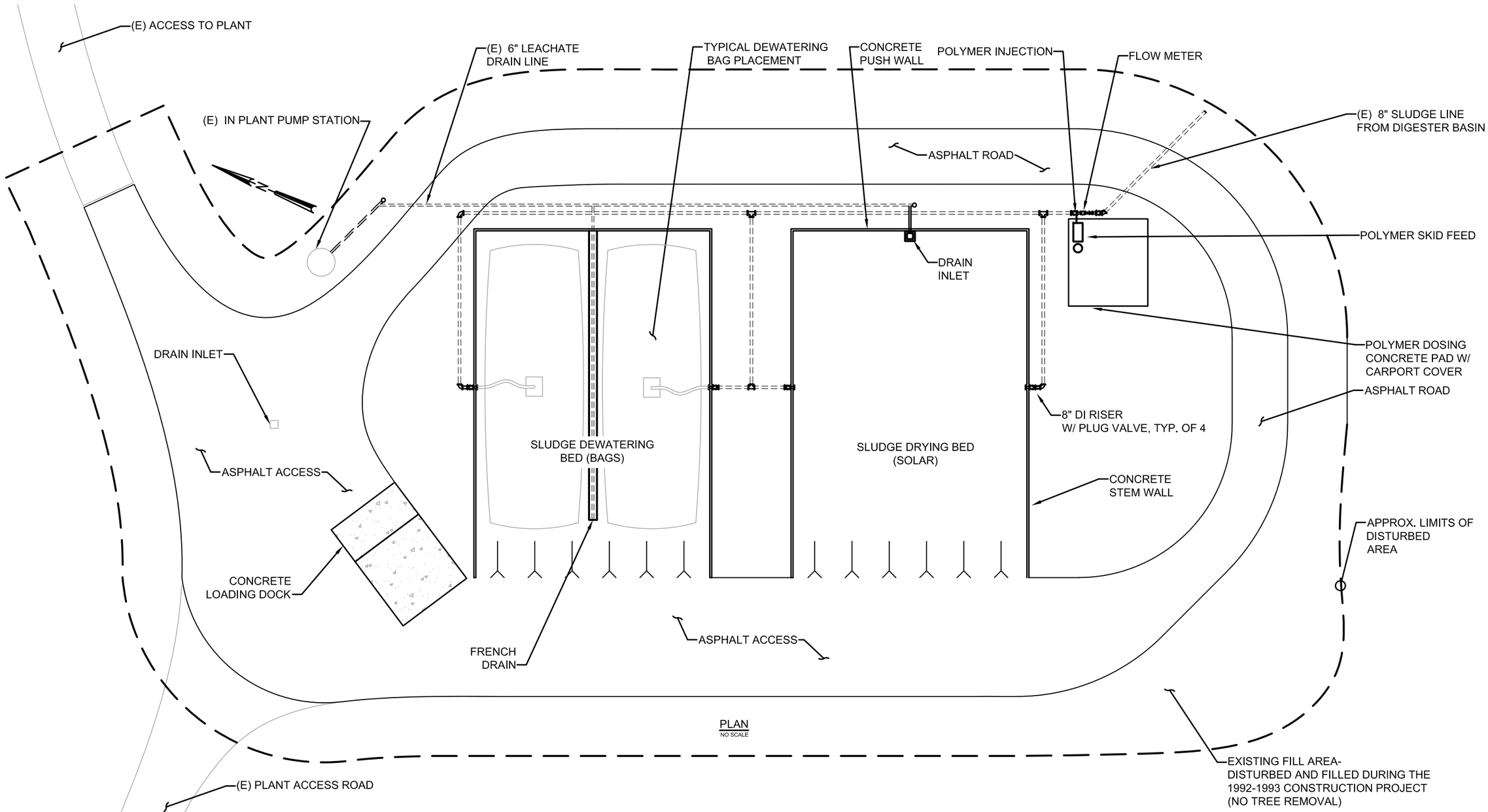
MC Engineering, Inc.
9294 Madison Ave
Orangevale, CA 95662
Tel: 916-223-3828
Fax: 916-860-1863
www.mc-engineers.com

Title:
GCSD WASTEWATER STUDY

Figure 7.2.6.B-1:
Secondary Plant Access Road Improvements

N

0 500 1,000 2,000
Feet



SLUDGE DRYING BEDS IMPROVEMENT PROJECT

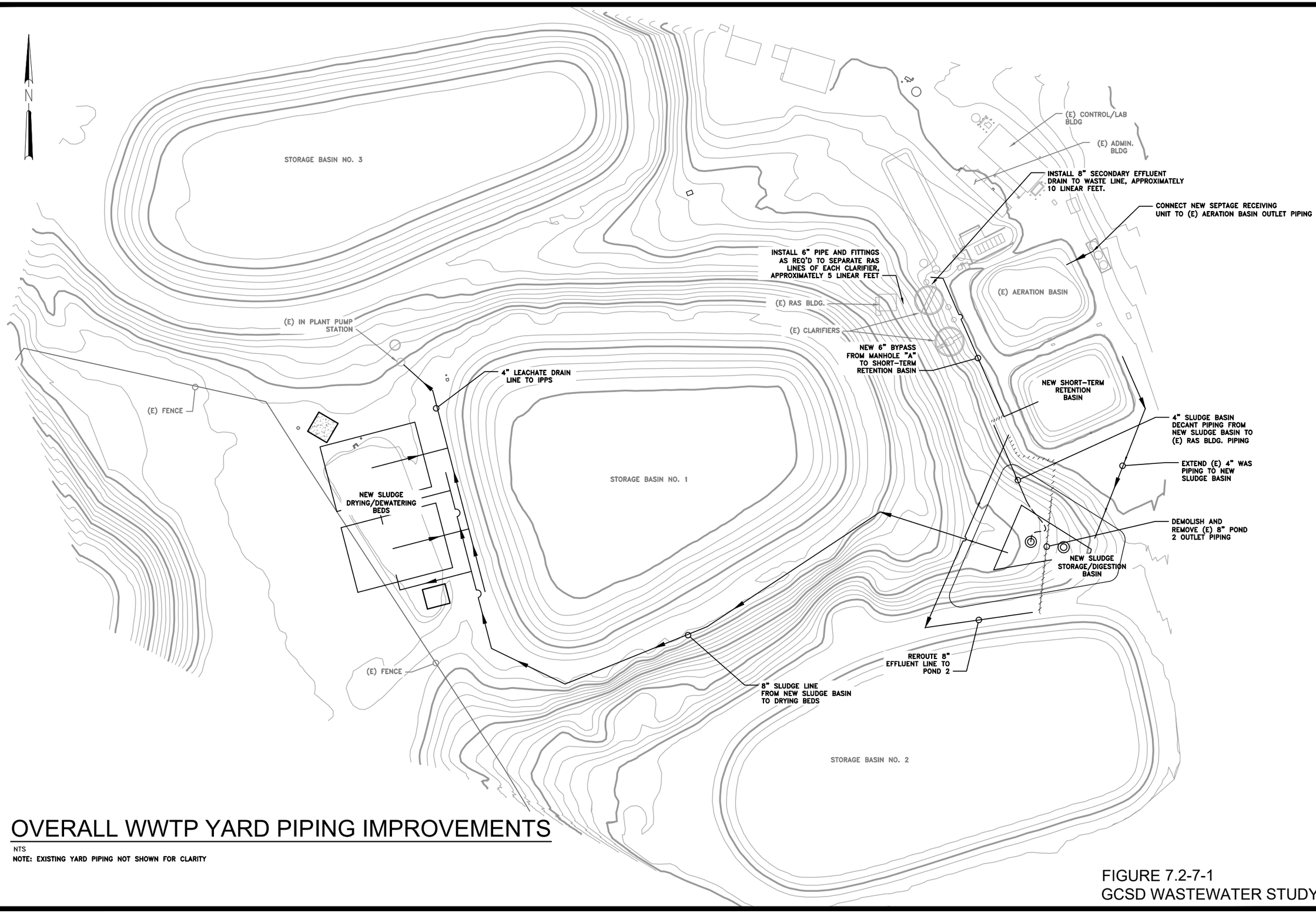
FIGURE 7.2.6-2
GCSD WASTEWATER STUDY

Table 7.2.6.B-1 Sludge Dewatering Facilities Recommended Project – Engineer's Opinion of Probable Construction Costs

Item	Qty.	Units	Unit Price	Labor		Total
				Hours	Rate	
Division 1 - General Requirements						
Mobilization	1	LS	10,620	included		10,620
Division 2 - Earth Work w/ Access Road						
Cut	550	YD	5	included		2,750
Fill w/ Compaction	900	YD	25	included		22,500
Class 2 AB Fill	5,000	YD	25	included		125,000
Division 3 - Concrete						
Structural Concrete	115	YD	800	included		92,000
Division 9 - Finishes						
Painting (above grade piping)	1	LS	20,000	included		20,000
Paving - 4" AC	15,000	SF	9	included		127,500
Division 11 - Equipment						
Polymer Feed Station	1	LS	15,000	included		15,000
Static Mixer	1	EA	3,000	included		3,000
Division 15 - Mechanical						
4" C900 Drain line	250	LF	110	included		27,500
6" C900 Sludge to Beds	200	LF	130	included		26,000
6" Plug Valve	2	EA	4,500	included		9,000
DI Fittings Allowance	1	LS	5,000	included		5,000
HDPE Liner	960	SQFT	3	included		2,880
4" Clean Outs	1,000	EA	2	included		2,000
Division 16 - Electrical and Instrumentation						
Power Conduit	200	LF	90	included		18,000
Land Acquisition						
Property Acquisition	60,000	SQFT	0.35	included		21,000
Construction Subtotal						**$ 529,750**

7.2.7 OVERALL SITE-PLAN IMPROVEMENTS

Figure 7.2.7-1 depicts the overall site plan and yard piping improvements. Yard piping improvements are needed as described in each respective process section. An opinion of costs for each respective pipe alignment is also included and can be found within each respective process improvement.



OVERALL WWTP YARD PIPING IMPROVEMENTS

NTS

NOTE: EXISTING YARD PIPING NOT SHOWN FOR CLARITY

FIGURE 7.2-7-1
GCSD WASTEWATER STUDY

7.2.8 Proposed Septage Receiving Facility

Deficiency:

Current septage disposal practices are described in detail in Sections 2, 5, and 6. In addition to the disposal facilities near Point Arena, rudimentary facilities exist at the WWTP. The current system at the plant includes piping with tanks that are used to accept sludge discharges from sludge hauling trucks prior to entering the aeration basin. The existing facilities cannot be metered or screened and there is no viable method to measure pH to identify potential toxic loadings. There is essentially no process control from either a qualitative or quantitative standpoint.

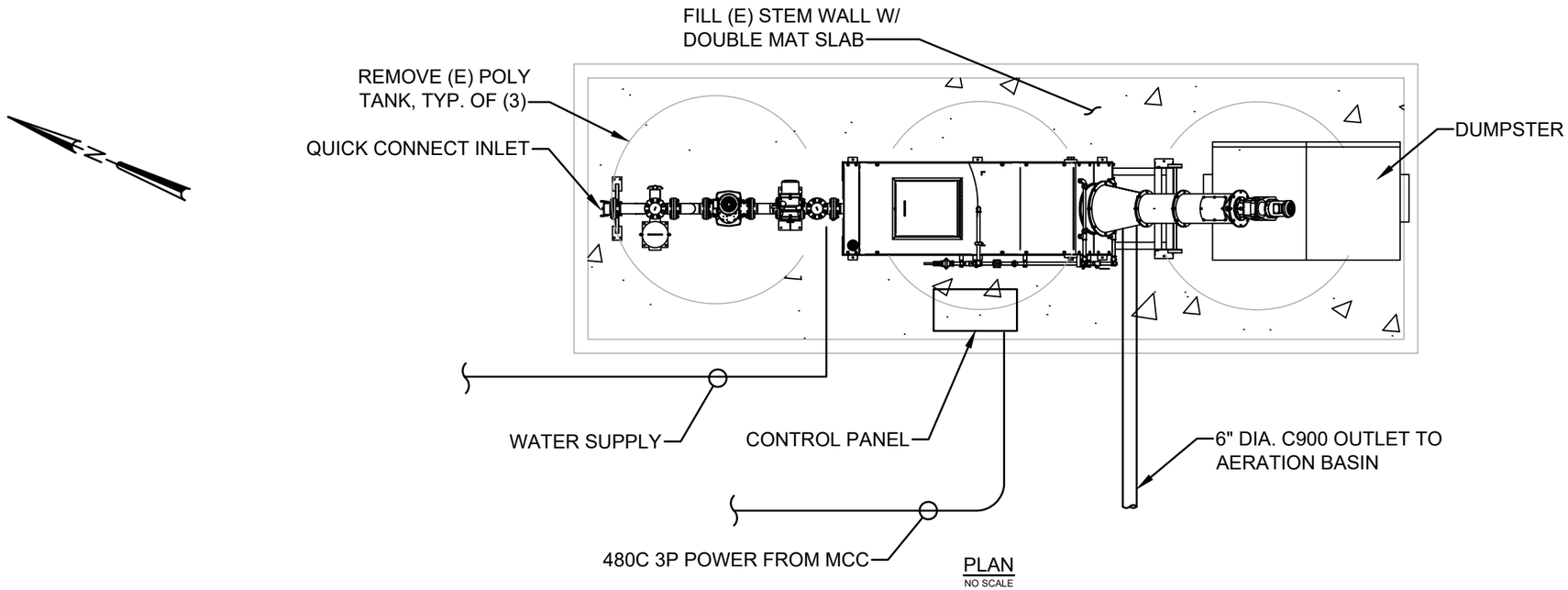
Recommendation:

To provide a backup in the event the Point Arena site is no longer available, coupled with the need to replace the existing septage disposal system at the WWTP, a new septage receiving facility at the plant is recommended (Alternative 2). An annualized cost comparison was also prepared to evaluate the current practice of hauling the interceptor tank wastes to Point Arena using GCSD labor and equipment rates, versus, the short hauling distance to a new proposed septage receiving facility at the WWTP. A cost analysis summary table is provided within Section 6 of this report (**Table 6.6- 1**).

The new facility could be used to meter discharges and generate additional revenue from outside septage haulers while providing some level of detection of toxic substances. The proposed facility is presented in **Figure 7.2.8-1**. Refer to **Table 7.2.8-1** for an Engineer's Opinion of Probable Construction Cost for the final recommended project.

Table 7.2.8-1 Proposed Septage Receiving Facility Recommended Project – Engineer's Opinion of Probable Construction Costs

Item	Qty.	Units	Unit Price	Labor		Total
				Hours	Rate	
Division 1 - General Requirements						
Mobilization	1	LS	10,000	included		10,000
Division 2 - Earth Work						
Rough Grading, Subgrade Prep	1	LS	25,000	included		25,000
Division 3 - Concrete						
Slab on Grade	8	YD	1,500	included		12,000
Division 9 - Finishes						
Paving restoration	2,500	SF	40	included		100,000
Division 11 - Equipment						
Honey Monster	1	EA	192,000	included		192,000
Division 15 - Mechanical						
Piping and Fittings	1	LS	20,000	included		20,000
Division 16 - Electrical and Instrumentation						
Power and control conduits/conductors	80	LF	150	included		12,000
Pull boxes connect to existing MCC and PLC	1	LS	20,000	included		20,000
SCADA programming and integration	1	LS	5,000	included		5,000
Construction Subtotal						**$396,000**



NEW SEPTAGE RECEIVING FACILITY PLAN

FIGURE 7.2.8-1
GCSD WASTEWATER STUDY

7.3 OPERATIONAL, ADMINISTRATIVE, AND OTHER FACILITY UPGRADES

DEFICIENCY:

Portions of the existing building, constructed in 1992, are in a deteriorated state and are made of flammable material without consideration of potential threats from wildfires. Section 5 includes more details regarding existing deficiencies associated with the existing administration building. The siding is highly susceptible to wild-fire and must be replaced. The control building houses all the main controls and SCADA systems to operate the WWTP, including the standby/backup generator, laboratory, and chemical feed room. Currently non-potable water is supplied to sinks and bathroom fixtures.

Recommendation:

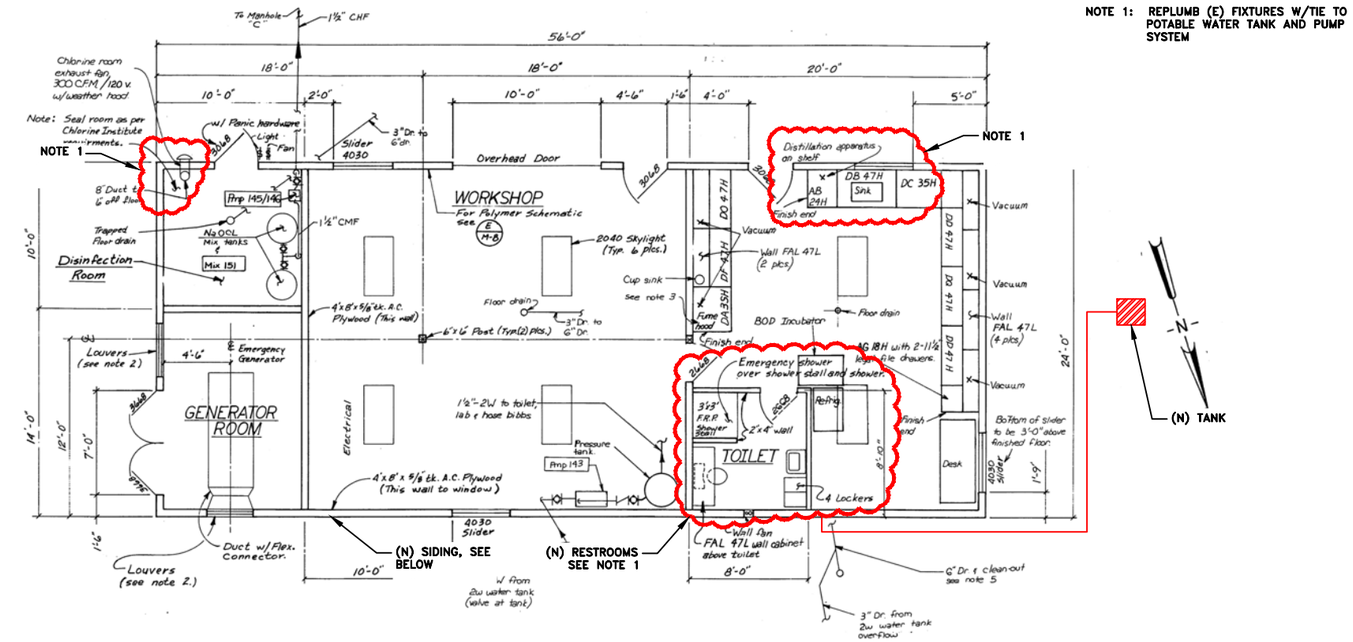
Recommendations for improvements at the existing operations building are presented in **Figure 7.3.1 -1**. At a minimum, the new building should include**:**

- Flashing to protect eaves and overhangs for fire prevention/suppression.
- Appropriate screens on roof and eave vents for improved fire protection
- New fire-resistant siding (i.e., James Hardie cement board or equivalent)
- New plumbing retrofits to accommodate potable water supplied to the building

Please refer to **Table 7.3.1 -1** for an Engineer's Estimate of Probable Construction Cost for the final recommended project. Costs for the potable water retrofit are listed under potable water supply improvements in related sections of the report.

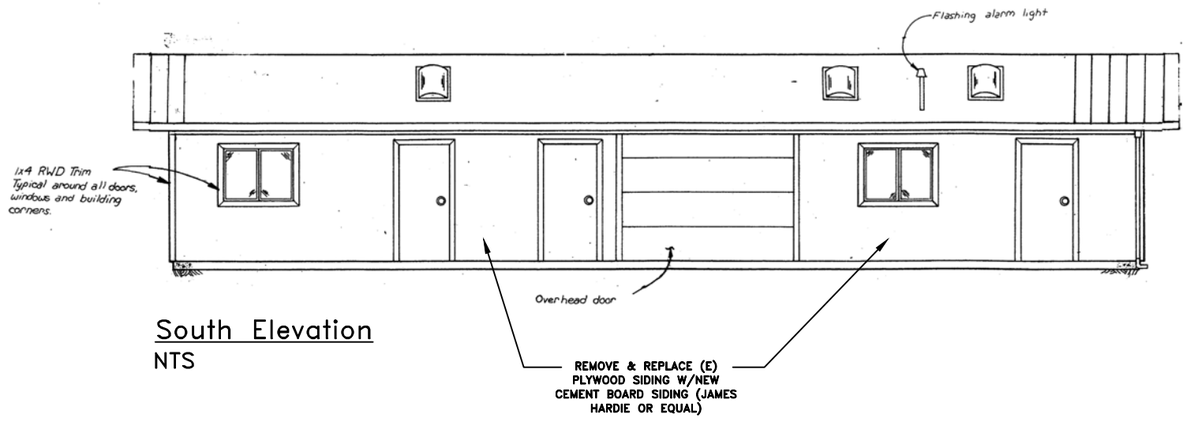
Table 7.3.1-1 Control/Operations Building w/ Lab Upgrades Recommended Project – Engineer's Opinion of Probable Construction Costs

Item	Qty.	Units	Unit Price	Labor		Total
				Hours	Rate	
Total Building Cost						
Upgrade/ Replace Siding on (E) Control Building w/Miscellaneou	1,600	SF	30	included		48,533
Miscellaneous (Electrical/Painting/Repairs)	1	LS	6,067	Included		6,067
Construction Subtotal						**$54,600**



NOTE 1: REPLUMB (E) FIXTURES W/TIE TO POTABLE WATER TANK AND PUMP SYSTEM

Floor Plan – Control Building
NTS



South Elevation
NTS

EXISTING MAINTENANCE AND CONTROL BUILDING REHABILITATION

FIGURE 7.3.1-1
GCSD WASTEWATER STUDY

7.3.2 ADMINISTRATION BUILDING

DEFICIENCY:

Portions of the existing building are not habitable for employees due to structural deterioration including holes in the floor, deteriorated siding and damage from a leaking roof. Health and safety (Cal OSHA) issues require that a new facility be constructed.

Recommendation:

The preferred alternative for the administration building consists of construction of a new 1,511 SF building. An initial conceptual floor plan was developed for the new administration building and is presented in **Figure 7.3.2 -1**. The related spaces as presented include:

- A separate reception area that includes desk and working space for the District's office staff
- General Manager's office
- Men's and women's locker room, shower, and bathroom
- Storage area
- Plant operator's office/quarters
- Employee lunchroom
- Conference room

The recommended administration building will be compliant with applicable Americans with Disabilities Act (ADA) standards.

Refer to **Table 7.3.2-1** for an Engineer's Opinion of Probable Construction Cost for the final recommended project.

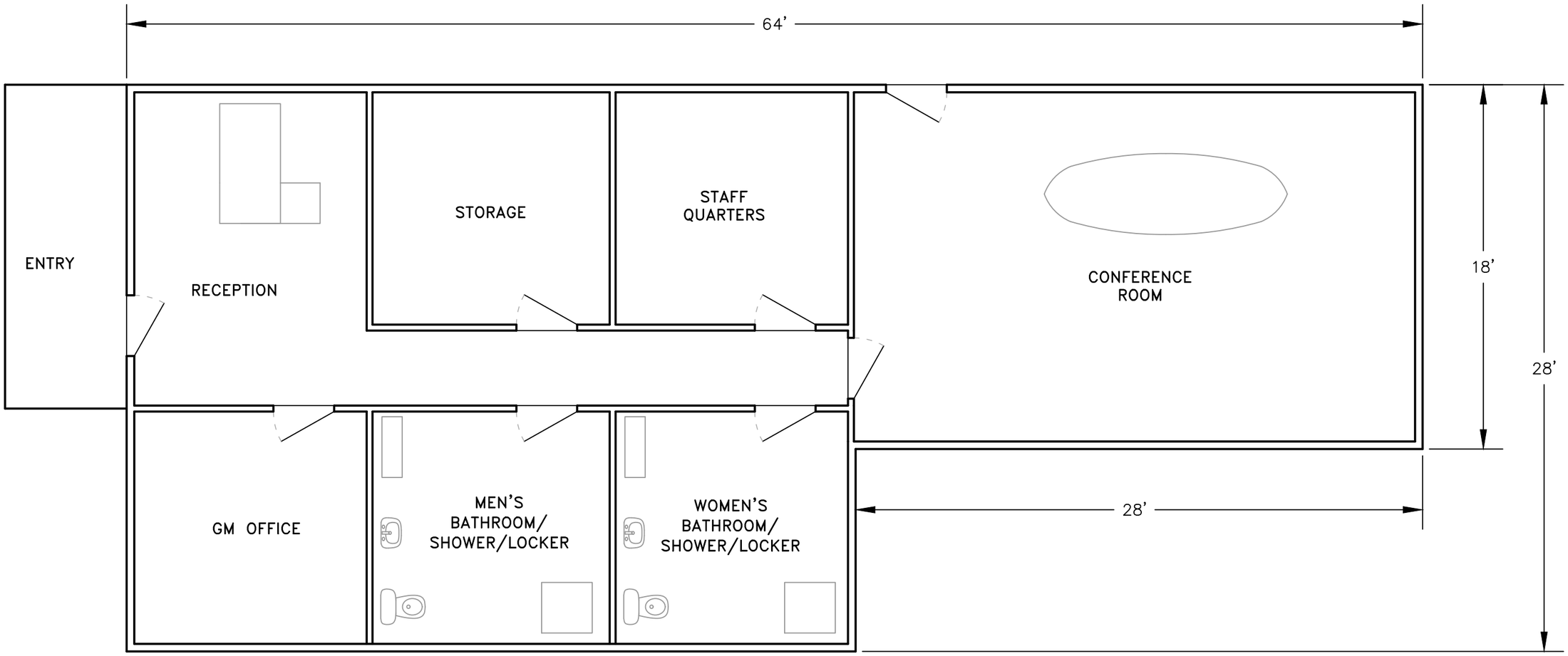
Table 7.3.2-1 Administration Building Recommended Project – Engineer's Opinion of Probable Construction Costs

Item	Qty.	Units	Unit Price	Labor		Total
				Hours	Rate	
Total Building Cost						
Admin. Building Cost [1 & 2]	1,511	SF	250	included		377,750
Demolition of Existing Building	1	LS	25,000	included		25,000
Construction Subtotal						**$402,750**

Note:

1. Cost assumes that all existing underground utilities will be reconnected

2. Building cost includes grading, foundation, wiring and other associated costs



EXISTING STORAGE FACILITY

FIGURE 7.3.2-1
GCSD WASTEWATER STUDY

7.3.3 Vehicle and Equipment Storage Facility

Deficiency:

Due to extreme corrosion and adverse atmospheric conditions, the equipment owned by the GCSD is deteriorating prematurely and should be protected.

Recommendation:

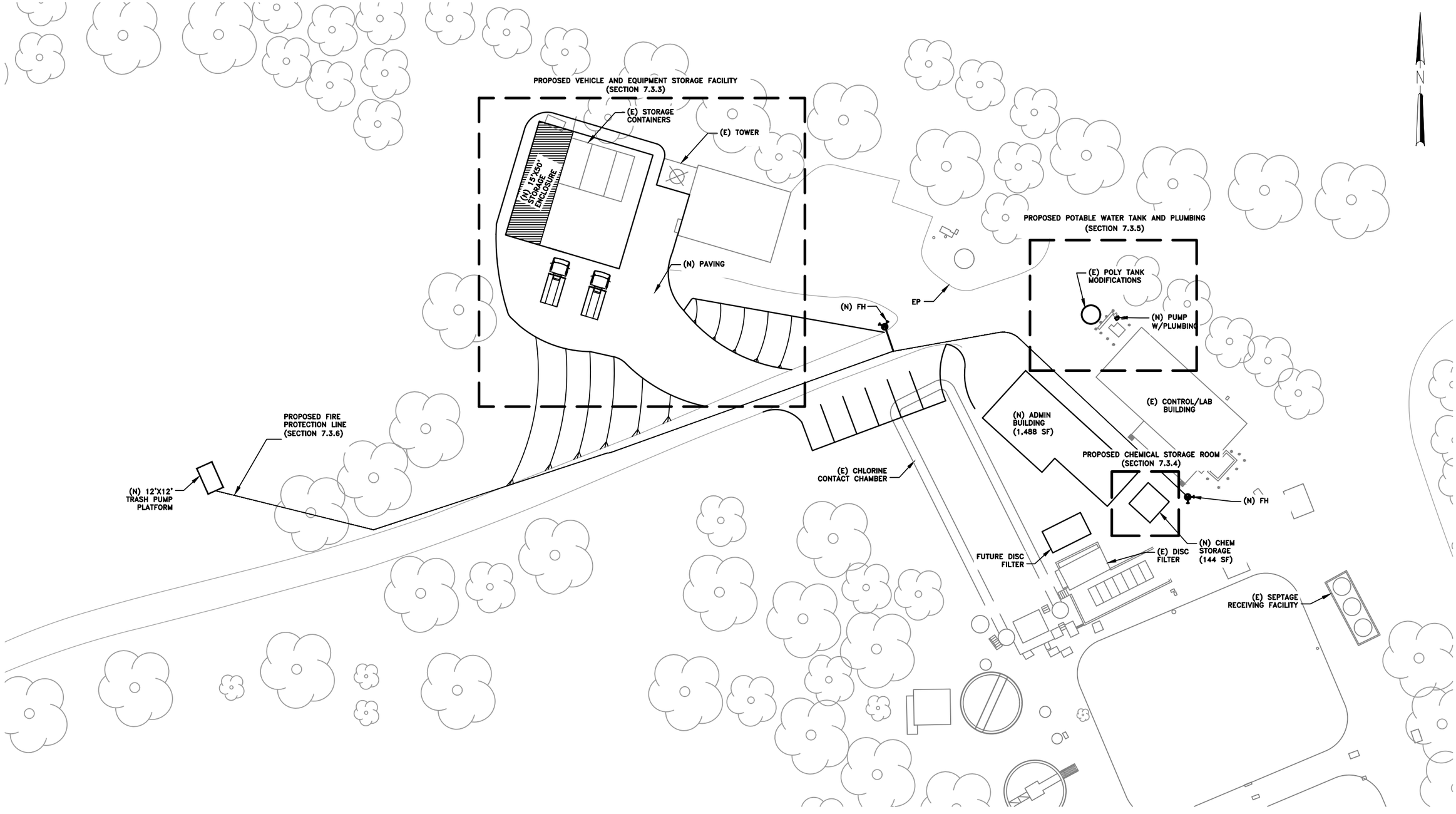
Constructing a new storage structure is recommended. A proposed metal structure is depicted in **Figure 7.3.3-1**. New covered storage should be provided for maintenance vehicles and equipment. The proposed new storage area includes a 50' x 50' covered structure with the westerly 15' fully enclosed to replace the deteriorated containers. Refer to **Table 7.3.3-1** for an Engineer's Opinion of Probable Construction Cost for the final recommended project.

Table 7.3.3-1 Vehicle and Equipment Storage Facility Recommended Project – Engineer's Opinion of Probable Construction Costs

Item	Qty.	Units	Unit Price	Labor		Total
				Hours	Rate	
Total Building Cost						
Building Cost (SF)	2,925	SF	100	included		292,500
Misc. Piping/Plumbing and Lighting	1	LS	20,000	included		20,000
Paving/Parking	9,000	SF	33	included		297,000
Construction Subtotal						**$609,500**

Notes:

1. Provide access road with parking.
2. Extend water pipelines for plumbing and wash-down and lighting



SCALE: 1"=40' 2' CONTOURS

PROPOSED IMPROVEMENTS SITE PLAN

FIGURE 7.3.3-1
GCSD WASTEWATER STUDY

7.3.4 Chemical Storage Room/Building

Deficiency:

Chemicals are stored in 50-gallon drums outside the control building. The drums are exposed to the weather and susceptible to vandalism. These chemicals include chlorine disinfection products which can pose a threat to health and safety if not handled properly.

Recommendation:

It is recommended that a new chemical storage room is constructed adjacent to the existing chemical feed room. The new building will be sized to contain all chemical drums. The proposed structure will be located adjacent to the existing chemical feed room as presented in **Figure 7.3.3-1**. Refer to **Table 7.3.4-1** for an Engineer's Opinion of Probable Construction Cost for the final recommended project.

Table 7.3.4-1 Chemical Storage Room/Building Recommended Project- Engineer's Opinion of Probable Construction Costs

Item	Qty.	Units	Unit Price	Labor		Total
				Hours	Rate	
Total Building Cost						
Chemical Storage Room/Building	120	SF	120	included		14,400
Construction Subtotal						**$14,400**

7.3.5 Potable Water

Deficiency:

Currently, operators have only recycled water available at the water plant, which includes the restroom and lab, and eyewash facilities. There are up to five employees at a time who work out of the administration building, and this presents health risks, violations of existing codes, and a serious and potential liability to the GCSD. Potable water is required for employee use and safety.

Recommendation:

A 5,000-gallon potable water tank is recommended (Alternative No.2). Water would be conveyed by trucks and delivered to the 5,000-gallon poly tank on a bi-monthly basis. A small booster pump and a bladder tank is recommended to boost pressures out of the 5,000 gallon tank for use in the new administration building and existing operations building. **Figure 7.3.3-1** presents the proposed location of the 5,000-gallon poly tank with a small booster pump and bladder tank being located adjacent to the poly tank. New ¾" – 1" plumbing will be installed along the north side of the control building with all critical fixtures being retro-fitted with new plumbing and appurtenances. Please refer to **Table 7.3.5-1** for an Engineer's Opinion of Probable Construction Cost for the final recommended project.

Table 7.3.5-1 Potable Water Recommended Project – Engineer's Opinion of Probable Construction Costs

Item	Qty.	Units	Unit Price	Labor		Total
				Hours	Rate	
Total Potable Water Line Cost						
Modify Existing 5,000 gallon poly tanks	2	EA	2,000	included		4,000
Misc. 1/2'-3/4" Water Lines w/Plumbing Retro (Internal)	1	LS	20,000	included		20,000
Booster Pump Station w/ Bladder and Controls	1	LS	6,000	included		6,000
Construction Subtotal						**$30,000**

Notes:

1. Water line to be installed for shower and kitchen
2. Install small pump w/ bladder from poly tank. Tank to be filled by water trucks periodically
3. Modify existing poly tanks/clean and disinfect add new plumbing connections

7.3.6 Fire Protection

Deficiency:

There are no existing means of providing fire flows at the plant, which is currently located on a densely wooded and forested hillside that poses as a significant wildfire risk.

Recommendation:

Based on a review of the alternatives presented in Section 6, the recommended cost-effective alternative (Project Alternative No. 2) would be to construct approximately 1000 LF of 6"-8" water main from the tertiary pond at the WWTP. This new reclaimed water main would include the installation of two new fire hydrants. These hydrants would be installed at strategic locations as presented in **Figure 7.3.3 -1**. Intake piping from the pond and a quick connect for a "trash pump" will be installed. The trash pump will be rated to provide at minimum of 1000-1500 GPM of flow during a fire event. Other actions that may be taken include the following:

- Implement an aggressive program to increase the defensible space around the plant by reducing fuel around existing trees with input from CalFire.
- Improve the exterior of the existing operations building by installing "Hardie Board" cement siding materials (Included in Section 7.3.1)
- Install hydrants that are fed from the tertiary effluent pond in order to supplement the engine driven pump in the interim
- Various project alternatives were evaluated to provide fire flows to the WWTP facilities, with a cost-effective evaluation being provided for within Section 6 of this Report **(Table 6.6- 1).**

Please refer to **Table 7.3.6-1** for an Engineer's Opinion of Probable Construction Cost for the final recommended project.

Table 7.3.6-1 Fire Protection Recommended Project – Engineer's Opinion of Probable Construction Costs

Item	Qty	Units	Unit Price	Labor		Total
				Hours	Rate	
Total Potable Water Line Cost						
6" Diameter Fire Line from Reclamation water pond	600	LF	90	included		54,000
Hydrant & Misc Quick Connect & Pond Intake	2	LS	10,000	included		20,000
Emergancy Booster Pump Station	1	LS	100,000	included		100,000
Construction Subtotal						**$174,000**

Notes:

1. Water pipeline to connect to Existing Reclamation pond with addition of pad and intake piping

2. Cost of water not included in capital cost evaluation

3. Purchase new 2000 GPM Portable (wheels) water pump

7.3.7 Access Road

Deficiency:

The 3,339 LF by 15-foot-wide access road to the plant is unpaved and portions of it have washed out during storm events. This access is critical and requires improvements to allow for all types of vehicles to access WWTP.

Recommendation:

Project Alternative 2 is recommended. This requires that GCSD regrade and pave portions of the WWTP access road and repair a serious washout area, along with adding a concrete headwall(s) upstream of all culvert crossings. At least three existing culverts will need replacement to provide adequate drainage flow for runoff during wet-weather periods. Portions of the access road will need to be regraded and 3-4 inches of aggregate base rock must be added. Various project alternatives were evaluated to provide better access to the WWTP facilities, with a cost-effective evaluation being provided for within Section 6 of this Report (**Table 6.6- 1**). See **Figure 7.3.7-1** for location and details of the proposed access road.

Refer to **Table 7.3.7-1** for an Engineer's Opinion of Probable Construction Cost for the final recommended project. A shared responsibility agreement wit the Gualala Redwoods Timber Company should be developed.

Table 7.3.7-1 Access Road Recommended Project Engineer's Opinion of Probable Construction Costs

Item	Qty.	Units	Unit Price	Labor		Total
				Hours	Rate	
Division 1 - General Requirements						
Mobilization	1	LS	10,000	included		10,000
Division 2 - Earth Work						
Cut-regrade (Rehabilitation Fill Areas)	15,000	YD	5	included		75,000
Fill w/ Compaction	900	YD	25	included		22,500
Class 2 AB Fill	800	YD	25	included		20,000
Division 3 - Concrete						
Structural Concrete (Headwalls (8))	110	YD	800	included		88,000
Division 9 - Finishes						
Paving	400	SF	25	included		10,000
Division 15 - Mechanical						
Culverts (Headwalls)	6	LF	4,000	included		24,000
Electrical Gate (Key-coded)	30	LF	200	included		6,000
Division 16 - Electrical and Instrumentation						
Power Conduit	120	LF	60	included		7,200
Construction Subtotal						**$ 262,700**

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Legend

- Access Road Improvements (3,339 LF)
- Washout Area

MC Engineering, Inc.
9294 Madison Ave
Orangevale, CA 95662
Tel: 916-223-3828
Fax: 916-860-1863
www.mc-engineers.com

Title:
GCSD WASTEWATER STUDY

Figure 7.3.4-1:
Access Road Improvements

N

0 500 1,000 2,000 Feet

7.3.8 Emergency Access for Pipeline Repairs

Deficiency:

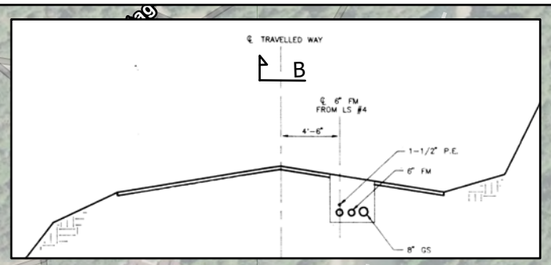
Portions of the main interceptor pipeline are constructed within cross-country reaches and non-accessible areas, thus significantly impairing access for inspections and emergency repairs.

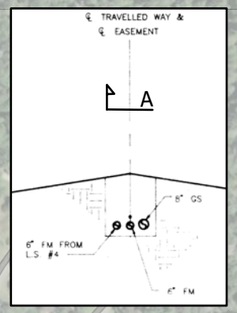
Recommendation:

Project Alternative 2 is recommended, which includes clearing and grubbing the inaccessible alignments of critical pipeline segments to allow for required maintenance equipment to gain access. This also requires the possible removal of all existing debris, brush, and shrubs from the existing pipeline alignments. Minimal grading of an access road may be required in some stretches. Please refer to **Table 7.3.8-1** for an Engineer's Opinion of Probable Construction Cost for the final recommended project. **Figure 7.3.8-1** depicts the specific location of cross-country mainlines.

Table 7.3.8-1 Emergency Access for Pipeline Repairs Recommended Project – Engineer's Opinion of Probable Construction Costs

Item	Qty.	Units	Unit Price	Labor		Total
				Hours	Rate	
Division 1 - General Requirements						
Mobilization	1	LS	5,000	included		5,000
Division 2 - Earth Work						
Rough Grading, Subgrade Prep	1	LS	25,000	included		25,000
Clearing and Grubbing	1	LS	20,000	included		20,000
Construction Subtotal						**$50,000**





STA 72+50

STA 68+10

STA 55+99

STA 45+51

STA 39+36

Old State Hwy

S Highway 1

SONOMA RIDGE ROAD

S Highway 1

Haversack

White Tail

Leeward Rd

Forecastle

Pipe Segment Description			
Station From	Station To	Length (LF)	Problem
STA 39+36	STA 45+51	615	No access do to overgrown shrubs over pipeline
STA 45+51	STA 55+99	1,048	N/A
STA 59+99	STA 68+10	811	Washout areas throughout unimproved road
STA 68+10	STA 72+50	440	No access do to overgrown shrubs

Legend

Proposed 6" Forcemain Alternative (FUTURE NOT EVALUATED)

Station

- 39+36 - 45+51
- 45+51 - 55+99
- 55+99 - 68+10
- 68+10 - 72+50

MC Engineering, Inc.
9294 Madison Ave
Orangevale, CA 95662
Tel: 916-223-3828
Fax: 916-860-1863
www.mc-engineers.com

Title:
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Figure 7.3.5-1:
Pipeline(s) Access Alignment

N

0 260 510 1,000 Feet

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7.4 COLLECTION SYSTEM UPGRADES

7.4.1 GCSD COLLECTION SYSTEM

No immediate replacements or upgrades are included at this time for the collection system pipelines. Recommended improvements associated with the tanks and pump systems (STEP/STEG) are discussed further below. An inventory of all existing collection lines is presented in Section 9 along with a long-term replacement strategy.

7.4.2 GCSD STEP SYSTEMS (INTERCEPTOR TANKS, PUMPS, AND SERVICE LINES)

DEFICIENCY:

There are over 180 existing interceptor tanks that require rehabilitation, including replacement of old and deteriorated pumps, repairs on access hatches, and relocation of corroded electrical pull boxes currently located within the effluent tanks.

Recommendation:

New access with hatches to allow the District's staff and pumper truck to properly pump-out tanks on a periodic basis are recommended. Other various repairs, replacement, and upgrades include, pumps, electrical wiring and pull boxes, and in some instances, complete tank replacements. The modifications recommended for the existing interceptor tanks are presented in **Figures 7.4.2-1** and **Figure 7.4.2-2** for the single and multiple interceptor tanks, respectively.

A breakdown of the opinion of costs for the existing interceptor tank repairs is presented in summary **Table 7.4.2-1**.

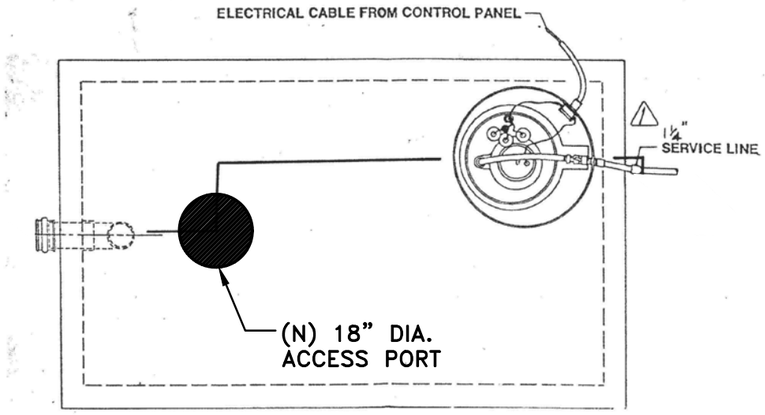
Table 7.4.2-1 Septage Interceptor Tanks Recommended Project – Engineer's Opinion of Probable Construction Costs

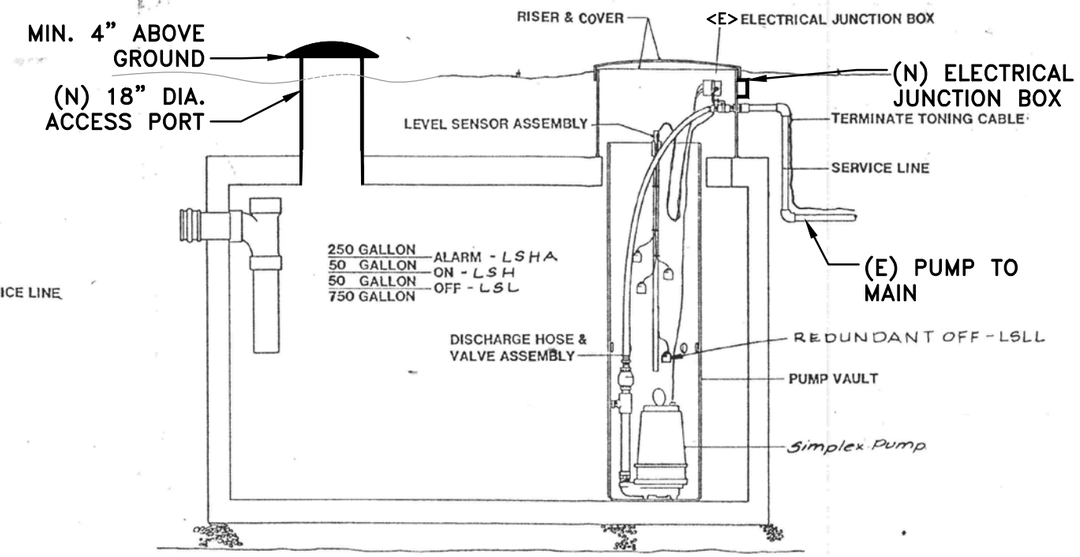
Number of (E) Interceptor Tanks	Access Pump-out Port			Interceptor Tank Rehab.			Total Cost
	Add Access Pump-out Port (80% of existing units)	Cost Per (N) Access Port	Cost	Total No. of Tanks Needing Repair (40%) [1]	Avg. Cost/Repair [2]	Cost	
226	181	$2,500	$452,000	90	$3,000	$271,200	**$723,200**
						Sub-Total	**$723,200**
						Easements/RWs	$30,000
						Total	**$753,200**

Notes:

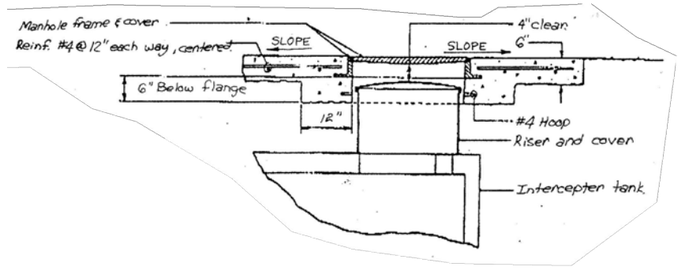
1. Current field survey being conducted to determine extent and type of deficiency (Repairs to include repair/replace manhole riser, pumps, panels, connectors, etc.)

2. Avg cost for repairing and/or replacing (E) MH risers and/or adding second MH and/or repairin

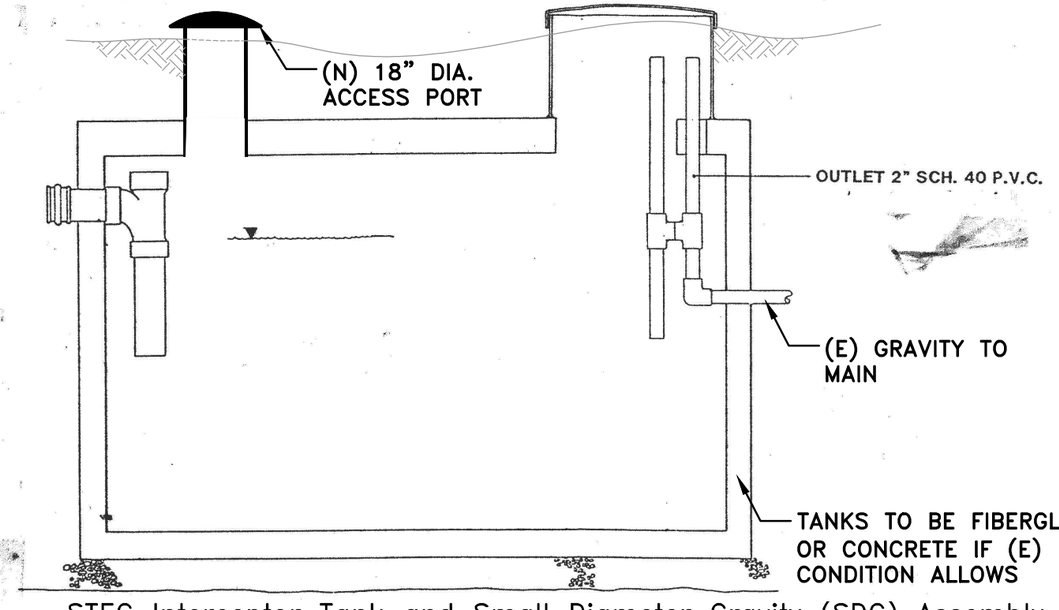




STEP Single Interceptor Tank and Pump Assembly
NTS



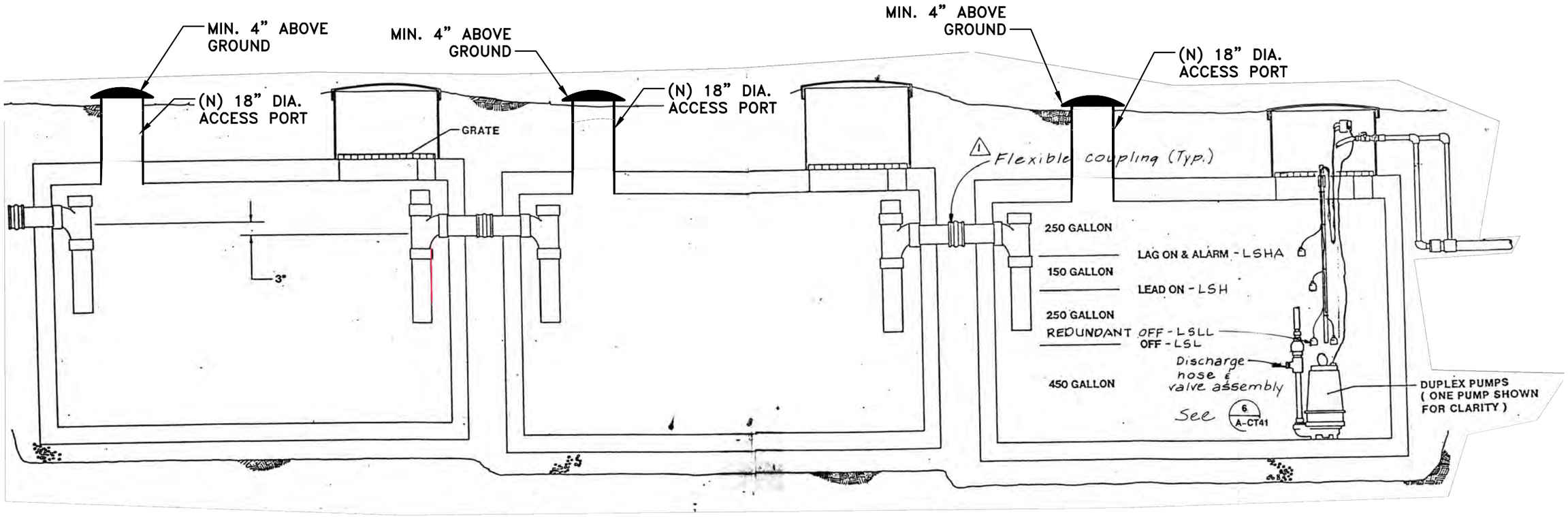
Paved Area Manhole Access W/Traffic Approved Lid
NTS



STEG Interceptor Tank and Small Diameter Gravity (SDG) Assembly
NTS

SINGLE INTERCEPTOR TANK ACESS PORT AND APPURTENANCES

FIGURE 7.4.2-1
GCSD WASTEWATER STUDY



MULTIPLE INTERCEPTOR TANK AND PUMP ASSEMBLY DETAILS

FIGURE 7.4.2-2
GCSD WASTEWATER STUDY

7.4.3 GCSD Lift Stations

Deficiency:

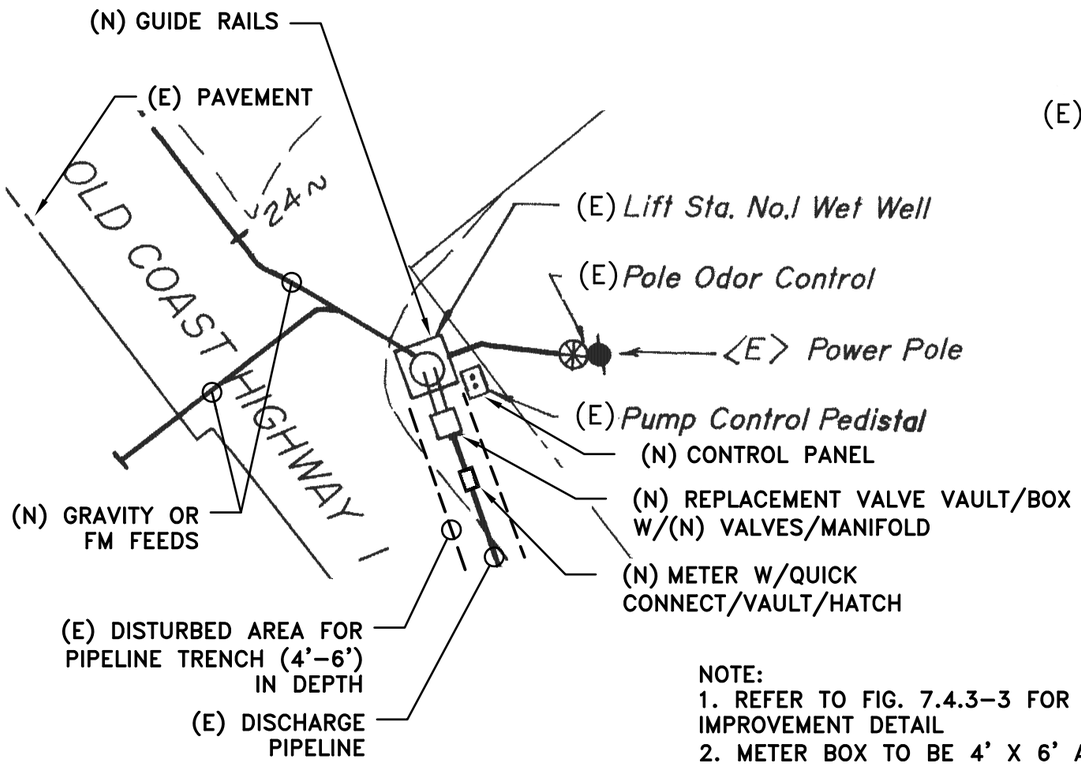
Components of the existing Lift Stations 1, 2, and 3 have deteriorated. Necessary upgrades include replacing the existing piping, valving, and electrical control equipment. There are no flow metering devices at the Lift Stations 1, 2, 3, and 4 to monitor wet weather flows in order to identify excessive I/I. There is also a critical need to provide an emergency overflow bypass quick connect at each lift station to prevent raw sewage overflows. Replacement of various other lift station components is required as a result of corrosion. In addition, Lift Station 4 has no viable means of handling wet-well overflows, other than bringing in pumper trucks in the event of a catastrophic pump and/or electrical failure.

Recommendation:

New bypass quick connects, meter and meter vaults for Lift Stations 1, 2, and 3 are recommended. Existing piping, valving, and access hatches should be replaced along with the wet-well pump guide rail systems. New control panels are proposed for Lift Stations 1 and 2. Preliminary site plans and details are presented for improvements proposed at Lift Stations 1, 2, and 3 as noted in **Figures 7.4.3-1, 7.4.3-2, and 7.4.3-3**. Various improvements are proposed separately for Lift Station 4, including emergency raw sewage quick connect assemblies and new check valves and SCADA PLCs, as described in **Figure 7.4.3-4**. Please refer to **Tables 7.4.3-1**, **7.4.3-2**, **7.4.3-3** and **7.4.3-4** for Engineer's Opinions of Probable Construction Cost for the final recommended projects.

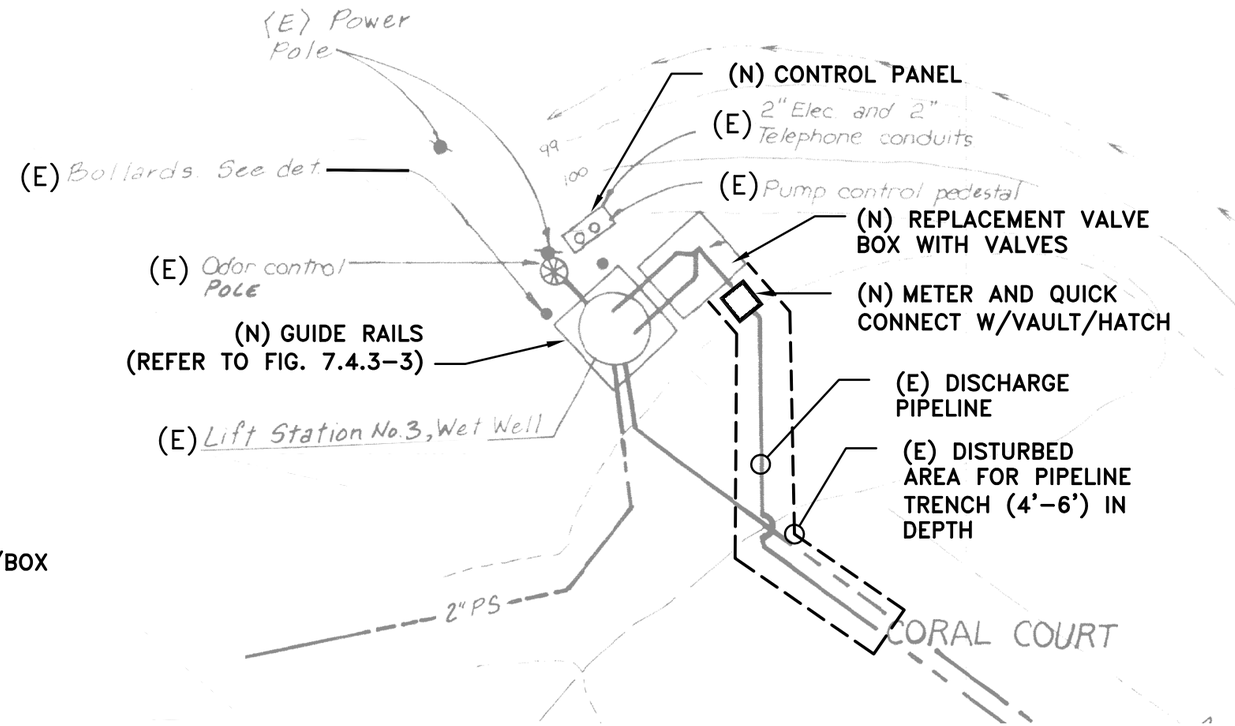
Table 7.4.3-1 GCSD Lift Station 1 Recommended Project – Engineer's Opinion of Probable Construction Costs

Item	Qty.	Units	Unit Price	Labor		Total
				Hours	Rate	
Division 2 - Earth Work/Demo						
Demo Vaults Hatches/Equipment	1	LS	8,000	included		8,000
Division 3 - Concrete						
Replace Wet well and Valve Box - Vault Hatches	2	EA	12,000	included		24,000
(N) 3'x4' Vault for Meter and Quick Connect w/Hatch	1	LS	15,000	included		15,000
Division 5 - Metals						
Slide Railings (Guide Rails)	1	LS	5,000	included		5,000
Division 9 - Finishes						
Paving Restoration w/ Drainage	600	SF	40	included		24,000
Division 15 - Mechanical						
2 Check Valves & 2 Gate Valves	4	EA	4,000	included		16,000
Wet well Piping and Fittings	1	LS	15,000	included		15,000
Meter/Quick Connect Piping/Fittings	1	LS	15,000	included		15,000
Division 16 - Electrical and Instrumentation						
3" Master Meter (included in Meter/Quick Connect, above-Div. 15)	1	LS	3,000	included		3,000
Electrical Underground/Overhead	1	LS	8,000	included		8,000
Control Panel (System Integration and SCADA Screens)	1	LS	80,000	included		80,000
Misc.	1	LS	5,000	included		5,000
Construction Subtotal						**$218,000**



Lift Station #1 Site Plan
NTS

NOTE:
1. REFER TO FIG. 7.4.3–3 FOR TYPICAL LIFT STATION IMPROVEMENT DETAIL
2. METER BOX TO BE 4' X 6' AND TO BE INSTALLED WITHIN LIMIT OF (E) TRENCH FOR BOTH LIFT STATIONS 1 AND 3. SEE FIGURE 7.4.3–3



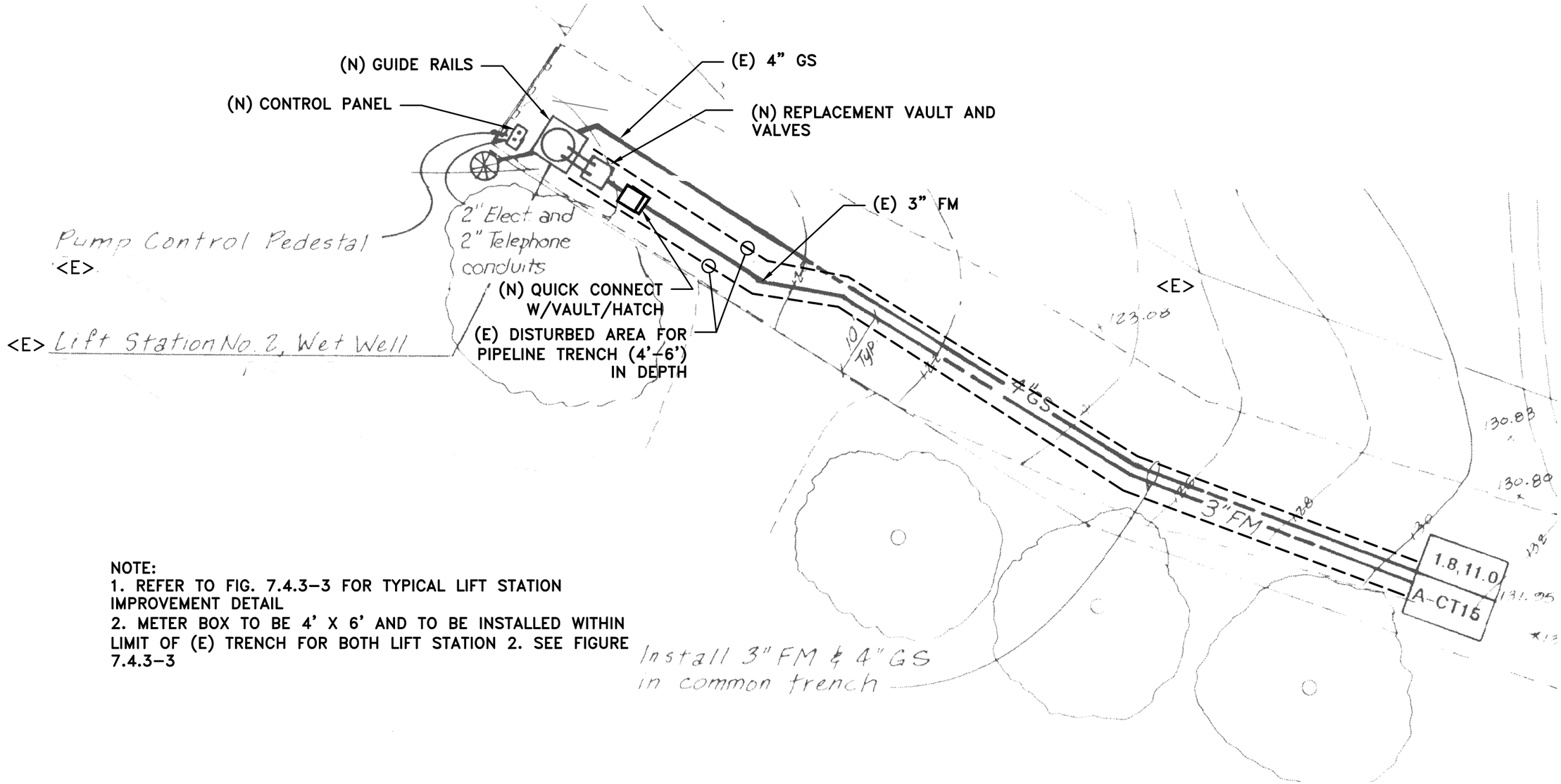
Lift Station #3 Site Plan
NTS

LIFT STATIONS 1 AND 3 SITEPLANS

FIGURE 7.4.3-1
GCSD WASTEWATER STUDY

Table 7.4.3-2 GCSD Lift Station 2 Recommended Project – Engineer's Opinion of Probable Construction Costs

Item	Qty.	Units	Unit Price	Labor		Total
				Hours	Rate	
Division 2 - Earth Work						
Demo Vaults Hatches/Equipment	1	LS	8,000	included		5,000
Division 3 - Concrete						
Replace Wet well and Valve Box - Vault Hatches	2	EA	12,000	included		24,000
(N) 3'x4' Vault for Meter and Quick Connect w/Hatch	1	LS	15,000	included		15,000
Division 5 - Metals						
Slide Railings	1	LS	5,000	included		5,000
Division 9 - Finishes						
Paving Restoration w/ Drainage	1,350	SF	40	included		54,000
Division 15 - Mechanical						
2 Check and 2 Gate Valves	4	EA	4,000	included		16,000
Wet well Piping, Odor Control, and Fittings	1	LS	18,000	included		20,000
Meter/Quick Connect Piping/Fittings and (N) 3-inch Meter	1	LS	15,000	included		15,000
Division 16 - Electrical and Instrumentation						
3" Master Meter (included in Meter/Quick Connect, above-Div. 15)	1	LS	3,000	included		3,000
Electrical Underground/Overhead	1	LS	8,000	included		8,000
Misc.	1	LS	5,000	included		3,000
Construction Subtotal						**$168,000**



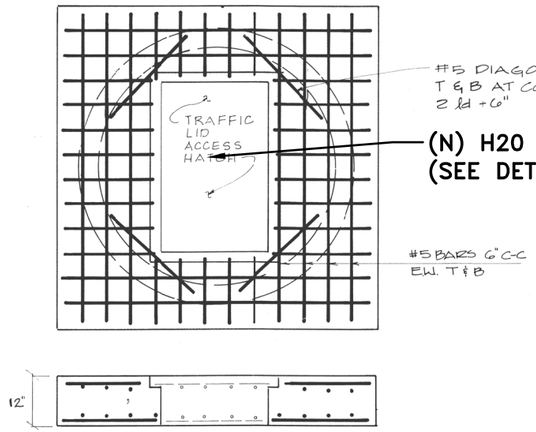
NOTE:
1. REFER TO FIG. 7.4.3-3 FOR TYPICAL LIFT STATION IMPROVEMENT DETAIL
2. METER BOX TO BE 4' X 6' AND TO BE INSTALLED WITHIN LIMIT OF (E) TRENCH FOR BOTH LIFT STATION 2. SEE FIGURE 7.4.3-3

LIFT STATION 2 SITEPLAN

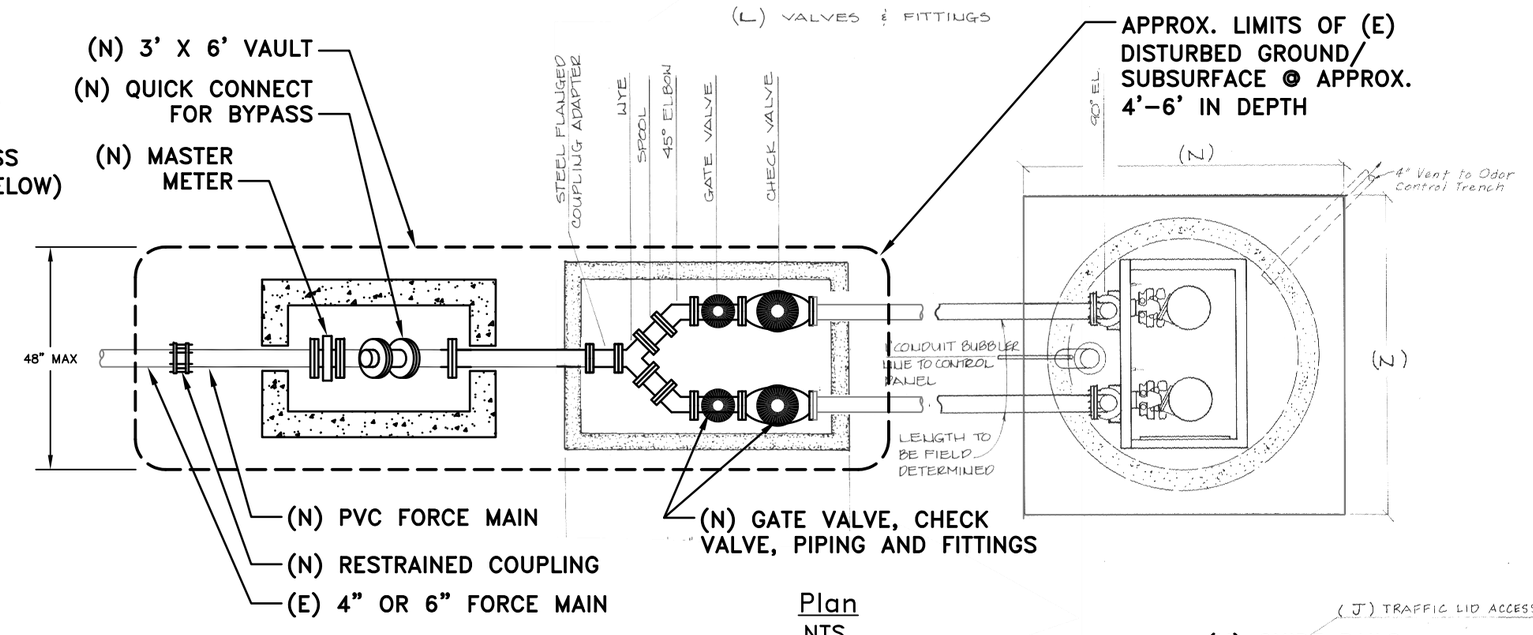
FIGURE 7.4.3-2
GCSD WASTEWATER STUDY

Table 7.4.3-3 GCSD Lift Station 3 Recommended Project- Engineer's Opinion of Probable Construction Costs

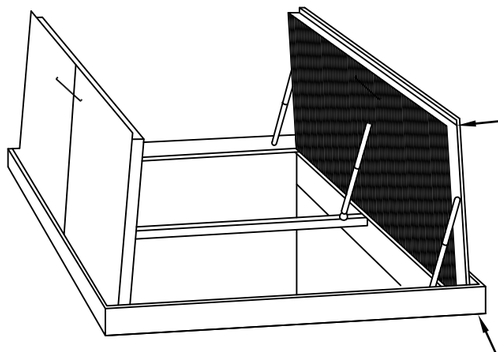
Item	Qty.	Units	Unit Price	Labor		Total
				Hours	Rate	
Division 2 - Earth Work						
Demo Vaults Hatches/Equipment	1	LS	8,000	included		8,000
Division 3 - Concrete						
Replace Wet well and Valve Box - Vault Hatches	2	EA	12,000	included		24,000
(N) 3'x4' Vault for Meter and Quick Connect w/Hatch	1	LS	15,000	included		15,000
Division 5 - Metals						
Slide Railings (Guide Rails)	1	LS	5,000	included		5,000
Division 9 - Finishes						
Paving Restoration w/ Drainage	1,350	SF	40	included		54,000
Division 15 - Mechanical						
2 Check and 2 Gate Valves	4	EA	4,000	included		16,000
Wet well Piping and Fittings	1	LS	15,000	included		15,000
Meter/Quick Connect Piping/Fittings	1	LS	15,000	included		15,000
Division 16 - Electrical and Instrumentation						
3" Master Meter (included in Meter/Quick Connect, above-Div. 15)	1	LS	3,000	included		3,000
Electrical Underground/Overhead	1	LS	8,000	included		8,000
Control Panel (System Integration and SCADA Screens)	1	LS	80,000	included		80,000
Misc.	1	LS	5,000	included		5,000
Construction Subtotal						**$248,000**



Wet Well Top Slab Detail
NTS



Plan
NTS

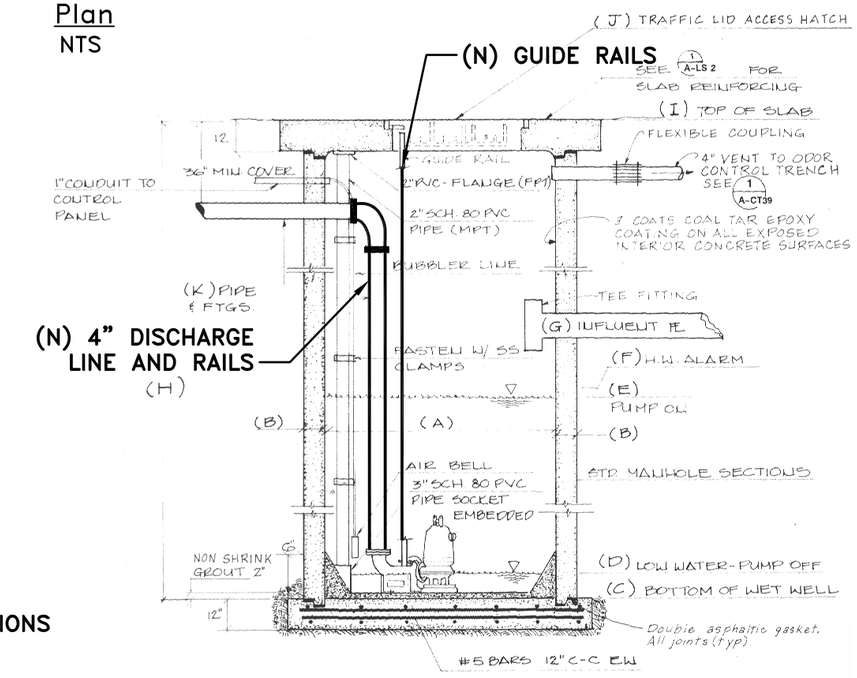


(N) DOUBLE LEAF ACCESS HATCH

(N) CONCRETE VAULT, JENSEN PRECAST OR EQUAL

Door Access
NTS

NOTE: ALL FITTINGS TO CONFORM TO FIELD CONDITIONS

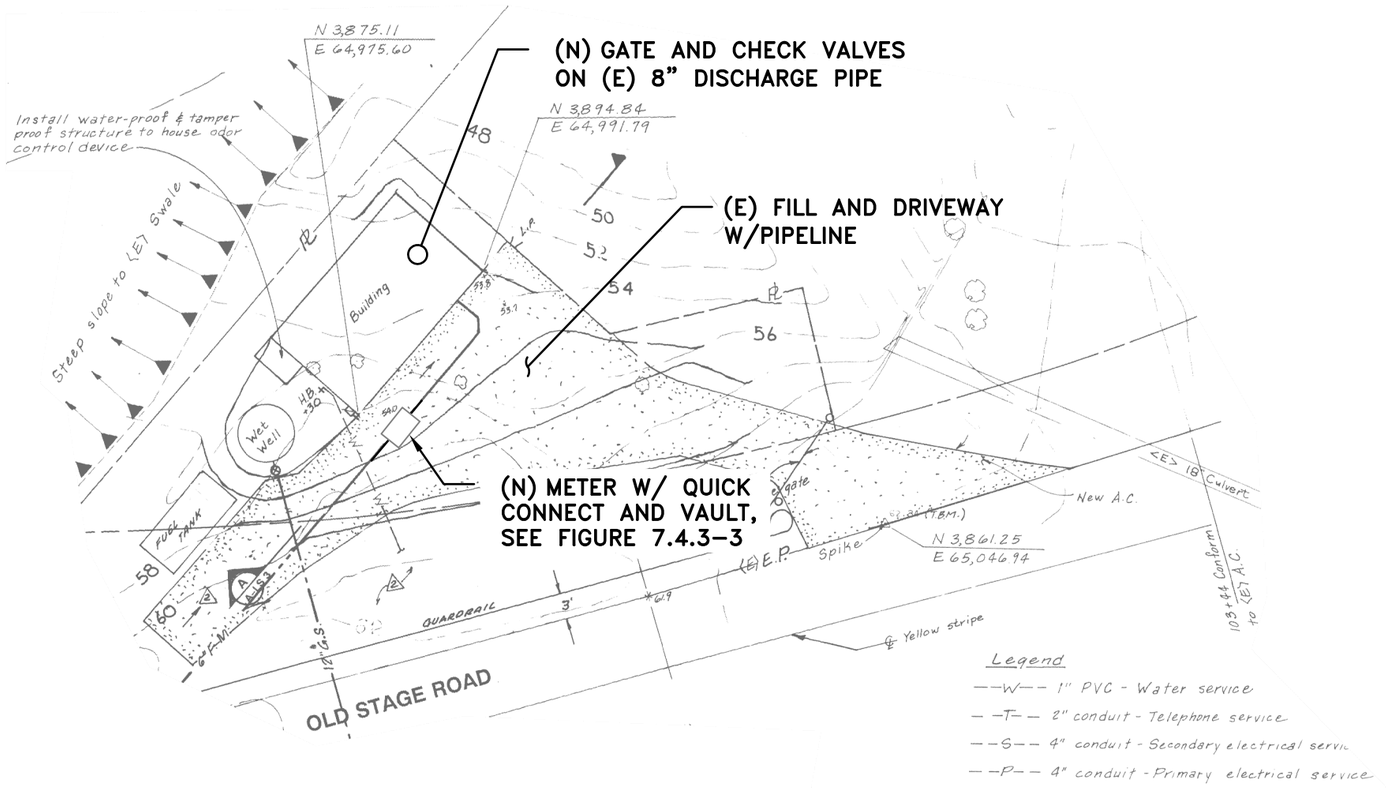


LIFT STATIONS 1, 2, AND 3 IMPROVEMENTS

FIGURE 7.4.3-3
GCSD WASTEWATER STUDY

Table 7.4.3-4 GCSD Lift Station 4 Recommended Project- Engineer's Opinion of Probable Construction Costs

Item	Qty.	Units	Unit Price	Labor		Total
				Hours	Rate	
Division 2 - Earth Work						
Demo Vaults Hatches/Equipment (Wet well)	1	LS	12,000	included		12,000
Division 3 - Concrete						
(N) 4'x5' Vault for Meter and Quick Connect w/Hatch	1	LS	25,000	included		25,000
Division 9 - Finishes						
Painting - Fire Proof Paneling (Hardi Siding)	1000	SF	22	included		22,220
Paving Restoration	1600	SF	40	included		64,000
Demolition	1000	SF	5	included		5,000
Division 11 - Equipment						
Wet well Improvements Vault Hatch	1	LS	15,000	included		15,000
Division 15 - Mechanical						
4" and 6" Check Valves and Fittings	4	EA	8,000	included		32,000
Meter/Quick Connect Piping/Fittings	1	LS	15,000	included		15,000
8" Master Meter	1	LS	10,000	included		10,000
Division 16 - Electrical and Instrumentation						
System Integration and SCADA Screens	1	LS	10,000	included		10,000
Misc. Electrical Underground/Overhead	1	LS	5,780	included		5,780
Control Panel	1	LS	80,000	included		80,000
Construction Subtotal						**$296,000**



NOTE: PROPOSED METER BOX WITHIN (E) DISTURBED MATERIAL

Lift Station #4 Emergency Upgrades

NTS

LIFT STATION 4 SITEPLAN AND DETAILS

FIGURE 7.4.3-4
GCSD WASTEWATER STUDY

7.4.4 Sonoma County CSA 6 Collection

Deficiency:

GCSD's ability to attenuate high I/I flow from the SRN collection system (Sonoma County CSA 6) is constrained by both the existing pump capacity and the existing inlet configuration at the SRN primary pond.

Recommendation:

Installation of a floating decant located on the west end of the SRN primary treatment basin is recommended (Project Alternative 1) and will minimize the amount of sludge and settled solids collected when the full capacity of the SRN pumps is required to lower the basin level after, or in anticipation of, wet weather events. Installation of piping and appurtenances will also be required. Sludge removal frequency should be increased to allow more freeboard during the rainy season.

A fiberglass floating decant, as shown in **Figure 7.4.4-1**, featuring stainless steel hardware is recommended. Intermediate piping from the floating decant to the existing inlet would consist of 4" flexible rubber piping suspended by floats as required. Refer to **Table 7.4.4-1** for an Engineer's Opinion of Probable Construction Cost for the final recommended project.

Figure 7.4.4-1 Floating Decant

Table 7.4.4-1 SRN Collection System Recommended Project – Engineer's Opinion of Probable Construction Costs

Item	Qty.	Units	Unit Price	Labor		Total
				Hours	Rate	
Division 1 - General Requirements						
Mobilization	1	LS	3,700	included		3,700
Division 11 - Equipment						
Floating decant *Fiberglass or Equal)	1	LS	20,000	included		20,000
Division 15 - Mechanical						
Install Check Valves	1	EA	4,500	included		4,500
Miscellaneous Piping and Tie-ins	1	LS	15,000	included		15,000
Install 6-inch Force-main Pipeline	120	LF	140	included		16,800
Construction Subtotal						**$60,000**

7.5 SERVICE AREA EXPANSION – UNSEWERED AREAS

As described in Sections 5 and 6 of this report, unsewered areas are encountering septic system failures (GCSD LAFCO Zones 3 and 4). Zone 5 is unsewered and has not been annexed into the GCSD boundary but has also been encountering similar septic system problems. The cost of providing sewer collection and conveyance systems for the unsewered areas is extremely high. Furthermore, the need for eliminating the problematic septic systems (tanks and leach lines) must be evaluated further along with costs for construction of the new facilities for maintaining the existing system and WWTP. Providing sewer service to the expansion areas (Zones 3, 4, and 5) will require additional force-mains, gravity sewer mains, and lift stations, including new infrastructure and appurtenances from the street mains to the house. These on-site improvements include retrofitting or providing new 1,200–1,500-gallon septic tanks (interceptor tanks), installing new small diameter sewer laterals and, in some instances, small individual lift stations if gravity flow cannot be achieved to convey flows into the new street mains. Individual easements for each STEP system will be required.

7.5.1 STEP/STEG System (Unsewered Areas)

Deficiencies:

As identified in Section 5 of this Report, rather extensive problems and failures were identified for the existing on-site sewer treatment systems. The evaluation revealed that existing septic systems have a variety of inherent deficiencies as a result of, and/or a combination of, high ground water, steep slopes, tree roots, settlement around septic tanks, improper construction techniques, and other miscellaneous issues. A water quality testing and monitoring program was developed to more thoroughly evaluate and address the water quality impacts of failed septic systems, This included investigating potential impacts to local streams. Some of the streams with flowing water serve as a source of drinking water for the community. Over a period of 18 months, suspect streams were tested for various contaminants (water quality indicators). A second method for identifying the failure rates of the existing septic systems was to contact and acquire repair records on file with Mendocino County as well as reports required at each escrow for houses that sold. Local inspectors provided critical input, including reports identifying repairs due to failures of either the septic tanks and/or the leach fields. Results of both water quality testing of streams and data acquired from local septic system repair contractors are detailed in Section 5, of this Report.

Recommendation:

Construction of new interceptor tanks along with both gravity (STEG) and pumped (STEP) small diameter service lines are recommended for existing failing septic systems. It was assumed that these new STEP/STEG Systems will require installation of new 1200 to 1500 gallon interceptor tanks with a majority of these new interceptor tanks requiring the installation of a small lift station. It is important to note that installation and long-term O&M of all new STEP and STEG systems will require permanent easements. The following is a breakdown of the total number of new STEP/STEG systems per unsewered area Zones:

Zone 3 - **91** STEP/STEG

Zone 4 - **132** STEP/STEG

Zone 5 - **116** STEP/STEG

Figure 7.5.1-1 depicts a preliminary layout and design for the new proposed sewer collection system for unsewered areas within Zones 3, 4, and 5. The proposed system will include locations of five (5) new Lift Stations. A detail of the proposed STEP/STEG Systems to be installed at each single-family house/structure are shown on **Figure 7.5.1-2**. For all estimated opinions of costs associated with the installation of these new STEP/STEG Systems, please refer to the Cost Summary in **Table 7.5.3 – 1.**

Figure 7.5.1-1 depicts a preliminary layout and design for the new proposed sewer collection system for unsewered areas within Zones 3, 4, and 5. The proposed system will include locations of five (5) new Lift Stations. A detail of the proposed STEP/STEG Systems to be installed at each single-family house/structure are shown on **Figure 7.5.1-2**. For all estimated opinions of costs associated with the installation of these new STEP/STEG Systems, please refer to the Cost Summary in **Table 7.5.3 – 1.**

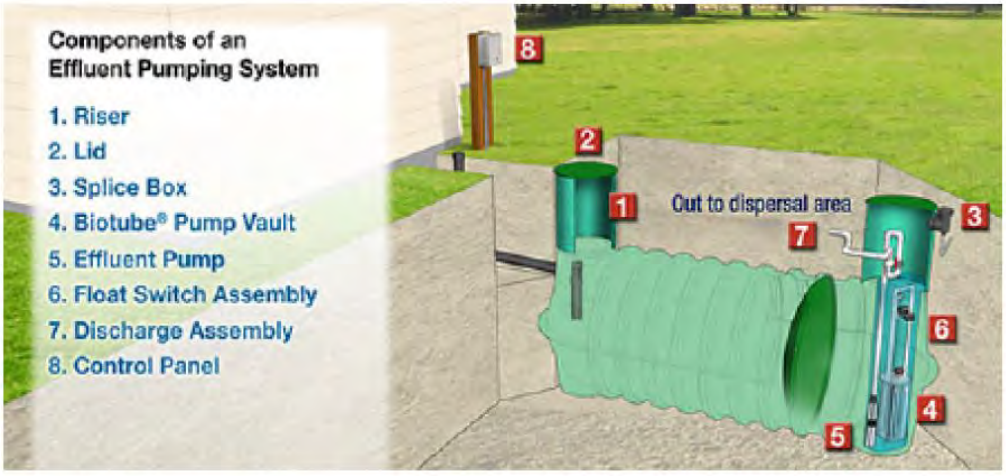
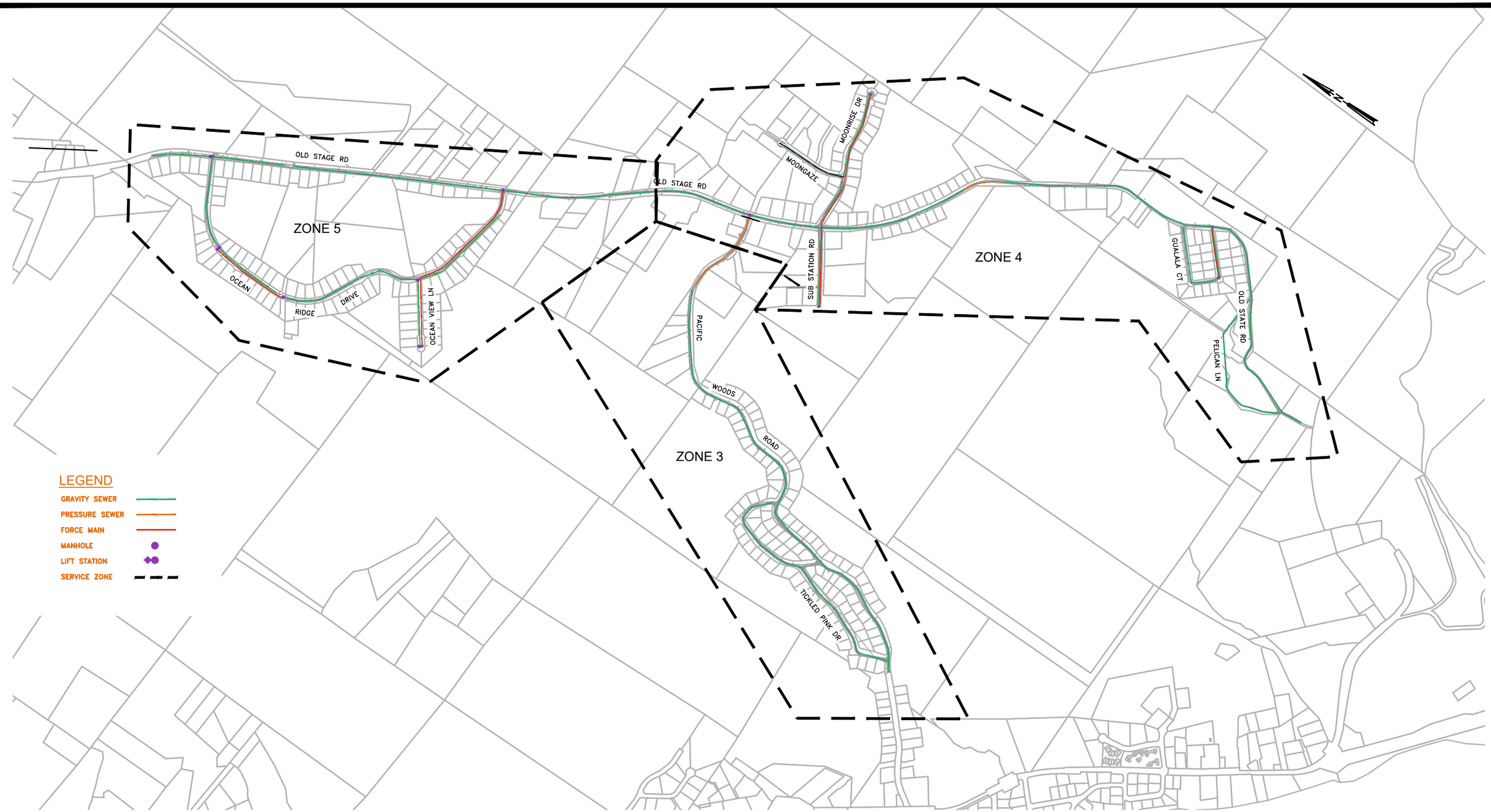


Figure 7.5.1-2 Components of an Effluent Pumping System (OnSite Systems Incorporated)
Source: *OSI Systems Design - STEP Systems for Effluent Collection (osieagle.ca)*



OVERALL GCSD SERVICE EXPANSION PLAN

SCALE: 1" = 1,000'

FIGURE 7.5.1-1
GCSD WASTEWATER STUDY

7.5.2 Lift Stations (Unsewered Areas)

To provide for the conveyance of raw sewage from various locations within each defined zone, multiple wastewater lift stations will need to be constructed. These lift stations, ranging in size from 3 HP to 10 HP, will serve various zones and require wet-wells, control panels, pumps, backup power, security, and electrical and controls (E/C) with SCADA. The proposed system requires that a total of five (5) lift stations be installed with no lift stations required in Zone 3, three in Zone 4, and two in Zone 5. The locations of the Lift Stations are as shown in **Figure 7.5.1-1**. Additional R/W or property acquisition may be required for certain lift stations.

7.5.3 Collection System (Unsewered Area)

The proposed collection system is comprised of sewer mains ranging from 4-inches to 6-inches in diameter. Other sewer mains will include manholes, blow-offs, cleanouts, and other appurtenances. These mains will be located along roadway shoulders where possible and in some cases require construction within the paved roadway alignment. Below is a breakdown of the footages and size of the new required sewer collection mains:

Zone 3: - 7,467 LF of gravity/force main pipelines (w/ manholes, cleanouts, air release valves (ARVs and appurtenances)

Zone 4: -18,037 LF of gravity/force main pipelines (w/ manholes, cleanouts, ARVs, and appurtenances)

Zone 5: -13,669 LF of gravity/force main pipelines (w/manholes, cleanouts, ARVs, and appurtenances)

Estimated opinions of costs associated with the installation of these new STEP/STEG systems are presented in **Table 7.5.3-1**.

Table 7.5.3-1 Collection System (Unsewered Area) Recommended Project- Engineer's Opinion of Probable Construction Costs

SOI Zone [1]	Total Cost
3	$2,181,737
4	$4,907,917
5	$3,820,149
Total[2 & 3]	**$10,909,803**

Note:

1. SOI is the Sphere of Influence Areas as approved by LAFCO

2. Sub-Total Cost include proposed construction costs for Gravity Mainline, Pressure Mainline, Clean-Outs, ARV's, Lift Stations, Paving, Control Panels, and Retro Interceptor Tanks

3. The total cost for the (N) 330 STP Systems does not include a GCSD WTP component connection fee as required by ordinance

7.6 PRESENT WORTH/USEFUL LIFE WITH PROJECTED LABOR COST

Appendix I contains a comprehensive analysis of a Present Worth (Useful Life) evaluation of each proposed capital improvement project and accompanying components.

The useful life for each new project component has been evaluated using various reference manuals and documents from sources such as the American Water Works Association (AWWA) and Water Environment Federation (WEF). Salvage value was not included in this evaluation. The recommended life expectancy of each component and a common interest rate of 2% /yr. was applied. The required annual O&M cost included labor with some minor repairs. Electrical and chemical costs were not included. Significant assistance and input were provided by the operations staff of the GCSD.

7.7 PRELIMINARY PROJECT SCHEDULE

A preliminary project schedule is presented in **Table 7.7-1**. The schedule is subject to timely approval of the project report and environmental by the state and is contingent upon receipt of grant funding.

Table 7.7-1 Preliminary Project Schedule

Task	Completion Date
Complete Facilities Plan/Environmental	10/15/2021
Submit Design Construction Application to SWRCB/USDA	10/15/2021
Design Contract Approved	11/15/2021
Approval of Waste Discharge Permit	12/15/2021
Grant Agreement w/SWRCB and Letter of Conditions (USDA) Approved	2/5/2021
218 Rate Hearing	concurrent with grant agreement
Project Report and Environmental Confirmation	1/17/2022
10 Design (P&S)	5/30/2022
Plan and Specification (100%)	1/30/2023
Final Budget Approval Package Submittal	2/15/2023
Bid Project	4/30/2023
Start Construction	7/15/2023
1913/15 Assessment District	11/15/2021 - 4/15/2021
Construction Completed, Final Inspection and Certification	12/15/2024
Project Completion Report	1/30/2025

SECTION 8- FINANCING, RATE STUDY, AND BUDGET IMPACTS ANALYSIS

8.1 INTRODUCTION

This section of the report includes a comprehensive evaluation of capital improvement costs and required financing of the proposed improvements, as recommended within Section 7. Also included are recommendations for both short and long-term strategies for future GCSD budgeting and rate setting/adjustments.

An abbreviated (draft) "Asset Management Plan" is presented as a guide for future GCSD capital replacement budgeting, as further described in Section 9. Significant input from the GCSD staff was provided and additional follow-up discussions, meetings, and decisions will be necessary to formalize both short and long-term financing and rate setting/adjustments based on the recommendations herein.

All projects and costs developed within this report were influenced by the following factors (among others): water quality/health and safety needs, time constraints, new permit requirements, rate stabilization and financing, employee safety, wildfire suppression, and future asset replacement preparedness.

8.2 CAPITAL IMPROVEMENT FINANCING ALTERNATIVES

This section provides for various funding and financing options for the recommended cost-effective projects, as described within Section 7. Due to funding limitations and required public acceptability, a two (2) phased approach is recommended for the projects identified within this report.

Phase One Project – Upgrades and modifications to existing treatment, reclamation, collection system, and STEP system projects.

Phase Two Project – Additional upgrades and modifications to existing treatment, reclamation, collection system, and STEP system projects along with providing new STEP/STEGs, gravity sewers, force-mains, and pump stations to serve unsewered areas (SOI Zones 3, 4, and 5)

Funding and financing options were prepared for both the Phase One and Phase Two projects to assist the District in the ultimate decision-making process. There are four funding options which take into consideration various project scenarios, as discussed further in this section of the report.

Based on our preliminary analysis, MC Engineering does not recommend moving ahead with design and construction of the Phase Two Project in the immediate future. It is recommended that further study and analysis be conducted, and additional funding be considered. Additional information should be acquired which includes further investigations and considerations given to existing septic system failure rates, potential water quality issues, and public acceptability. A second and less important consideration includes an additional revenue stream through added service charges by increasing the overall user system rate base. However, these new user fee revenues may be off-set by the required O&M needed to maintain the new STEP systems, which includes periodic pumping and maintenance of tanks and pumps, along with short and long-term replacement of individual pumps and interceptor tanks. The effects of grease accumulation from

commercial users could be problematic and an updated grease trap enforcement program is recommended, as discussed in Section 9. An overall summary table of all proposed costs, local share, and debt service, is presented in Section 8.2.5.

The conclusions and recommendations below will be based on the overall wastewater system needs and priorities, including both emergency (immediate), short and long-term benefits. Costs are evaluated with an emphasis placed on "affordability" and "cost-effectiveness" for all potentially new and existing GCSD customers. Factors influencing the ability to fund projects include:

- Ability of the customers to provide the required debt service for the new project(s)
- Availability and amount of grant funds
- Availability and amount of loan funding
- Interest rate and terms of future loans
- Impacts of required rate increase to meet current operational need(s)
- Other factors that may include environmental impacts, time constraints, public-acceptability, and concurrent approvals of regulatory agencies

Several system improvement and funding strategies were analyzed to develop a recommended cost-effective approach for the short and long-term funding and financing of the new and upgraded facilities, including:

- **FUNDING/FINANCING OPTION 1 (Phase One Project) - (Recommended)** This option includes repairing and replacing existing WWTP/Reclamation mechanical equipment along with process upgrades, repairs, and needed structures, potable water supplies at the WWTP, upgrades to the existing lift stations and STEP system interceptor tanks. Improvement costs for repairs to the WWTP access road are included along with the costs for improving equipment and vehicle access for maintaining and repairing cross-country influent sewers. No expansion of the service area (unsewered areas- SOI Zones 3, 4 and 5), is included under this option. A detailed list with cost estimates of related projects is included in Section 7.

- **FUNDING/FINANCING OPTION 2 (Phase Two Project) -** This option includes all improvements in Funding Option 1, as well as expansion and addition of new sewers into SOI Zones 3, 4, and 5. This option may be considered as a viable and cost-effective project in the future and is dependent on hearings and public participation, including additional field investigations with considerations given to existing septic system failure rates and potential water quality issues. It is recommended that Option 2 be deferred due to a lack of available funding. If deemed viable in the future additional sampling and data collection should be included during the next phase (Phase 2). It would also require 1913/15 Act Assessment District or equivalent method of financing to separately levy assessments on the new unsewered customers/lots.

- **FUNDING/FINANCING OPTION 3 (Phase Two Project) -** This option includes all of the improvements found in Funding Option 1, along with the addition of sewerage and expanding collection system(s) into SOI Zone 3, only. This option may be considered as a viable and cost-effective project and is dependent on further hearings and public participation, including additional field investigations with considerations given to existing septic system failure rates, and potential water quality issues. This proposed project may

also require 1913/15 Act Assessment District or equivalent method of financing to separately levy assessments on the new unsewered customers/lots.

- **FUNDING/FINANCING OPTION 4 (Phase Two Project) -** This option includes all improvements in Funding Option 1, as well as expansion of new sewers into SOI Zones 3 and 4, only. This Option may be considered as a viable and cost-effective project and is dependent on further hearings and public participation, including additional field investigations with considerations given to existing septic system failure rates, and potential water quality issues. This proposed project would also require 1913/15 Act Assessment District or equivalent method of financing to separately levy assessments on the new unsewered customers/lots.

The above options included various funding strategies including utilization and application of available grant and loan funds from the SWRCB Clean Water State Revolving Fund (CWSRF) and USDA Rural Development (USDA RD) programs. CWSRF grant funding availability is dependent upon the median household income (MHI) in GCSD's service area and wastewater rates/fees/assessments.

Currently, the SWRCB CWSRF program provides grant funding of up to 100% for small and disadvantaged communities (under 20,000 population) with low to very low median household incomes (MHI) in comparison to the state MHI. The state MHI is calculated using the American Community Survey (ACS) and is updated annually in April. The funding thresholds for projects funded in April 2021 to March 2022 as provided by the SWRCB are as noted below:

- State MHI = $75,235
- Disadvantaged Community (DAC) = $60,188 (80% of the statewide MHI)
- Severely Disadvantaged Community (SDAC) = $45,141 (60% of the statewide MHI)

DACs with wastewater rates/fees/assessments of at least 1.5% of the community MHI qualify for a 75% grant/25% loan, with a maximum grant amount of $6 million for WWTP/collection system projects, and $10 million for septic to sewer projects.

SDACs qualify for a 100% grant, with a maximum grant amount of $6 million for WWTP/collection system projects and $10 million for septic to sewer projects. The maximum grant amounts include planning and construction costs. These grant funding limits include planning costs.

The SWRCB has determined GCSD's MHI is $52,664 and is classified as a DAC. The determination was completed using 2015-2019 ACS data. The classification and grant eligibility amounts will be based on the community's MHI and Intended Use Plan at the time GCSD has a complete construction application and the SWRCB has completed a credit review.

The above options included various funding strategies including utilization and application of available grant and loan funds from the SWRCB SRF (State Revolving Fund) and USDA Rural Development (Federal) programs. The SWRCB SRF grant funding availability is dependent upon the median household income (MHI) in the town of Gualala along combined with new annual assessments and existing user fees.

Currently, the SWRCB CWSRF program provides grant funding of up to 100% for small and disadvantaged communities (under 20,000 population) with low to very low median household incomes (MHI) in comparison to the state MHI. The state MHI is calculated using the American

Community Survey (ACS). The current funding thresholds as provided by the SWRCB are as noted below:

- State Median Household Income (MHI) = $75,235
- Disadvantage Community (DAC) = $60,188 or less
- Severe Disadvantage Community (SDAC) = $45,141
- Other criteria include:
  - ✓ If wastewater rates are 1.5% more/year than community MHI = 75% grant
  - ✓ If the community has an MHI less than 60% of the State MHI = 100% grant

Note: At the time of this report completion, it is not yet determined as to what the most current (2021) state-wide MHI is and what updates to local community threshold amount(s) are proposed.

The maximum amount of the SWRCB Grant (DAC/SDAC) is $ 6.0 million for new and existing WWTP and collection system improvement projects. For unsewered areas the maximum grant amount is $ 12.0 million. These grant funding limits include planning costs and currently the GCSD has an approved $484,000 planning grant, thus leaving approximately $11.5 million for those funding/improvement options (Options 2, 3, and 4), with approximately $ 5.5 million available to be applied to Option 1.

The USDA Rural Development Program may provide matching funds to any remaining project cost not eligible for grants under the SWRCB SRF program(s). The USDA may also provide up to 30% grant funding of the matching required local share if the GCSD service area qualifies as low income under Federal guidelines.

At this point in time (August 2021), it has not been confirmed, by the SWRCB, as to whether-or-not the GCSD meets specific grant funding eligibility requirements, for either 75% or 100% grant funding, based on the community MHI. MC Engineering has analyzed the Funding Options 1, 2, 3, and 4, which includes various projects, grant and loan funding amounts, debt service and repayment plan/strategies, number of customers (customer base), long term capital replacement strategies, and cost sharing participation from Sonoma County CSA 6.

For Options 2, 3, and 4 it is important to note the number of customers (single family equivalent dwelling units) to be applied to the debt service varies depending on which projects are chosen. It is also assumed that the Sonoma County CSA 6 will participate in all recommended and required improvement project costs specifically associated with the WWTP and the reclamation facilities.

8.2.1 OPTION 1 FUNDING STRATEGY (EXISTING WWTP, COLLECTION SYSTEM, LIFT STATIONS PROJECTS)

Option 1 projects are recommended and are required to prevent water quality and health and safety violations along with meeting existing and proposed waste discharge requirements while being sensitive to the customer's ability to finance the local share of the proposed capital costs as shown in **Table 8.2.1-1** which includes 36.5% in soft costs.

Table 8.2.1-1 Opinion 1 of Cost Summary

(E) WWTRF	$ 4,941,286
(E) Collection System Pump Station Upgrades	$ 1,294,095
(E) STEP System Rehabilitation	$ 1,048,078
Total Project Cost	**$ 7,283,459**

A summary of cost-effective projects, with emphasis placed on immediate action through modifications and upgrades to existing WWTP and Collection System Facilities (Option 1), is presented in **Appendix K**. This summary includes all costs to date, including the current planning grant amount of $485,000 (approx. $500,000), which reduces the available grant funding that can be applied to the design and construction costs.

The various funding approaches considered a 100% SWRCB CWSRF grant along with an alternative that is based on a 75% SWRCB CWSRF grant and a matching grant and/or loan funding from the USDA Rural Development. The USDA current loan interest rate is 2.0 % with a 40-year repayment plan. USDA may provide up to 30% in additional grant funding.

It is important to note the number of customers (single family equivalent dwelling units) to be applied to the debt service varies depending on which projects are chosen. It is also assumed that the Sonoma County CSA 6 will participate in only those improvements associated with the WWTP and not the existing GCSD collection system (STEPs and Pump Stations) .

The preliminary debt service for Option 1 includes a 75% SWRCB grant and an accompanying USDA grant (30%) and loan. The monthly fee may range from $5/month to $7/month per EDU/SFE connection for GCSD with an equivalent monthly fee of $3/month to $5/month for CSA 6. CSA 6. The monthly fee may vary based on their rate structure. Refer to Table 8.2.6-3. The monthly fee ranges are based on multiple factors relating to funding sources and therefore are an engineer's opinion for the purposes of this report.

8.2.2 OPTION 2 FUNDING STRATEGY (INCLUDES ALL OF OPTION 1 AND UNSEWERED ZONES 3, 4, AND 5)

The Option 2 projects depicted in **Table 8.2.2-1** are a combination of existing facility improvements and costs required to meet existing and proposed waste discharge requirements and to prevent water quality and health and safety violations, along with providing sewers to the unsewered areas SOI Zones 3, 4, and 5, which are encountering some septic system failures. **Table 8.2.2-1** includes 36.5% in soft costs.

Table 8.2.2-1 Option 2 Cost Summary

(E) WWTRF	$ 4,941,286
(E) Collection System Pump Station Upgrades	$ 1,294,095
(E) STEP System Rehabilitation	$ 1,048,078
(N) STEP Systems w/ Collection System **(Zones 3, 4, & 5)**	$ 14,983,353
Total Project Cost	**$ 22,266,812**

A summary of cost-effective projects, with emphasis placed on immediate action through modifications and upgrades to existing WWTP and collection system facilities (Option 1) and providing new public sewers to the unsewered areas SOI Zones 3, 4, and 5, is presented in **Appendix K**. This summary includes all costs to date, including the current planning grant amount of $485,000 (approx. $500,000), which reduces the available grant funding that can be applied to the design and construction costs.

The various funding approaches are based first on a 100% SWRCB CWSRF grant and an alternative based on a 75% SWRCB Clean Water State Revolving Fund (CWSRF) grant with a matching grant

and/or loan funding from the USDA Rural Development. The USDA current loan interest rate is 2.0 % with a 40-year repayment plan. USDA may provide up to 30% in grant funding.

Zone 5 has not been annexed into the GCSD service area. Annexation would require a sphere of influence (SOI) modification and LAFCO approval. The most recent GCSD SOI approved by LAFCO was prepared in 2015, and only included Zones 3 and 4. It would take considerable time to annex Zone 5 into the SOI.

The preliminary debt service (excluding added monthly user fees) for Option 2, includes a 75% SWRCB grant and a USDA grant (30%) and loan. The monthly fee ranged from $3/month to $5/month per EDU/SFE connection for GCSD with an equivalent monthly fee of $2/month to $4/month for CSA 6. The CSA 6 monthly fee may vary based on their rate structure. This option also includes the addition to sewer Zones 3, 4, and 5. It is assumed that the unsewered area's debt service will possibly be collected through a combination of monthly rates and an assessment district (1913/15 Act). A special assessment may range from $200 to $300 per year per EDU. Refer to **Table 8.2.6-3**. The monthly fee ranges are based on multiple factors related to funding sources and therefore are an engineer's opinion only for the purpose of this report.

8.2.3 OPTION 3 FUNDING STRATEGY (INCLUDES ALL OF OPTION 1 AND UNSEWERED ZONE 3)

The Option 3 Projects depicted in **Table 8.2.3-1** are a combination of those existing facility improvement required to meet existing and proposed waste discharge requirements and prevent water quality and health and safety violations (Option 3) along with providing sewers to the unsewered area SOI Zones 3, which is encountering some septic system failures. **Table 8.2.3-1** includes 36.5% in soft costs.

Table 8.2.3-1 Option 3 Cost Summary

(E) WWTRF	$ 4,941,286
(E) Collection System Pump Station Upgrades	$ 1,294,095
(E) STEP System Rehabilitation	$ 1,048,078
(N) STEP Systems w/ Collection System **(Zone 3 Only)**	$ 2,982,834
Total Project Cost	**$ 10,266,293**

A summary of cost-effective projects, with an emphasis placed on immediate action through modifications and upgrades to existing WWTP and collection system facilities (Option 3) and the provision of new public sewers to the unsewered area SOI Zone 3, is presented in **Appendix K**. This summary includes all costs to date, including the current planning grant amount of $485,000 (approx. $500,000), which reduces the available grant funding that can be applied to the design and construction costs.

Option 3 remains a viable opion but it will require the acquisition of additional field and sampling data, along with a significant amount of public participation and ultimately the support of those participating customers for the unsewered area (SOI Zone 3). This additional field data and public participation could significantly delay the design and construction of the immediate Phase 1 Project (Option 1), which includes funding existing system-wide improvements as described within Section 7 of this report. Secondly, this proposed project may have minimal impacts on the existing GCSD rate system, including minimal impacts on the existing customers while providing the best overall near-term outcome.

The preliminary debt service for Option 3, includes a 75% SWRCB grant along with a USDA grant (30%) and loan. The monthly fee ranged from $ 4/month to $ 6/month per EDU/SFE connection for GCSD with an equivalent monthly fee of $2/month to $5/month for CSA 6. The CSA 6 monthly fee may vary based on their rate structure. This option also includes the sewering of Zone 3. It is assumed that the unsewered area's debt service will possibly be collected through a combination of monthly rates and assessment district (1913/15 Act). A special assessment for debt service repayment may range from $200 to $300 per year per EDU. Refer to **Table 8.2.6-3**. The monthly fee ranges are based on multiple factors relating to funding sources and therefore are an engineer's opinion for the purpose of this report.

8.2.4 OPTION 4 FUNDING STRATEGY (INCLUDES ALL OF OPTION 1 AND UNSEWERED ZONE 3 AND 4)

The Option 4 projects **(Table 8.2.4-1)** include all those in Option 1 along with providing sewers to the unsewered areas SOI Zones 3 and 4 (excluding Zone 5), which are encountering some septic system failures. More detail is presented in **Appendix K**. **Table 8.2.4-1** provides a summary which includes 36.5% in soft costs.

Table 8.2.4-1 Option 4 Cost Summary

(E) WWTRF	$ 4,941,286
(E) Collection System Pump Station Upgrades	$ 1,294,095
(E) STEP System Rehabilitation	$ 1,048,078
(N) STEP Systems w/ Collection System **(Zones 3 & 4)**	$ 9,735,244
Total Project Cost	**$ 17,018,703**

The preliminary debt service for Option 4 includes a 75% SWRCB grant along with a USDA grant (30%) and loan. The estimated monthly fee ranged from $6/month to $8/month per EDU/SFE connection for GCSD with an equivalent monthly fee of $3/month to $5/month for CSA 6. The CSA 6 monthly fee may vary based on their rate structure. This option also includes the sewering of Zone 3 and 4. It is assumed that the unsewered area's debt service will possibly be collected through a combination of monthly rates and assessment district (1913/15 Act). A special assessment may range from $600 to $700 per year per EDU. Refer to **Table 8.2.6-3**. The monthly fee ranges are based on multiple factors relating to funding sources and therefore are an engineer's estimate for this report.

8.2.5 OPTION 5 FUNDING STRATEGY (NO SWRCB GRANT ASSISTANCE)

A final option (Option 5) examined the ability of the GCSD to fund the project without SWRCB grant assistance. Financing and debt services assumes only a USDA 30% grant and loan. It also includes the participation of the CSA 6 service area. It does not include the unsewered areas in Zones 3, 4, and 5. The proposed debt service without the SWRCB grant would place a significant burden on the District's customers, since they are also considered a disadvantaged community under State guidelines. **Table 8.2.6-3** illustrates that the potential debt service to fund the Option 1 projects without SWRCB grant(s) would be a minimum of $25/month/EDU which is a minimum 30% rate increase. The monthly fee ranges are based on multiple factors relating to funding sources and therefore are an engineer's opinion for the purpose of this report.

8.2.6 Summary and Proposed Revenue Program and Debt Repayment Plans to Fund Various Scenarios

The various funding approaches are based first on GCSD acquiring a 100% SWRCB CWSRF Grant and an alternative based on acquiring a 75% SWRCB Clean Water State Revolving Fund (CWSRF) grant and a matching grant and/or loan funding from the USDA Rural Development. The USDA current loan interest rate is 2.0 % with a 40-year repayment plan. USDA may provide up to 30% in grant funding.

The funding strategies for Options 1-4 will require the use of both SWRCB SRF and USDA grant and loan funding, with significant emphasis being placed on cost-effectiveness and the ability for debt repayment by both new and existing customers. **Table 8.2.6-1** includes the calculated EDUs for both the GCSD customers along with future proposed EDUs/customers for Zones 3,4, and 5. **Table 8.2.6-2** includes the calculated EDU-Dwelling Units for both GCSD and CSA 6 service areas. The method to calculate the EDUs was based on the recorded yearly wastewater flows for FY 2018/19 by first determining the gpd/EDU for the existing GCSD 415 EDUs and then pro-rating based on flows to determine the estimated 494 CSA 6 EDUs. The approximate total number of EDUs for both GCSD and CSA 6 is 909. **Table 8.2.6-3** is a summary table that provides monthly costs per EDU-Dwelling Units for currently billed customers and provides for various levels of loan and grant funding.

Table 8.2.6-1 GCSD EDU-Dwelling Units (for Table 8.2.6-3)

No. of EDU's Per Zone	
Zone 1 & 2	415
Zone 3	91
Zone 4	132
Zone 5	116

Table 8.2.6-2 Calculating GCSD and Sea Ranch North EDU-Dwelling Units (for Table 8.2.6-3)

Agency	Years of Flow Record	Combined Average Flow (gpd)	Total Combined	% Participation	Total Calculated EDUs/ Agency (1) (2)	Total Combined EDUs
GCSD	2015-2020	31,600	73,770	0.43	415	909
SRN	2015-2020	42,170		0.57	494	

Note: **(1)** GCSD EDUs are based on actual billing units and calculation
(2) SRN EDUs calculated using Equivalent EDU ratio

Both Options 3 and 4, include a funding plan that provides for different funding debt repayment plans. The most fair and equitable method for funding the projects is to separate the existing system replacement and improvement projects in Option 1 from the Zone 3 and 4 expansion related costs. Financing for the existing customers for their share of costs associated with the recommended system improvements will be based on a user fee (flat rate) increase, whereby the proposed unsewered parcels and potentially new customers will have a user fee equal to the existing customer/rate payer rates and be given the opportunity to pay for the costs of the new sewer collection system and STEP system(s) through the formation of an assessment district (1913/15 Act). It is not recommended that the existing customers use the assessment district method for financing

the new improvements, since they currently were previously assessed under a 1913/15 Act Assessment District, in 1991.

Table 8.2.6-3 includes a specific funding strategy based on both a 75% SWRCB SRF grant in combination with a USDA 30% grant and low interest loan (2-4% with a 40-repayment term) These tables include the proposed monthly debt as well as a calculated debt repayment for the *unsewered* areas, based on a yearly tax assessment. The recommended alternative/option is Option 1, which does not include providing sewers to the unsewered areas.

A summary of cost-effective projects, with emphasis placed on immediate action through modifications and upgrades to existing WWTP and Collection System Facilities (Option 1), and providing new public sewers to the unsewered areas SOI Zones 3, 4, and 5, (Option 4) is presented in **Table 8.2.5-3**. This summary includes all costs to date, including the current planning grant amount of $485,000 (approx. $500,000), which reduces the available grant funding that can be applied to the design and construction costs.

Table 8.2.5-3 Specific Funding Strategy Options

OPTION 1 - Funding and Cost Sharing
SWRCB 75% Grant w/ USDA Grant and Loan Match

Approximate Monthly PRO - RATA Cost Share for GCSD and CSA 6 Facilities Improvements

Project Element/Components	Cost Element (Component Cost)	Eligible EDUs to Apply [1]	Available Grant Amount (Less $500,000)	**Local Share** Assumes 75% Grant Applied to $7,283,459 = $5,462,594	Available Grant Amount Less > $500,000 ($6 Mil Eligible Grant)	Local Share	Remaining Local Share w/ USDA Grant (30%)	Amount of Debt Financing Per Year (USDA Loan)	Cost/EDU/YR Component (GCSD and CSA 6)	**GCSD Proposed Monthly Cost (Equivalent)** EDUs	Cost Share Per EDU/Year	Yearly Debt Service	GCSD Cost/Monthly/ EDU	**SRN Proposed Monthly Cost (Equivalent)** EDUs	Cost Share Per EDU/Year	Yearly Debt Service	SRN Cost/Monthly/ EDU	Monthly GCSD w/ SRN
(E) WWTP Components (68.2545%)	$4,971,286	909	$5,500,000	$1,820,865	$3,753,997	$1,242,822	$869,976	$31,841	$35	415	$35	$14,537		494	$35	$17,304		909 EDUs
(E) STEPS/Collection/LS (31.7455%)	$2,312,173	415			$1,746,005	$578,043	$404,630	$14,809	$36		$36	$14,809		NA	NA	NA		
Totals	$7,283,459		$5,500,000	$1,820,865		$1,820,865	$1,274,606	$46,651				$29,346	**$5.89**			$17,304	**$2.92**	**$4.28**

Notes: **(1)** EDUs calculated - Refer to Tables 8.2.6-1 and Table 8.2.6-2

OPTION 2 - Funding and Cost Sharing (Zones 3, 4, & 5)
SWRCB 75% Grant w/ USDA Grant and Loan Match

Approximate Monthly PRO - RATA Cost Share for GCSD, Zones 3, 4, & 5 and CSA 6 Facilities Improvements

Project Element/Components	Cost Element	Eligible EDUs to Apply [1]	Available Grant Amount (Less $500,000)	**Local Share** (Assumes 75% Grant Applied to $$22,266,812 or $11,500,000 (whichever is Less)	Percentage of Construction Cost	Local Share Less > $ 500,000 ($12 Mil Eligible Grant)	Remaining Local Share w/ USDA Grant (30%)	Amount of Debt Financing Per Year (USDA Loan)	GCSD, Zones 3, 4, & 5 and CSA 6 Cost/EDU/YR/ Component	**Existing GCSD Monthly Cost (Equivalent)** EDUs	Cost Share Per EDU/Year	Yearly Debt Service	GCSD Cost/Monthly/ EDU	**SRN Monthly Cost (Equivalent)** EDUs	Cost Share Per EDU/Year	Yearly Debt Service	SRN Cost/Monthly/ EDU	**GCSD Zone 3, 4, & 5 Cost/Month (Equivalent)** EDUs	Cost Share Per EDU/Year	Yearly Debt Service	Zone 3,4,5 Cost/Monthly/ EDU	Yearly Assessment/EDU	Monthly GCSD w/ SRN and Zones 3, 4, & 5
(E) WWTP Components (%)	$4,971,286	1,248			0.22326	$1,160,976	$812,683	$29,744	$24	415	$24	$9,891		494	$24	$11,774			$24	$8,080			
(E) STEPS/Collection/LS (31.7455%)	$2,312,173	754	$11,500,000	$5,200,109	0.10384	$539,976	$377,983	$13,834	$18		$18	$7,614		NA	NA	NA		339	$18	$6,220			1,248 EDUs
(N) SOI Zones 3, 4, & 5	$14,983,353	339			0.67290	$3,499,157	$2,449,410	$89,648	$264	NA	NA	NA		NA	NA	NA			$264	$89,648		$264	
Totals	$22,266,812		$11,500,000	$5,200,109				$133,227				$17,505	**$3.52**			$11,774	**$1.99**			$103,948	**$25.55**		**$8.90**

Notes: (1) EDUs calculated - Refer to Tables 8.2.6-1 and Table 8.2.6-2

OPTION 3 - Funding and Cost Sharing (Zone 3)
SWRCB 75% Grant w/ USDA Grant and Loan Match

Approximate Monthly PRO - RATA Cost Share for GCSD, Zone 3, and CSA 6 Facilities Improvements

Project Element/Components	Cost Element	Eligible EDUs to Apply (1)	Available Grant Amount (Less $500,000)	**Local Share** Assumes 75% Grant Applied to $10,266,293	Percentage of Construction Cost	Local Share per Component Less > $ 500,000 ($12 Mil Eligible Grant)	Remaining Local Share w/ USDA Grant (30%)	Amount of Debt Financing Per Year (USDA Loan)	GCSD, Zones 3, and CSA 6 Cost/EDU/YR/ Component	**Existing GCSD Monthly Cost (Equivalent)** EDUs	Cost Share Per EDU/Year	Yearly Debt Service	GCSD w/ Zone 3 Cost/Monthly/ EDU	**SRN Monthly Cost (Equivalent)** EDUs	Cost Share Per EDU/Year	Yearly Debt Service	SRN Cost/Monthly/ EDU	**GCSD Zone 3** EDUs	Cost Share Per EDU/Year	Yearly Debt Service	Zone 3, Cost/Monthly/ EDU	Yearly Assessment/EDU	GCSD w/ SRN (Monthly)
(E) WWTP Components	$4,971,286	1,000			0.48423	$1,242,822	$869,975	$31,841	$32	415	$32	$13,214		494	$32	$15,729			$32	$2,898			
(E) STEPS/Collection/LS	$2,312,173	506	$11,500,000	$2,566,573	0.22522	$578,043	$404,630	$14,809	$29		$29	$12,146		NA	NA	NA		91	$29	$2,663			1,000 EDUs
(N) SOI Zone 3	$2,982,834	91			0.29055	$745,709	$521,996	$19,105	$210	NA	NA	NA		NA	NA	NA			$210	$19,105		$210	
Totals	$10,266,293			$2,566,573		$2,566,573	$1,796,601	$65,756				$25,360	**$5.09**			$15,729	**$2.65**			$24,666	**$22.59**		**$5.48**

Notes: (1) EDUs calculated - Refer to Tables 8.2.6-1 and Table 8.2.6-2

OPTION 4 - Funding and Cost Sharing (Zone 3 & 4)
SWRCB 75% Grant w/ USDA Grant and Loan Match

Approximate Monthly PRO - RATA Cost Share for GCSD, Zone 3,4 and CSA 6 Facilities Improvements

Project Element/Components	Cost Element	Eligible EDUs to Apply (1)	Available Grant Amount (Less $500,000)	**Local Share** Assumes 75% Grant Applied to $$19,283,979 Less $11.5 Mil	Percentage of Construction Cost	**Local Share** per Component Less > $ 500,000 ($12 Mil Eligible Grant)	Remaining Local Share w/ USDA Grant (30%)	Amount of Debt Financing Per Year (USDA Loan)	GCSD, Zones 3,4,and CSA 6 Cost/EDU/YR/ Component	**Existing GCSD Monthly Cost (Equivalent)** EDUs	Cost Share Per EDU/Year	Yearly Debt Service	GCSD Cost/Monthly/ EDU	**SRN Monthly Cost (Equivalent)** EDUs	Cost Share Per EDU/Year	Yearly Debt Service	SRN Cost/Monthly/ EDU	**GCSD N Zone 3 & 4 Proposed Monthly Cost (Equivalent)** EDUs	Cost Share Per EDU/Year	Yearly Debt Service	Zone 3,4 Cost/Monthly/ EDU	Yearly Assessment/EDU	GCSD w/ SRN (Monthly)
(E) WWTP Components	$4,971,286	1,132			0.25779	$2,006,660	$1,404,662	$51,411	$45	415	$45	$18,848		494	$45	$22,435			$45	$10,128			
(E) STEPS/Collection/LS	$2,312,173	638	$11,500,000	$7,783,979	0.11990	$933,309	$653,316	$23,911	$37		$37	$15,554		NA	NA	NA		223	$37	$8,358			1,132 EDUs
(N) Zones 3 and 4	$12,000,520	223			0.62231	$4,844,010	$3,390,807	$124,104	$557	NA	NA	NA		NA	NA	NA			$557	$124,104		$557	
Totals	$19,283,979			$7,783,979		$7,783,979	$5,448,785	$199,426				$34,401	**$6.91**			$22,435	**$3.78**			$142,589	**$53.28**		**$14.68**

Notes: (1) EDUs calculated - Refer to Tables 8.2.6-1 and Table 8.2.6-2

OPTION 5 - Funding and Cost Sharing
Grant and Loan Match

Project Element/Components	Cost Element (Component Cost)	Eligible EDUs to Apply [1]	**Local Share** Assumes No SWRCB Grant Funding	Remaining Local Share w/ USDA Grant (30%)	Amount of Debt Financing Per Year (USDA Loan)	Cost/EDU/YR Component (GCSD and CSA 6)	**GCSD Proposed Monthly Cost (Equivalent)** EDUs	Cost Share Per EDU/Year	Yearly Debt Service	GCSD Cost/Monthly/ EDU	**SRN Proposed Monthly Cost (Equivalent)** EDUs	Cost Share Per EDU/Year	Yearly Debt Service	SRN Cost/Monthly/ EDU
(E) WWTP Components (68.2545%)	$4,971,286	909	$7,283,459	$3,479,902	$127,364	$140	415	$140	$58,148		494	$140	$69,217	
(E) STEPS/Collection/LS (31.7455%)	$2,312,173	415			$59,238	$143		$143	$59,238		NA	NA	NA	
Totals	$7,283,459		$7,283,459	$3,479,902	$186,602				$117,385	**$23.57**			$69,217	**$11.68**

Notes: (1) EDUs calculated - Refer to Tables 8.2.6-1 and Table 8.2.6-2

Table 8.2.6-4 Approved FY 2020/21 Budget

Tentative/Proposed Rate Increase for GCSD Customers (Options 1, 2, 3, 4, and 5)				
Funding Options	**Loan Amount (Financing)**	**Monthly Equivalent Cost - Per EDU Customer**	**Existing Rate - Yearly Billed (Per EDU Customer)**	**Rate Increase w/Financing Options**
Option 1	$29,346	**$5.89**	94.75	**6%**
Option 2	$17,505	**$3.52**	94.75	**4%**
Option 3	$25,360	**$5.09**	94.75	**5%**
Option 4	$34,401	**$6.91**	94.75	**7%**
Option 5	$117,385	**$23.57**	94.75	**25%**

Table 8.2.6-4 above, is a cost comparison with added debt service (proposed approved projects) applied on a yearly basis per EDU customer type. These proposed increases are only preliminary estimates and will be based on various factors, including and not limited to; final approved loans and grant amount by the SWRCB and USDA, agreed to pro-rata share of costs from the SRN Area and future unsewered areas, and final approved design costs.

The ability of the GCSD customers to pay for the recommended projects plays an important role in the overall financing strategy. Other factors that were analyzed include the availability and amount of grant funding, which is primarily based upon the MHI data as agreed to by the SWRCB. Other funding agencies were evaluated for the ability to fund eligible projects. It was determined that the USDA Rural Development Program provided the best opportunity to match the SWRCB SRF funding program. The USDA funding could be used for the SWRCB non-eligible project fund match. The USDA can provide both grants and low interest loans with 40-year repayment terms and could fund up to 40% of the match with grant funding.

In conclusion, it is recommended that GCSD pursue funding Option 1 in the immediate future. The GCSD and MC Engineering staff should, upon completion of the environmental documents, pursue a design and construction grant application through the SWRCB SRF program. Simultaneously, the GCSD should be preparing a USDA Rural Development Infrastructure grant and loan application for funding the non-eligible SWRCB grant share. Funding Option 3 is also a possible choice, but due to the need to acquire additional field data, sampling results, along with septic system surveys, and acquiring public acceptability for the SOI Zone 3 unsewered areas, this Option 3 would require at least 6 months of time to complete, thus impacting the completion of those emergency and system wide as identified in Section 7 and found within Option 1, above.

8.3 OPERATIONS BUDGET

GCSD prepared its Fiscal Year (FY) 2021/2022 budget which was evaluated in order to assess revenues and rate impacts. As previously described, the GCSD not only operates a wastewater treatment and reclamation facility and a collection system with four (4) lift stations, but it also has the responsibility of maintaining over 238 STEP systems. This includes both an interceptor tank and a small pump for each individual service. The wastewater facilities are managed by a Grade 5

operator, who also serves as the General Manager. There is one additional full-time employee who is a Grade 2 operator and two Operators in Training (OITs) who assist in the day-to-day operations and maintenance of the system.

8.3.1 Current Expenditures

MC Engineering has reviewed the current operating budgets for the last two years with significant assistance form the GCSD staff. In summary, the revenue versus expenditures is at a critical point and needs to be analyzed further, after the selected project alternative and financing mechanism is established, with more consideration given to the following areas:

1. Employee costs
2. Materials and supply cost
3. Energy and chemical costs
4. Minor maintenance and replacement costs
5. Short-term modifications and/or replacements (facility improvements)
6. Long-term asset management and system-wide replacements
7. Current debt service and special assessments

Table 8.3.1-1 includes the GCSD's current annual operating budget. Also attached, in **Appendix L**, is the 2019/2020 Annual Audit prepared for the District by others. The current budget breaks the GCSD's income into various categories as shown.

Table 8.3.1-1 Approved FY 2020/21 Budget

Main Categories	Sub Categories	Current Budget	Main Categories	Sub Categories	Current Budget
		2020-2021			2020-2021
Ordinary Income/Expense			Total 5500 - Vehicle		**$9,500**
Income					
4000 · Sewer Fee Income			5701 · Utilities – Electric – LS#1		$700
4001 · Sewer Fees (Monthly Commercial)*		$189,936	5702 · Utilities – Electric – LS#2		$900
4004 · Sewer Fee Income From Tax Roll*		$339,274	5703 · Utilities – Electric – LS#3		$650
Total 4000 · Sewer Fee Income		**$529,210**	5704 · Utilities – Electric – LS#4		$7,500
			5706 · Utilities – Electric – T Plant		$40,000
4011 · Golf Course Water Sales		$58,544	5707 · Utilities – Office Propane Tank		$350
4019 · Water Processing CSA6 Treatment		$130,000	Total 5700 · Utilities – Electricity/Propane		**$50,100**
4020 · Leachate Income		$24,000			
4060 · Late/Rewards/Int/Adj Charges		$0	5900 · Major Equipment Replacement	Possible to add a new truck to replace GMC	$0
4069 · Services to other angencies (Pumping Services)		$6,000			
4151 · Grant Income	New Account for Grant	$100,000	Total 5000 · Plant & Operations		**$460,773**
4152 · Grant Expense	New Account for Grant	-$100,000			
Total Income		**$747,754**	6000 · Admin/Overhead Expenses		
			6210 · Audit		$10,000
Expense			6015 · Bank Fees/ Finance Charges		$175
5000 · Plant & Operations			6216 · Bookkeeping	CONTRACT JULY ONLY	$2,500
5100 · Collection System			6220 - Legal Fees		$25,000
5105 · Collection System – Materials (Comm & Res)		$7,500	6028 · Computer Repair & Supplies		$0
5110 · Collection System – R & M		$12,000	6032 · LAFCO Fees		$1,500
5115 · Lift Station R & M			6033 · County Tax Collection Fee		$9,000
	51151 - Lift Station #1	$500	6046 - Board of Directors Meeting Expense		$3,000
	51152 - Lift Station #2	$3,000	6064 · Dues and Subscriptions (Software)		$1,850
	51153 - Lift Station #3	$500	6069 - Phones		$3,200
	51154 - Lift Station #4	$7,500	6070 · Postage		$250
	51154.1 Lift Station #4 Generator	$500	6075 · Printing & Copying		$200
5120 · Vacuum Truck – Solids Removal		$15,000	6080 · Public Notices		$400
Total 5100 · Collection System		**$46,500**	6085 · Board of Director Training		
see #5365	5205 · Contract Services - Engineering	**$0**		60852 – Training	$500
	5210 · Contract Services - Pumping	**$0**		60854– Travel	$500
Carey..no longer using	5215 - Contract Services-Accounting	**$0**	Total 6000 · Admin/Overhead Expenses		**$58,075**
July 2020 only contract. /see acct #6216 under Admin below	5216 · Contract Services-Bookkeeper	**$0**			
Total 5200 · Contract Services		**$0**	6090 · Payroll Benefits		
			6092 · Yearly Drug Testing		$375
5300 · Treatment Plant			6093 · Benefits – Employee Retirement*		$23,000
5305 · Chemicals & Nutrients			6094 · Benefits – Employee Health Ins*		$62,534
	53052– Chlorine	$5,000	6095 · Workers Comp Insurance		$16,000
	53054– Coagulant	$7,000	6096 · AirMed (Reach)		$1,300
	53056– Nutrients (Sodium Bycarbonate)	$4,000	6097 · Employee Life Insurance		$850
Total 5305 · Chemicals & Nutrients		**$16,000**	Total 6090 · Payroll Benefits		**$104,059**
6028 · Computer Equip/Repairs/Supplies		$0	6100 · Payroll		
5308 · County Trash Fees		$500	6145 · Direct Deposit Charge		$150
5325 · Electrical Supplies		$1,500	6162 · Medicare Tax Expense		$4,240
5315 · Equipment Rental		$100	6163 · Social Security Tax Expense		$1,800
5317 · Freight & Shipping		$1,200	6164 · SUI Tax Expense		$900
5322 · Meter Calibration		$2,000	6165 · CA Training Tax Expense		$40
6068 · Office Supplies – Plant		$1,000	Total 6160 · Payroll Tax Expense		**$7,130**
5325 · Operating Supplies and Minor R&M		$3,000			
5326 · Uniform Service		$3,600	6191 · Payroll Adjustments Audit	This will be added with the audit	$0
Operations – Lab Testing			6192 · Other Audit Accruals	This will be added with the audit	$0
	5331– Lab Supplies	$5,000			
	5330– Outside Lab Testing	$10,000	Total 6100 · Payroll		**$403,790**
5340 · Plant R & M – Materials and Tools		$15,000			
5345 · Safety Equipment		$2,000	6300 · Wages and Salaries		
5352 · Training – Operations		$1,500	6301 · General Manager	Chris	$105,000
5353 · Dues/Subscriptions/Memberships		$4,560	6302 · Plant Operator MW Wages	No longer with GCSD	$0
5360 · Permits/Fees/Licenses/Prop Tax		$17,000	6303 · Plant Operator/ Lab Director MB Wages	Mike	$62,926
5365 · Engineering Fees		$5,000	6304 · Temp/ Maintenance		$0
5370 · Drinking Water		$500	6316 · Temp/ Maintenance/OIT (New Account)	Leo	$35,000
5375- Internet		$5,000	6306 - Administrative Time		$4,038
6069 · Phone/VOIP OOMA	CHANGED TO ACCT #6069 see below	$0	6315 · Administrative Assistant	Geraldine	$29,062
5416 · Depreciation & Amortization exp		$234,093	6320 - On Call Pay	365 x $45.	$16,425
5425 · Robinson Reef Antenna Reimburse		$120	6325 · Temp/ Maintenance/OIT RP Wages	Rigo	$35,000
5430 · Business Travel – Operations		$1,500	6330 - Overtime (total group)		$5,000
5435 · Liability Insurance		$23,000	Total 6300 · Wages and Salaries		**$292,451**
5440 - Plant Generator		$500			
Total 5000 · Treatment Plant		**$354,673**			
			Total Expense		**$922,638**
5500 · Vehicle			Net Ordinary Income		**-$174,884**
5505 · Fuel & Gas					
	55052-Gas	$3,500	Total 4101 · Interest Income Banks		$4,500
	55054 - Diesel	$2,000	Total Other Income		**$4,500**
5510 · Vehicle Expense & Repairs			Other Expense		
	5511 · Backhow Expense- New Account	$500	6035 · Interest – Loans		$22,000
	5512 - GMC	$500	6035 · Loan Principal		$64,595
	5514 - Toyota 2011	$500	6820 · NonCash Income for Depreciation		$234,093
	5516 - Toyota 2015	$500	Total Other Expense		**$86,595**
	5518 - Septic	$500			
5520 · Portable Generator Expense		$500			
5519 · Vehicle Quarterly Inspection		$1,000	Net Income		**-$22,886**

The existing budget revenue sources are classified within the following categories:

1. Sewer fee Income (monthly commercial and sewer fee income form tax rolls)
2. Golf Course Recycled Water Sales
3. Treatment Costs (reimbursement revenue from Sea Ranch)
4. Leachate Income
5. Pumping Services to Other Agencies
6. Applicable Grants

The proposed FY 2021/2022 Budget was approved in June 2021. It is highly recommended that the FY 2020/2021 Operating Budget be updated and revised to take into consideration the new projects as recommended in Section 7 of this report. This proposed revised budget and subsequent 218 rate hearings will include possible new debt service and some revisions to both revenues and O&M costs. It would also take into consideration grant and loan funds and method of repayment. Public participation will be required during the approval process for presenting the proposed projects and related implementation of debt service and rate adjustments. The public participation process is anticipated to begin in the Fall of 2021, once the SWRCB and the USDA approves the Project Report and Facilities Plan, and funding application, which would allow the GCSD to proceed with the design and construction of the recommended project improvements. Concurrently, the GCSD should be preparing applications for additional sources of funds, as recommended, through the USDA Rural Development Program.

It is also highly recommended that GCSD take a closer look at the current budget, including methods of generating revenues and simplifying the billing system. The implementation of the Capital Improvement Financing Plan, as presented in Section 8.2 of this report will be a significant asset to the GCSD and will provide an opportunity to "catch-up" in the repair and replacement of key system-wide facilities and components.

8.3.2 Current Revenue

MC Engineering, with significant assistance form the GCSD staff, has reviewed the current revenue and ordinances applicable to the rate structure which provides the necessary operating revenue. This section includes a discussion and recommendations in-regards-to the application of "special assessments" and monthly sewer service charges (fees) as currently instituted within the GCSD rate structure.

Independent of the current rate structure is the special assessment levied on customers within the existing GCSD service area. Assessments and liens were levied on benefitting properties (parcels) through the formation of a 1913/15 Act Assessment District, which was established in 1991. These original assessments provided the required revenues to pay-off bonds (debt service costs). The funded projects included the WWTP, collection system, pump stations, and the STEP systems. This current annual assessment, as collected by Mendocino County, is approximately $160/Yr./ parcel. It is assumed that that the bonds will be paid-off in 2031. This assessment (1913/15 Act Assessment District) is independent of the any "special assessment" fees as required and implemented by the GCSD to fund capital improvements (refer to **Table 5.6.1-1**).

Currently, the customer base is broken down into commercial and residential customers, with additional dwelling unit (flat rate) charges applied to each billed customer. as noted below:

- **Commercial** – Billed 61 customers compared to 238 Dwelling Units (flat rate)
- **Residential** – Billed 177 customers compared to 177 Dwelling Units (flat rate)

The number of billed customers listed above does equal the actual equivalent number of dwellings used by the GCSD. One example is the Gualala Mobile Home Park which has one point of connection and one monthly bill. The monthly bill includes multiple flat rate charges (EDU/SFE) for each dwelling unit within the park consisting of approximately 54 units.

Ordinance 2010-1 establishes the most current user charges for services as provided by the GCSD, and it amends provisions within Ordinances 1991-11, 1991-2, 1994-6, 1995-2, 2001-1, and 1998-2. Ordinance 2010-1 specifically established a "flat rate" of $55/month per residential user or EDU and any water customer using more than 85,000 gals per year is charged $.023 per gallon for usage over the 85,000-gallon threshold. This ordinance also provides for a standby/administrative fee of $51/Yr. with a 2% collection charge for collection services required by Mendocino County. There is also a provision that allows for an annual increase of 2% per year per residential customer and a $.0005 per gallon increase for commercial customers. Connection/hookup fees with an application fee are charged separately when applicable by the GCSD. Late fees are assessed at ½% per month. These fees have been updated, to include approved increases as shown in **Table 8.3.2-1 (Current Sewer Fee Schedule)**.

Table 8.3.2-1 Current Sewer fee Schedule (Excerpt)

Sewer fees for each billable unit billed on the county tax bills are as follows per year.

	2017-18	2018-19	2019-20
Flat rate sewer fee	$756	$771	$786
Annual standby (Admin) fee	$51	$51	$51
Special Assessment	$278	$278	$278
County 2% collection fee	$22	$22	$22
	$1,107	$ 1,122	$ 1,137

Commercial units are billed per gallon of water used from July 1 - June 30. If a commercial unit uses less than 76,656 gallons of water per year it pays the flat rate as above.

	2017-18	2018-19	2019-20
Cost per gallon over 76,656	0.0265	0.0270	0.0275

Sewer Fees are increased by 2% for flat rate and $.0005 per gallon for commercial every July 1.

Residential units that use over 76,656 gallons of water per year based on the winter average (November - February) are charged an additional per gallon of water used over 76,656 gallons based on the commercial rates above.

There are a few exceptions. Those few accounts that are billed monthly are billed the same as above less the county collection fee. These are commercial accounts, no residential accounts are billed monthly.

The GCSD revenue is as follows:

Sewer Fees and Special Assessment	71.31%
Sea Ranch Golf Course Sales	6.06%
Leachate Hauling	4.39%
Equipment rental/Interest/Late Fees	0.31%
CSA#6 Processing Fees/Sonoma County	17.93%
Total	100.00%

More recently, in 2016, Ordinance No. 2016-2 was approved by the GCSD Board to replace prior Ordinances that allowed for the establishment of special assessments to fund required and necessary capital replacements. This Ordinance No. 2016-2, increases the then existing special assessment (surcharge) per EDU from $180/Yr. to $278/yr. This rate increase included the following provisions/requirements:

- ✓ Replaces the $180/Yr. assessment from Ordinance 2014-1
- ✓ Special Assessment can be raised by no more than 25% of the Current Assessment for the upcoming fiscal year.
- ✓ Commercial Units to be assessed $.0005 per gallon per prior year (7/1-6/30) water usage or $278 per year, whichever is greater.
- ✓ Funds from the Special Assessment (surcharge) are to be used for capital improvements

The revenue and rate structure includes a combination of flat rate billings, special assessment fees, and water usage surcharges.

A portion of the GCSD revenue is derived from the SRGL and SCWA, with responsibilities and costs outlined in general terms within the current Tri-party Agreement, dated March 21, 2016. The Tri-Party agreement provides for revenue from both the SRGL and Sonoma County Water Agency for both saw sewage flows from the Sea Ranch North Area along with treatment and distribution cost to provide recycled (Title 22) wastewater to the SRGL. Please refer to **Appendix O** for recommended billings revisions to be provided to both Sonoma County CSA 6 and to the Sea Ranch Golf Course. Based on updated operation and maintenance costs, including employee hourly and burdened rates.

The current billing structure for the GCSD includes both monthly billings to the 20 commercial customers, while the remaining GCSD residential and commercial customers are billed with fees and charges through the county tax rolls, with important and critical water use data being supplied by the NGWC. This annual billing process typically requires that the GCSD provide all billable data per customer to the county by the end of June of each year and the county then places the billing amounts on the customer's tax bill. There is a 2% fee applied by the county to the GCSD to process these charges annually. The revenues/proceeds from the yearly tax roll billings/assessments are received by the GCSD three times per year (in August, December, and April).

As of the end of FY 2019/21 the GCSD had a cash reserve of $202,769 in money market certificates and savings accounts. Mendocino County maintains a bond reserve account which, at this time, is $139,767, with the bonds being collateralized by a lien on the property per the 1913/15 Act Assessment District.

8.3.3 Capital Improvement and Replacement Needs

The current GCSD 2020/21 FY budget includes special assessments that are applied to the bills (flat rate/dwelling units) of the customers on a yearly basis. These special assessments can be broken down into the following categories:

- ✓ Gualala Community Services District Sewer System Assessment District 1967-1: This was approved in 1993 with a total bond issuance in the amount of $ 973,118.18 and applied and apportioned to all benefiting parcels, or approximately $160 per EDU. This assessment fee is collected by the county and used to pay off bonds. No portion of this amount comes to the GCSD. The bonds/obligation, as issued through this assessment district, will be paid

off in 2031. This fee is assessed annually by the GCSD and placed on the Mendocino County tax rolls. The revenue is collected by the county and provided to the bond holders and as of the end of FY 2019/20 the remaining unpaid special assessment bond was $455,000. The county maintains a bond reserve of over $200,000.

- ✓ Levied Special Assessment Fee of approx. $ 154 per EDU (Assessment District)/Approved by Ordinances from 1993-1 and others: Assessments were levied on all participating parcels to fund the local share of the new wastewater collection and WWTP. This assessment cannot be confused with the special assessment(s) as imposed by the District since 1994 to fund projects. The County collects the proceeds from the levied parcels on a yearly basis and then forwards proceeds to bond holders. The ending term of this assessment expires in 2031.
- ✓ Special Assessment fee of $24 per EDU Assessed/Approved by Ordinance 2010-1 and 2014-1: This assessment fee was used for needed critical capital improvements. This "special assessment" brought the total assessment to $178/Yr. per billable customer. This fee is assessed annually by the GCSD and placed on the Mendocino County tax rolls. The revenue is collected by the county and distributed three times per year to the GCSD.
- ✓ Special Assessment fee of $98 per billable unit (EDU) assessed/approved by Ordinance 2016-2: This assessment fee was also used for needed critical capital improvements. This "special assessment' fee brings the current "special assessment" fee to $276/yr. per billable customer (EDU) and is assessed annually. It is to be used for capital replacement projects and other associated costs. The revenue is collected by the county and distributed three times per year back to the GCSD.

To assess the overall system needs, a preliminary asset plan was developed (see Section 9), which included an inventory of all GCSD infrastructure assets, including age and replacement costs for the wastewater treatment plant, collection system, lift stations, and STEP systems. To properly maintain existing system-wide infrastructure (assets) the GCSD must strategically plan for emergency, short-term and long-term repair and replacement of certain facility components to avoid adversely affecting the water quality and environment.

Over the past 10 years the GCSD has been providing emergency funding on a year-to-year basis by increasing the sewer surcharges (special assessments) to "stay-ahead" of catastrophic failures. The most recent capital improvement was to provide emergency repairs to the WWTP clarifier at a cost of $700,000. This necessary improvement required the acquisition of a short-term loan from CoBank of Denver, Colorado which is currently reflected within the special assessment fee. This current loan has a variable rate and is expected to be fully paid-off in December of 2026, with the security for the loan being pledged revenues. These emergency improvements (short-term) are troublesome since the GCSD has no short and long-term capital replacement plan or strategy.

Recommendations: It is recommended that GCSD initiate a short-term and long-term capital replacement plan. The GCSD will need to create a Capital Replacement Program (CRP) and show and identify it as a budgetary line-item. Funding future proposed projects will require further study and examination by the staff and board, with input from an engineering consultant. Once project cost, timing, and amounts are determined and tentatively approved, the public's input may be required under the statutory 218 hearing process. All rate adjustments will require final acceptance by ordinance. The following is an emergency (immediate), short-term (planned), and long-term (planned) list of capital improvements that the District will need to provide necessary capital for upgrades, repairs, and replacements.

1. Emergency (Immediate) – Note: Specific projects are recommended and required to be implemented to prevent CRWQCB violations, to address the recent draft revisions to the GCSD Report of Waste Discharge Permit, and to ultimately avoid any water quality and health and safety affects resulting from system operational failures. It is important to note that that Section 7 of this report outlines some of the most critical emergency and required short-term projects that should be implemented and completed within the next 2-3 years.

2. Short-term Projects – These projects are identified in the preliminary asset management plan, as tentatively drafted, and detailed within Section 9 of this report. The specific project(s) as noted within the tentative asset plan are those future projects that were included within Section 7 of this report. If for some reason equitable funding cannot be acquired to complete those projects as recommended within Section 7, then the GCSD should provide funding within the new CRP account to complete design and construction on a prioritized basis.

3. Long-term Projects - The recommended long-term infrastructure projects are as listed and defined within Section 9 of this report. These specific projects include a preliminary list of the infrastructure components from the WWTP, collection system, lift stations, and STEP systems. A present worth value was considered for each replacement item(s), along with the current useful life and recommended replacement dates. A future cost was derived and ultimately an estimated annual cost was generated to show the amount of reserve funds that will need to be put aside on a yearly basis to replace those aged and deteriorated system components. It is not expected that the GCSD will set-aside all funds for the replacement cost on a year-to-year basis, but at least attempt to recognize the need and allocate some amount of revenue to this short and long-term program. Over time, all projects in this short and long-term project list should be re-evaluated taking into consideration future grants and loans as well as changing federal and state regulation revisions and revisions to the GCSD's Report of Waste Discharge.

4. Provide for a Capital Replacement Budgetary Small Component (Expenditure) Line Item Within the District's Annual Budget: This includes providing for small operational and maintenance repairs and replacements beyond those typically less than $20,000, which the GCSD already reflects within their current budget.

It is recommended that the GCSD review and revise the current connection fee based on the proposed emergency short-term projects (see Section 7) including reviewing the status of the NGWC water connection moratorium and remaining available connections that could be made available for connection into the GCSD system. It is also imperative that the GCSD require that all costs associated with capital replacement shared on a pro-rata basis with CSA 6 (SRN), through a recommended Tri-Party Agreement amendment.

8.4 PROJECTED 5-YEAR BUDGET

8.4.1 BUDGET PROJECTIONS (NO PROPOSED CAPITAL IMPROVEMENTS)

The GCSD is currently preparing their FY 2021/2022 budget. There are no proposed capital replacement projects shown. It is recommended that those projects as defined and identified within Section 7 of this report be completed which will eliminate the need for the GCSD to provide the

revenue for projects within the next 5 years, and hopefully longer. As mentioned in Sections 5, 6, and 7 of this report, the proposed recommended projects were identified as both emergency and short-term projects and should provide the GCSD with a level of protection from catastrophic failures. The funding methods for the new recommended capital replacement projects are stated in Section 7.

8.5 PROPOSED ORDINANCES AND AGREEMENTS

These attached ordinances and agreements are a vital component for implementation of all fees and approval of the overall GCSD budget. It is important to note that during the record search, by the MC Engineering team and GCSD staff, it was found that a vast majority of the administration records were destroyed by water damage. Efforts were made by both parties to acquire records and pertinent information from other sources, including the CRWQB files in Santa Rosa. Certain files were found that assisted the team in making some decisions and accurate recommendations. There is still missing data, however, over-time the GCSD may be able to find those missing files. We are recommending that once the SWRCB SRF Program staff occupies their offices in Sacramento, that the GCSD staff research the old grant files to acquire additional information pertaining to the final grant/loan amounts (approved revenue program and project acceptance reports and letters).

ORDINANCES

The following is a list of the ordinances, agreements and policies that affect the current rate setting and revenue programs implemented by the District:

- Ordinance No.2010-1
- Ordinance No. 2014-1
- Ordinance No. 2016-2
- Tri-Party Agreement with Sonoma County and SRGL for both Raw Sewage and Reclaimed Effluent (Revision, dated 2/18/2016)
- Ordinance No. 1993-1

AGREEMENTS

Tri-Party Agreement Financial Review and Considerations

As described in previous sections, MC Engineering reviewed and evaluated the Tri-party Agreement (Agreement) between GCSD, SCWA, and SRGL. The Agreement defines, among other things, financial obligations of the various parties, including requirements for reimbursements to GCSD by the SRGL for tertiary treated water and the SRN for secondary treatment of flows from the SRN primary settling pond. The evaluation assumes that GCSD will continue to operate independently of the SRN with the SRN continuing to be responsible for the maintenance of the SRN pond and pumping and piping facilities that will continued to be controlled by GCSD.

As described previously in Section 1, the SCWA is responsible for reimbursing GCSD for their pro-rata share for secondary treatment. MC Engineering drew upon the original assumptions and allocations to provide an updated pro-rata share of costs for future billing to SCWA/SRN.

Some of the updates and considerations for this new allocation included:

- Updated energy costs.
- Updated assumptions regarding kWH usage, including energy required for secondary treatment and mixing.
- Additional costs for biosolids management associated with new mandates for handling and disposing of sludge generated at the GCSD WWTP.
- Modifications to the pro-rata share of costs assigned to SCWA/SRN based on the most recent flow data which resulted in a slightly higher proportion of the flow coming into the WWTP being allocated to SRN.
- Strengths and loadings of all waste flows.

The Tri-Party Agreement also lays out the method by which the SRGL is required to pay for treating water at the GSCD plant to tertiary levels. Once again, MC Engineering relied on previously established formulas and methodologies to provide updated estimates for reimbursements by SRGL to GCSD for the tertiary treatment associated with the golf course reclaimed water supply system **(Appendix M)**. Updated costs for the SRGL took into consideration the following variables:

- Re-assessment of the time allotted to tertiary treatment by GCSD staff.
- More appropriate billing rates for GCSD staff based on their fully burdened costs.
- Miscellaneous increases in materials and supplies, including those associated with disinfection and filtration.

In addition to the operational cost related aspects of the Agreement, GCSD will be incurring additional capital expenditures associated with a combination of obsolete or and/deteriorated equipment, marginal original designs, and new improvements mandated based on state permit requirements. These requirements and deficiencies are explained in detail in previous sections of this report (Section 7). The Tri-Party agreement has provisions to re-assess and negotiate "in good faith" as the agreement is renewed every five years. The final financial requirements of SCWA and SRGL for reimbursing GCSD for increases in secondary treatment costs, tertiary treatment costs, and new capital improvements are subject to negotiation and have been presented in this report and found within various tables. It is recommended that the initial findings and costs developed in this report be used to facilitate discussions for finalizing the updates to the Tri-Party related cost sharing components and that the resulting budget impacts be included by the fall of 2021. Because this is a public document, details pertaining to GCSD's position on these items will be made available pending the appropriate public forum and after consideration of all available grant funding for related amortized capital costs if required.

A very important element of the overall operations of the GCSD is found within this existing Tri-Party Agreement as amended in 2016. It is recommended that the GCSD immediately initiate negotiations with the Tri-Party participants regarding any determinations and revisions to coincide with the recommended proposed revenue plan and proposed rate adjustment process to be undertaken immediately and approved in the Fall of 2021.

8.6 PROPOSED BUDGETARY REVISIONS AND FUTURE RATE INCREASE (INCLUDING CAPITAL IMPROVEMENTS)

The GCSD has prepared its FY 2021/2022 budget. This budget will only include a 2% increase to the customer charges (Ordinance No. 2010-1) to off-set current and projected budgetary expenditures. The GCSD and MC Engineering staff have reviewed available records and information during record search and is recommending the following and GCSD is proposing to develop a final revised budget through ordinance(s), with any budget revisions to consider the following concerns and recommendations:

1. A large portion of the commercial and residential billings rely on winter water usage, specifically the commercial use, and this doesn't provide for a stable source of revenue. This is concerning since the wastewater treatment, collection, and on-site STEP systems require continuous operational expenditures, including those associated with manpower, maintenance and repairs, energy, chemical and other costs. All of these O&M costs are relatively constant (i.e., not dependent upon water usage), even if the individual customer usage fluctuates on a daily, monthly, and yearly basis. The current staff operating and maintaining the overall system includes two (4) full-time and three (1) part-time employees. The part-time employees handle billings and other administrative work, while two of the permanent employees are OIT's and require some direction. Considering these facts, the GCSD has taken on a significant responsibility not only to maintain the WWTP, collection system, lift stations, and reclamation facilities, but also to maintain all existing STEP systems (238), which could be considered minor primary WWTPs.

   The STEP systems, specifically the commercial customers (61), require regular inspection, maintenance, and pumping (pump out) with the District owned pumper truck. The residential customers (178) require yearly inspections with less maintenance for pumping-out. In both cases emergency repairs are periodically required including pump, electrical and interceptor tank repairs. The manpower alone for the pumping of the interceptor tanks exceeds 800-1000 manhours/year since tank pump-outs most often require a minimum of two (2) employees, with the waste hauling and unloading requiring over 3 hours to complete a round-trip. Secondarily, all interceptor tanks and individual pump stations require annual inspections which is approximately 800-1000 additional manhours/year.

   Recommendation: It is recommended that the GCSD re-establish the overall rate system to provide a more constant and reliable source of revenue which will be based primarily on a flat-rate charge through the establishment of an EDU that can then be applied to commercial and multi- family customers. This proposed methodology will ultimately require additional review of existing water usage and verification of suggested EDU equivalent values from book values (theoretical) based on nation-wide or regional studies for comparable equivalent dwelling units. Water meter and other actual flow records were revised by MCE in order to establish a preliminary Single-Family Equivalency (SFE) or EDU flow based equivalent. This final SFEC/EDU flow should be used to establish the basis for a flat rate charge and used to calculate the average commercial billing per month. The GCSD is also requesting that all commercial users be billed on a monthly basis to allow for revenue continuity.

2. Commercial establishments are billed per flat rate and charged for additional usage through water meter records as collected for the NGWC. The additional monthly charges assessed to the commercial establishments based on additional water usage is problematic, as noted by Budgetary Revision No. 1, above, and do not truly represent the wastewater usage, especially during the summer months which are the peak tourist season when the highest flows and loadings occur. Also, there seems to be some discrepancy in the yearly allocation of charges to various commercial customers. This practice should be minimized.

   Recommendation: If water usage is used to calculate the waste flows, then the additional water flows, acquired from the NGWC, should be based on usage for the months of July through September and not winter months. The summer use is a better representation of the commercial waste flows impacting the sewer collection, energy, transport, and treatment costs. It is also recommended that the establishment of an EDU-based value be used for each commercial establishment, where possible. This value should be calculated based on past summer flow records and should include acquiring other data from similar type establishments along the coast to better represent the overall commercial usage. A square footage approach can also be applied after refinement of the approach.

3. Required operation and maintenance of the commercial establishment's STEP systems are extremely labor intensive and require more frequent pump outs and associated manpower and disposal costs, including wear and tear on the GCSD's equipment.

   Recommendation: The GCSD should review all past operation records for interceptor tanks and pump station maintenance at the commercial establishments. The evaluation should also include the hotel and motels. This maintenance and manpower information should be used to re-establish related O&M budgets and the related rate impacts.

4. Currently, the operations budget has one single line item for special assessments (surcharges). This single revenue line item does not take into consideration that over half of this revenue never reaches the "hands" of the GCSD. It is acquired and processed by the County and paid to bond holders, thus creating some confusion as to the benefit of the current $ 278/yr special assessment.

   Recommendation: The GCSD needs to provide for a separate budgetary revenue line item, which specifically identifies the 1913/15 Act Assessment District Revenues levied by Mendocino County. Secondly, and more importantly, a new revenue line item should be established that can be referred to as the "CRP", with generated revenue to be used for existing and future capital replacements. Note: Section 9 will provide for a preliminary short-term and long-term capital replacement program. The GCSD may want to divide their CRP into short and long- term line items.

5. As noted by Item 4, the District has no planned short or long-term capital replacement programs in place. It is imperative that the District plan into the future to acquire necessary revenue to plan for needed capital improvements. There is no specific short or long-term method established by the GCSD to provide for the necessary funding to avoid health and safety issues, and to ensure that water quality problems are avoided.

   Recommendation: The District should establish a short and long-term capital replacement plan that will generate a portion of, or all, the necessary revenue to properly plan for those critical and necessary capital replacements and/or improvements. Section 9 of this report includes a preliminary short and long-term replacement program. It is important to note

that the GCSD should allocate some emergency funds for unplanned O&M as well. This report includes those required short-term improvements (see Section 7) that should give the GCSD a "head-start" in planning for the future, with the assumption that the SWRCB and USDA could provide the necessary and required grant a loan funds. Even with the possible addition of grant and loan funds, other short-term projects may be required with additional funds being put-aside for long-term replacement/improvements.

Recommendations: The GCSD needs to generate the required revenue to implement the necessary planned and unforeseen long-term improvements. This revenue should be a part of the planned rate adjustments and possible 218 Hearing in the Fall of 2021. This rate adjustment will not only address those current shortfalls, but also take into consideration the current and recommended projects as recommended within Section 7 of this report.

6. The staff of MC Engineering and GCSD reviewed the current Tri-Party Agreement and found required revisions, and most importantly budgetary revenue short-falls, in the user fee calculation(s) for both the raw sewage form the County (CSA 6) and the recycled effluent to the SRGL.

   Recommendations: GCSD should review the revised user fee calculation tables as developed by MC Engineering and GCSD staff and initiate negotiations with the Tri-Party participants to reconcile the identified revenue shortfalls. This should include a review all manpower requirements for all system-wide operations, including and not limited to; routine maintenance, testing, reporting, and inspections, required system operational planned and unplanned repairs, customer callouts and emergencies, and other miscellaneous duties related to customer relations and billings. The required manpower in the plan should be developed using yearly available work hours per employee at 1800 hrs./year (effective work hours). Any potential shortfalls in required operations staffing should be addressed. GCSD should periodically review and acquire updated BOD data from the CSA 6 service area and get all flow metering up-to-date and calibrated. Data loggers should be installed at all lift stations (1-4) to acquire flow records for specific zoned areas (Refer to **Appendix O**).

7. Currently, the GCSD bills 20 of its current commercial customers monthly. This lends itself to better control of the potential revenue to be generated.

   Recommendations: It is recommended that the District consider providing monthly billings to all 61 commercial customers. This would require some additional time on the part of the GCSD's billing staff and would require working with the County, who currently bills the remaining 41 commercial customers on a quarterly basis.

8.7 PROPOSED RATE INCREASE (WITH CAPITAL IMPROVEMENT ALTERNATIVES)

Due to the timing and completion of this report, it was agreed that the proposed FY 2021/2022 budget will not include the serious and critical budget recommendations, as noted above. It was also recommended that a revised user fee calculation/method be developed with less reliance on water usage and establishment of an equivalent dwelling unit or SFEC flow in gallons per day (ADWF).

Once the SWRCB approves the findings within this report, the GCSD will apply for both USDA and SWRCB funding, with a method of financing being approved by the GCSD Board. This may include the addition of debt service to the monthly flat rate for the existing "special assessment fee". If it is

decided to proceed with funding Option 3 (w/ SOI Zone3) the revenue could be generated by a combination of methods including assessment district financing and flat rate per EDU increases. It is assumed that the required O& M for Option 1 will be minimal, however, adding SOI Zone 3 (unsewered area) will require additional manpower. Ideally, the additional new connection billing revenue could off-set the additional O&M costs.

A second and important potential revenue short-fall should be addressed during this process, which includes reviewing and negotiating possible revisions to the existing (2016) Tri-Party Agreement. This agreement stipulates the method of calculating the user fee to be paid to the GCSD from the SCWA and the SRGL. Other considerations should be given to proportional cost sharing for the proposed capital improvements and any future capital improvements, as required by the GCSD.

SECTION 9- PRELIMINARY RECOMMENDED SYSTEM-WIDE OPERATIONAL IMPROVEMENTS

(Including emergency short-term and long-term projects along with operations, and maintenance procedures and programs.)

9.1 INTRODUCTION

This Section provides critical system-wide facilities information, including a rate analysis and study with recommendations. to provide the District with the ability to establish and maintain adequate levels of service on a cost-effective basis. The following recommendations are the result of a system-wide evaluation of the GCSD Wastewater Facilities from both an operational and financial perspective. This Section is only a "first level" analysis due to budgetary constraints. Preliminary recommendations are provided that should be implemented by the District to anticipate operational issues and future expenditures to provide the most cost-effective operation, maintenance, and replacement of the wastewater infrastructure. Currently, certain operation and maintenance programs and procedures are being implemented by the District staff, and periodically, on a reactive emergency basis. Regardless of the need, the on-going repairs and maintenance should all be reviewed and updated as procedural standards, maintenance needs, and funding programs evolve.

9.2 USER FEE ORDINANCE AND GREASE TRAP ENFORCEMENT PROGRAMS

Currently the District is in the process of updating Ordinance No. 1991-11 (revised as of September 30, 2020) – Titled "*Ordinance of the Board of Directors of The Gualala Community Services District Prescribing Conditions For Connection To And Use Of Wastewater Facilities and the Fees and Charges for Such Use"*. This user fee ordinance also includes provisions for grease trap enforcement. Grease has been problematic for the District and will continue to affect the system operations, including increased operation and maintenance costs, while putting a "strain" on the existing and limited staff. MC Engineering is recommending that the District re-evaluate certain ordinances that include the following system management and budgetary practices (also refer to recommendations in Section 9.4):

1. Revise rate structure by developing primary EDU flat rate system and eliminate water usage driven rates, where possible.
2. Endeavor to leverage grant funding for all future capital improvements based on recommendations in this report in order to minimize emergency short-term capital expenditures.
3. Revise grease trap enforcement provisions within the existing ordinance.
4. Review and revise the "Tri-Party Agreement" to reflect updated system costs, including manpower costs, while providing new language that assures the District that all proposed and future capital costs are equitably shared by all Tri-Party members.
5. Restructure budget line items and include a separate line item for a new Capital Replacement Program (CRP).
6. Plan for a Proposition 218 Hearing for the Fall of 2021 to coincide with approved SWRCB and USDA Grant and Loan funding and any required rate adjustments by ordinance.
7. Per staff recommendations, bill all commercial establishments on a monthly basis.

8. Conduct the required public hearings for rate ordinance revisions and other rate changes due to the possible grant and loan funding.
9. The District may need to pursue a 1913/15 Act Assessment District for Zones 3, 4 and 5 (the unsewered areas) if it is agreed to by the Board and other agencies.
10. Review and update the current system-wide sewer system management plan (SSMP) Program, as required by the NCRWQCB Exec. Department of Water Quality (DWQ) Order No. WQ 2008-0002, DWQ Order No. 2006-0003, and DWQ Order No. 2013-0058.
11. Review and periodically update manpower requirements for system-wide operations, as needed, due to the age and continued deterioration of the wastewater treatment facilities. This information will also be used for cost-sharing of operations as defined in the Tri-Party Agreement.
12. Implement the new mapping system, as provided by MC Engineering under the grant funded program, and review for any discrepancies and current field changes for repairs, upgrades, and new capital improvements.
13. Update the current STEP system maintenance procedures and provide for computerized detailed logging of all inspections and observations and any repair and replacements required. This important information will be used for future budgeting and will assist in recognizing and trending system failures.
14. Update the current WWTP, collection system, and lift station maintenance procedures and provide for computerized detailed logging of all inspections and observations and any repair and replacements required. This important information will be used for future budgeting and will also assist in recognizing and trending system failures.
15. Update the computerized work order system for tracking call-outs, repairs, repair locations, time and cost and other vital information to be used for future budgeting and preventing future spills and water quality related issues.

9.3 DRAFT REPORT OF WASTE DISCHARGE PERMITTING AND BIO-SOLIDS MANAGEMENT REPORT

As of May 1, 2021, the District, working with MC Engineering, has submitted a draft (revised) Report of Waste Discharge Permit to CRWQCB, Santa Rosa. It is anticipated that this revised permit may be approved by the end of the year (2021). Section 7 of this report includes recommended capital improvements that will be required to in-order to stay in compliance with those provisions found within the current draft Report of WD Permit. This Draft Permit can be found within the **Appendix M** of this report.

Table 9.3-1 below, presents the required improvements to facilitate the pending Report of WD Permit. Also, those system-wide projects, as recommended within this Report, include wastewater recycling and related permit(s), specifically those required by Title 22, which are noted in the right-hand column of the Table.

Table 9.3-1 Required Improvements

Improvement	Section 7 Reference	Required by Title 22
Tertiary Filter(s) Improvements	7.2.3	Yes
Disinfection	7.2.4	Yes
Emergency Storage Basin	7.2.1	Yes
Sludge Storage Basin	7.2.6.A	No
Sludge Drying Beds	7.2.6.B	No

Also included within this report is a subset of the Bio-Solids Management Report prepared by MC Engineering, Inc. for the Gualala Wastewater Facilities, which includes the WWTP solids disposal and drying, along with an analysis of pumped solids from the existing STEP system. Refer to the **Appendix J** of this report for a complete copy of the Biosolids Management Plan.

9.4 SHORT AND LONG TERM BUDGETARY CONSIDERATIONS AND RATE STABILIZATION

This report attempts to analyze the major aspects of the GCSD wastewater facilities operations related to operational costs. Consideration is given to both the operational and maintenance needs along with the corresponding costs, with consideration of projected revenue. During the record search, communications with staff, along with other investigations conducted by MC Engineering staff, resulted in a determination that the District has current revenue shortages that were a result of various issues including and not limited to:

1. Lack of revenue due to limitations in existing fee structure ordinances.
2. Additional operational and maintenance repairs and demands for system-wide facilities primarily because of old and deteriorated facilities.
3. Lack of revenue due to limitations and outdated costs in existing agreements with third parties.
4. Fee structures based on flat usage and winter water consumption without regard to peak seasonal summer flows. This system could be simplified by eliminating portion of the water use based method/component of the billing system.
5. Lack of capital improvement funding to provide necessary revenue for critical infrastructure repairs and replacement.
6. Absence of a reserve/contingency fund considering the current 8–12-month lag in revenue from the annual tax bill receipts. It is important to note that the District receives a majority of their revenue by submitting the quantified flat rate and special assessments, per GCSD customer account, to the County for billing (tax bill) and receives the yearly proceeds from the County in three payments during the year. There is a small portion of the commercial users that are billed monthly.

In the past, by Ordinance, both in 2011 and 2016, the District has acquired additional revenue from surcharges (special assessments) that were necessary to provide for emergency repairs. These repairs were not planned well in advance, and a short-term loan from CoBank was acquired to assist in paying for the improvement(s). The GCSD is lacking a capital improvements plan for wastewater facilities. It was also recognized that the STEP system operations, which includes over 135 individual pump stations, which are maintained by the District staff, have placed a burden on the existing and required manpower and have limited the time required for the preventative operation and maintenance of the treatment and reclamation facilities. The current budget lacks the necessary revenue to both provide required operation and maintenance services along with the required funding for unplanned and planned capital repairs. This can be said for most of the wastewater facilities throughout the State, however for GCSD the problem is exacerbated by the number of STEP system components in need of on-going maintenance and repair coupled with a relatively small number of connections forming the rate base. These STEP systems could be considered small primary treatment systems that are maintenance intensive.

Sections 7, 8 and 9 of the Report provides for a cost-effective approach to eliminate budget shortfalls and possible water quality violations. Section 9.7 of this report provides a preliminary "Asset Management Plan" that assigns cost, applicable both now and in the future, for the

replacement of key wastewater treatment infrastructure and collection system operational components. The MC and GCSD staff attempted to list and quantify all the system-wide facilities and infrastructure components.

Approximately five to ten years of required emergency type improvements have been identified within Sections 6, 7, 8, and 9 of this report, to avoid serious water quality violations and incorporate provisions, as provided for within the updated and proposed revised Report of Waste Discharge. Other improvements within Section 7 were identified with consideration given to personnel safety (CalOSHA Requirements). It is imperative that funding agencies assist in providing the necessary matching revenue for the recommended system-wide improvements in order to maintain solvency of the District and to provide on-going service to the Town of Gualala. Key identified funding agencies include the SWRCB SRF and the USDA Rural Development Grant and Loan Programs. The Asset Management Plan does not include all those recommended facilities and components requiring immediate replacement and/or upgrades as identified in Sections 5-8 of this report.

In conclusion, the current rate structure relies in-part on water usage as method of generating additional operating revenue. This is problematic since most of the existing wastewater facilities require daily operational and maintenance costs that only vary slightly based on fluctuations in waste flows. While the existing flow-based billing system does establish an equitable means of sharing costs, and it hinders the ability of the District to properly fund the fixed operating costs needed to maintain the system. There are variable costs such as some reduced energy costs, but generally fixed operational costs cannot be reduced accordingly, including manpower and other overhead expenses.

Recommendations: (Also refer to Section 8)

1. Revise rate structure to minimize use of water service flow records. Provide for a flat rate structure with minimal reliance on water usage.
2. Develop a rate structure using equivalent dwelling units (EDU's) based on an average flow per single family connection. This will require a system wide flow study with water use and system pumping records. Consideration should be given for other types of wastewater utilities along the North Coast and "book values" form technical reports.
3. Approve and incorporate a short and long-term replacement plan into the yearly budget process by setting aside, on a yearly basis, a capital improvement project CIP/CRP funds.
4. Rates should be increased to accommodate both emergency repairs and short and long-term replacements.
5. Review and analyze the overall effect of the "Tri-Party Agreement" on the rates, specifically manpower, chemical, and energy costs, with consideration given to the capital improvement cost sharing for needed capital improvements, many of which are being driven by new permit requirements (**See Appendix O** for initial estimates).
6. Pursue Grant and loan funding

9.4.1 Annual Budgeting for STEP System Repairs

Existing STEP systems includes interceptor tanks, piping and valving, control panels, and pumps. Due to the existing age and condition of the existing STEP systems, it highly recommended that a detailed inventory of each STEP system be provided by the staff. This inventory should be compiled into a working Table/Document and periodically updated. We have included a sample table (**Table 9.4.1-1**) to be revised and amended to include the STEP system annual observations and improvements.

Table 9.4.1-1 Preliminary Collection System Replacement Inventory

Road/General Loaction	Gravity Mainline					Pressure Mainline					Manhole			Clean-Out			ARV's			Valve			PS/Conrol Panels/STP			Services /Retro Tanks			Total Cost
	Quantity (LF)	Existing Pipe Size (inch)	Year Installed	Unit Price/LF	Cost	Quantity (LF)	Existing Pipe Size (inch)	Year Installed	Unit Price/LF	Cost	Quantity	Unit Cost (Each)	Cost	Quantity	Unit Cost (Each)	Cost	Quantity	Unit Cost (Each)	Cost	Quantity (LF)	Cost/LF	Cost	Quantity	Unit Cost (Each)	Cost	Quantity	Unit Cost (Each)	Cost	
Big Gulch	1,499	4	1990	$95	$142,405	448	2	1990	$70	$31,360	1	$4,000	$4,000	1	$1,500	$1,500				1	$3,500	$3,500	7	$4,000	$28,000	10	$8,800	$88,000	$298,765
N Bodhi Tree	349	4	1990	$95	$33,155	1,043	2	1990	$70	$73,039				1	$1,500	$1,500	2	$4,500	$9,000				1	$4,000	$4,000	3	$8,800	$26,400	$147,094
S Bodhi Tree	590	4	1900	$95	$56,050																				3	$8,800	$26,400	$82,450
Center St	346	4	1990	$95	$32,870																				3	$8,800	$26,400	$59,270
Church St	1,230	4	1990	$95	$116,850												1	$4,500	$4,500				1	$4,000	$4,000	5	$8,800	$44,000	$169,350
Coral Ct	829	4	1990	$95	$78,755	1,400	3	1990	$80	$112,000										1	$3,500	$3,500				13	$8,800	$114,400	$308,655
Cypress Way	755	4	1990	$95	$71,725												1	$4,500	$4,500				0			2	$8,800	$17,600	$93,825
Honey Run					$0	447	2	1990	$70	$31,290				1	$1,500	$1,500				2	$3,500	$7,000				4	$8,800	$35,200	$74,990
Hubert Dr	522	4	1990	$95	$49,590						1	$4,000	$4,000												4	$8,800	$35,200	$88,790
Marine View					$0	639	2	1990	$70	$44,730	1	$4,000	$4,000							1	$3,500	$3,500	5	$4,000	$20,000	5	$8,800	$44,000	$116,230
Milano Terrace	1,294	4	1990	$95	$122,930	392	3	1990	$80	$31,360	1	$4,000	$4,000										2	$4,000	$8,000	9	$8,800	$79,200	$245,490
Ocean Dr	775	4	1990	$95	$73,625	906	3	1990	$80	$72,480				1	$1,500	$1,500	4	$4,500	$18,000				1	$4,000	$4,000	17	$8,800	$149,600	$319,205
Old Coast	1,180	4	1990	$95	$112,100	2,681	3	1990	$80	$214,504															13	$8,800	$114,400	$441,004
Old Stage Rd- Segment A	3,969	4	1990	$95	$377,055	1,446	3	1990	$80	$115,680															6	$8,800	$52,800	$545,535
Old Stage Rd- Segment B	128	6	1990	$105	$13,440	355	6	1990	$110	$39,050																		$52,490
Old Stage Rd- Segment C	266	10	1990	$125	$33,250																							$33,250
Old State HWY					$0	704	2	1990	$70	$49,280	2	$4,000	$8,000	11	$1,500	$16,500							1	$4,000	$4,000	2	$8,800	$17,600	$95,380
Pacific Dr	1,158	4	1990	$95	$110,010	367	3	1990	$80	$29,360							2	$4,500	$9,000	1	$3,500	$3,500	2	$4,000	$8,000	18	$8,800	$158,400	$318,270
Pacific View Dr	690	4	1990	$95	$65,550									1	$1,500	$1,500							8	$4,000	$32,000	12	$8,800	$105,600	$204,650
Pacific Woods Rd	1,403	6	1990	$105	$147,315									1	$1,500	$1,500	1	$4,500	$4,500				6	$4,000	$24,000	14	$8,800	$123,200	$300,515
Robinson Reef	873	4	1990	$95	$82,935	382	2	1990	$70	$26,740				2	$1,500	$3,000	1	$4,500	$4,500							23	$8,800	$202,400	$319,575
S HWY 1 Segment A	1,805	10	1990	$125	$225,613	2,682	6	1990	$110	$295,020	7	$4,000	$28,000	1	$1,500	$1,500	4	$4,500	$18,000				17	$4,000	$68,000	41	$8,800	$360,800	$996,933
S HWY 1- Segment B	2,800	8	1990	$115	$322,035	1,447	3	1990	$80	$115,760																		$437,795
S HWY 1 - Segment C	1,576	4	1990	$95	$149,758	528	2	1990	$70	$36,960																		$186,718
Sedalia Dr - Segment A	657	4	1990	$95	$62,415	728	3	1990	$80	$58,240				5	$1,500	$7,500	2	$4,500	$9,000	5	$3,500	$17,500	0			25	$8,800	$220,000	$374,655
Sedalia Dr - Segment B					$0	325	2	1990	$70	$22,750																		$22,750
Windward Ct	254	4	1990	$95	$24,130																				2	$8,800	$17,600	$41,730
Westward Ho Rd	275	4	1990	$95	$26,125						1	$4,000	$4,000												4	$8,800	$35,200	$65,325
Waste Water Treatment Rd					$0	4,609	3	1990	$80	$368,720																		$368,720
Sea Ranch Alignment	9,249	4	1990	$95	$878,655	5,629	3	1990	$80	$450,320													84	$4,000	$336,000				$1,664,975
Subtotal	**34,473**					**27,159**					**14**			**25**		**$37,500**	**18**		**$81,000**	**11**		**$38,500**	**135**		**$540,000**	**238**		**$2,094,400**	**$8,474,383**

9.5 FOLLOW-UP AND ROUTINE CCTV, SMOKE TESTING, AND FLOW ISOLATION PROGRAMS

The following I/I Summary (**Table 9.5-1)** was prepared based on the information generated from the data loggers and existing WWTP metering. It should be noted that the data logger information was during the winter of 2021, but the loggers were only installed for a short time and during a relatively dry winter. Section 4 of this report includes additional information regarding the I/I contribution to the collection and STEP systems.

Figure 9.5-1 Peak Daily Flow and peaking Factors

Lift Station	No. of Interceptor Tank Connections	Peak Daily Flow	Peaking Factor	Date
1	30	24,635	2.6	1/26/2021
2	54	30,319	1.1	1/26/2021
3	31	1,196	2	1/27/2021

The results clearly indicate that there is an inflow problem, as identified during a short-term storm event, within the collection as served by Lift Stations No. 1 and 2. The peaking factor for lift station 1 is high in comparison to the other lift station zones. This peaking factor was a result of an event driven rainstorm on the 26th of January 2021. It indicates some potential infiltration and inflow, which are those indirect types of problems associated with leaking manholes and pipelines, and possibly illegal storm drains and roof drains, or because of high groundwater.

The hydrograph in **Figure 9.5-1** shows an immediate relationship between a rainstorm event and excessive inflow. Inflow is defined a direct connection to the sewer system through cracks in the system components in combination with illegal roof gutters and storm drain connections. The hydrograph indicates excessive peak flows in relationship to the storm events. A more detailed analysis is provided within Section 4 of this Report.

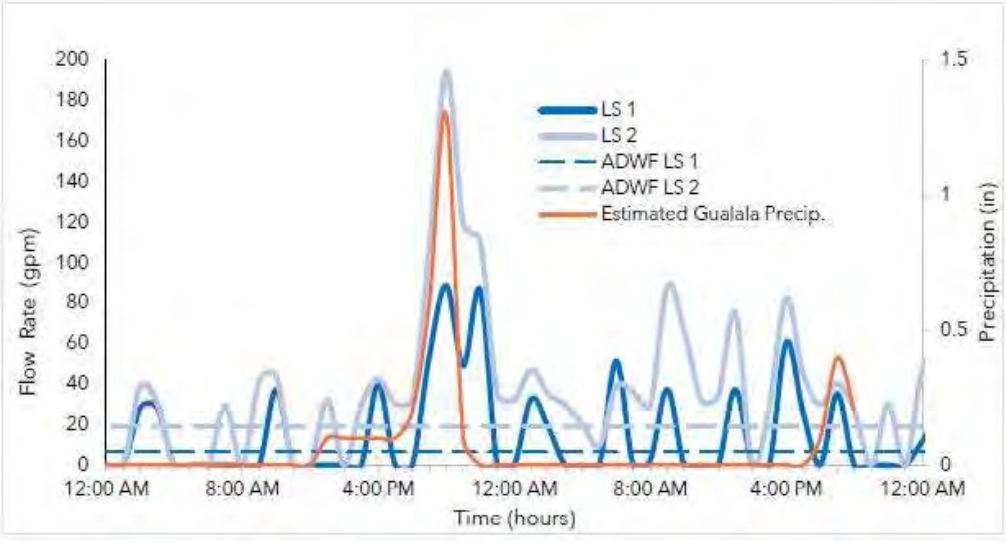


Figure 9.5-1 January 26th, 2021, through January 27th, 2021 Storm Event Flows at Lift Station 1 & 2 and Estimated Hourly Precipitation in Gualala

It is recommended that the GCSD staff evaluate potential sources of Inflow sources, by using smoke testing techniques in select locations. Locations identified for smoke testing should include those areas where flows have become problematic. It is not apparent as to the cause of the excessive inflow, but it suspected that the cause could be related to drainage entering the system through broken pipes, roof drains, and or interceptor tanks. The District should budget for the smoke testing this fiscal year. The work could be performed by the staff once certain equipment and smoke bombs are purchased. The flows could be a result of leaking and cracked and/or sheared pipelines. Impacted areas could include trailer parks, multi-family connections, and interceptor tanks.

Below, is a summary of what future actions should be taken by the District to identify potential I/I. By eliminating the excessive I/I the potential for raw sewage overflows and excessive treatment costs can be minimized:

1. Continue utilizing data loggers to acquire flow information from LS's No. 1-4.
2. Periodically, during the winter months, conduct flow isolation on existing gravity lines.
3. Provide smoke testing and visual inspection of interceptor tanks on a yearly basis.

9.6 RECOMMENDED FUTURE ASSET MANAGEMENT PROGRAM DESCRIPTION

Strategic and key components of the Asset Management Program is for maintaining both short-term and long-term wastewater system operational integrity. Important considerations include:

1. Water Quality Health and Safety
2. Rate Stabilization
3. Asset Preservation
4. Quality of Service and Cost
5. Cost-effective and Pro-active Operations
6. Communications with State, Federal, and Local Officials

Typically, both Short & Long-Term projects cannot be fully developed and assessed until such time that a more formal "Asset Management Plan" is developed. Part of this study allows for the preparation of a preliminary asset management plan, which includes an initial inventory of all the GCSD assets, including buildings pipelines, pump stations, STEP Systems, WWTP components and fittings, and other equipment. During the overall wastewater facilities system evaluation, the condition of certain system components was recognized as a serious and immediate problem and were included within this report and shown as recommended projects in Sections 5-8. It is important to note that regardless of the level of evaluation, certain facility infrastructure components will deteriorate or fail to a point where they must be immediately replaced (unforeseen emergencies).

This asset evaluation includes recommended immediate emergency (projects under $20,000), short-term (10 Years) and long-term (>10 Years) projects. The overall system evaluation included input from the operations staff of the GCSD, with other input gathered from communications and discussions the CRWQCB staff (Refer to the Waste Discharge Report).

The staff and the Board of the GCSD should consider increasing and/or budgeting for emergency, predictive short-term and long-term projects on a yearly basis. The amount of funds for the repairs and upgrades should ultimately be determined by the staff based on system history, with approval by the decision-making body. Considerations should be given to the affordability and impact on all residential and commercial customers.

As a part of this report, significant emphasis was placed on assessing the condition of the existing facilities with the intent of requesting grant and loan funds for the short-term emergency type

projects to both stabilize and improve the financial condition of the District while at the same time eliminating serious risks to the health and safety of the public and environment.

Sections 5-8 of this report include those assets requiring immediate attention along with serious consideration given to predictive and emergency type projects, with funding assistance to be provided by the SWRCB SRF and USDA Programs. These projects are as noted below:

Aging Assets and Premature Failures (Corrosion and Component Deficiency)

- Replacement of the temporary administration building with a permanent structure
- Replacement of deteriorated storage facility and new covered parking to protect District equipment and vehicles
- Repair of a failed liner at Pond 2
- Improvement of the four lift stations
- Repair and replacement of existing STEP systems, including interceptor tanks and pumps
- Miscellaneous WWTP components replacement
- Replacement of system-wide Lift Station and STEP System components due to premature deterioration and failures

Permit Related Needs to meeting requirements of the CRWQCB:

Refer to Table 9.3-, above for permit related needs.

Potential Service Area Expansion (Unsewered) – Water Quality Impacts (Eliminate Septic Systems)

- Conveyance system needs
- WWTP expansion to accommodate added capacity

Section 9.6 will concentrate on developing short-term and long-term system-wide replacement and upgrades, to ultimately be implemented by the District. This plan will include infrastructure projects that will be required in the future with serious consideration given to the District's ability to plan-ahead and fund through the preparation and establishment of a Capital Replace Program (CRP).

9.6.1 Emergency (Unplanned)

Periodic emergency and unpredictable systems failures may include and are not limited to catastrophic repairs and replacements to wastewater pumps and motors, interceptor tank repairs, WWTP small system pumps, chemical feed facilities, pond linings, access road failures, panels, electrical, structures, and other identified system failures.

It is recommended that the amount of funding to be allocated should be based on past O&M experience and trending. These emergency type projects should be budgeted yearly and are primarily for small capital improvements and repairs (<$20,000). It should be noted that Sections 1-8 of this report define those current emergency projects that require immediate funding and assistance form the identified funding agencies.

9.6.2 Short-Term CIP Projects (Less Than 10-Yrs Old)

Short-term projects can be considered projects required within the next 10-years. Sections 5-8 of this report have identified certain critical and emergency type projects that would fall into this short-

term category. MC Engineering has also provided a preliminary list of short-term projects related to replacement and improvement of certain facilities and components, to the following:

- WWTP and Reclamation System Components
- Collection System
  - ✓ Sewer Mains (Gravity and Force Mains)
  - ✓ Pump Stations Pump Stations (Large WWTP and Reclamation
- STEP Systems
  - ✓ Interceptor tank
  - ✓ Small Pumps)w/ controls
  - ✓ Service Line

This report provides a list of system components and appurtenances to be included within this short-term replacement program and does not include those projects as noted within Sections 5-8 of this report. This short-term plan will include current and future values of system components and appurtenances, using cost of money and inflation, at 1% and 3%, respectively.

The current short-term infrastructure replacement analysis is for consideration only. It is highly recommended that the GCSD staff complete and update the overall asset list, if necessary. The cost analysis can be updated with recommendations, including the required amount funds to be budgeted on a yearly basis, as a part of the proposed CRP Program. The amount of funds to be budgeted will be subject to the financial status of the District with emphasis placed on minimizing customer rate impacts to the extent possible. The intent is to ideally eliminate or minimize the need to acquire emergency funding and financing.

9.6.3 Long -Term CIP Projects (10-yrs Old and Greater Than)

Long-term projects can be considered those projects required beyond the 10-year planning horizon. MC Engineering has also provided a preliminary list of other long-term projects related to replace and improve certain facilities and components, these include:

- WWTP and Reclamation System Components
- Collection System
  - ✓ Sewer Mains (gravity and force mains)
  - ✓ Pump Stations Pump Stations (large WWTP and reclamation pumps)
- STEP Systems
  - ✓ Interceptor tanks
  - ✓ Small Pumps w/ controls
  - ✓ Service Lines

This report provides a list of system components and appurtenances to be included within this long-term replacement program. The related Tables will include current and future values of system components and appurtenances, using cost of money and inflation at 1% and 3%, respectively.

The current short-term infrastructure replacement analysis is for review and is highly recommended that the GCSD staff complete and update the overall asset list, if necessary. The cost analysis can be updated with recommendations, including the required amount funds to be budgeted on a yearly basis, as a part of the proposed CRP Program. The amount of funds to be budgeted will be subject to the financial status of the District with emphasis placed on minimizing customer rate

impacts to the extent possible. The intent is to hopefully eliminate or minimize the need to acquire emergency funding and financing.

Other factors include system master plans and new treatment processes as required by possible State and Federal Regulatory requirements.

9.6.4 Replacement of Septic Systems (SOI Zones 3, 4, and 5) by Providing Public Sewers

Due to the potential water quality and other related health and safety concerns, the District should continue to monitor the status of the existing unsewered area septic systems. The District should monitor the operational characteristics of the existing septic tanks with information provided by the County and repair contractors and update the on-gong operational condition assessment of the of the unsewered areas. It is in the best interest for the staff of the GCSD to work closely with the County, including providing surveys/questionnaires to customers regarding their septic system conditions (i.e., tank and leach fields).

Provided within this report is recent operational failure and repair data regarding existing septic tanks within Zone 3, 4, and 5 (see **Appendix E**). Water quality sampling was conducted by GCSD with results as noted within Section 5.5.2 of this report. If the District pursues the funding for the sewerage of any individual or combined Zones 3, 4 and 5, as described in Section 7 and 8, of this report, then additional efforts should continue towards monitoring, collection of septic system operational data, customer surveys, and water quality sampling.

It is important that the District take an active role in the monitoring of the condition of the existing septic systems, since the failed septic systems may pollute small streams within the service areas and pose as a water quality threat to the drinking water source and the environment. It is also highly recommended that GCSD work closely with the unsewered property owners by organizing a small unsewered committee that includes property owners within the unsewered zones to assist in notifications and communications for providing future sewerage to those potential service areas. Within the beginning Section 8 of this report, we have described the monitoring and possible sewering of SOI Zones 3, 4, and 5 as Phase Two.

9.7 YEARLY O&M PROGRAM - PREVENTATIVE/PREDICTIVE

The wastewater system will be maintained based on the California Waste Discharge Program and Title 22 for Recycled Water reuse requirements. Maintenance is typically classified as routine, predicive, preventative, and emergency. The goal of the emergency short-term reserves (projects less than $20,000) is to provide for the maintenance and replacement of various system-wide components on an annual basis. Periodically, emergency repairs are required throughout the system with the materials and supplies necessary to repair facilities included within the recommended annual budget, as shown within Sections 8.3 and 9.4.

The yearly required expenditures, not including labor to replace certain essential components, for preventative, predictive, and emergency replacement, along with repairs of the wastewater system, include and are not limited to valves, fittings, interceptor tanks, electrical and control systems, small pumps and motors, filter system components buildings and other appurtenances. Certain system components and appurtenances may age prematurely or may be damaged and require immediate attention. The District currently warehouses various replacement pumps and other equipment for the lift stations and other facilities. Each year's budget should be developed to provide for the necessary inventory of parts and fittings for the operations staff to make necessary repairs or

replacement of old and deteriorated equipment and appurtenances, which is currently being implemented by the GSCD staff. Each year this inventory should be re-evaluated and re-stocked, if necessary. This section of the report only focuses on the required materials and supplies to perform the necessary preventative, predictive, and emergency replacement and repair to system facility components and **does not** include standard daily, weekly and monthly materials, supplies, power, labor, chemicals, and other items that are required to operate the WWTP.

Most required maintenance, whether preventative or predictive, can be performed by in-house crews/staff. Material for emergency repairs will be acquired from the existing inventory, as needed. Certain components require maintenance every 5-10 years, including painting and coating. As stated, the inventory should be evaluated every year and revised as necessary to better match repair trends throughout the wastewater system.

9.7.1 Pipeline Inventory (Size, Type, Condition, Length)

The collection system contains a total of 61,630 LF of gravity and pressurized mains. A preliminary pipeline inventory list is presented in **Table 9.7.1-1**, which includes the collection and interceptor pipelines system, WWTP yard piping, and reclamation pipelines. The useful life expectancy for the existing pipelines is 50 years and many have a remaining useful life of 22 years. A preliminary asset management plan was developed and discussed in Section 9.6. This table below only reflects pipelines and inventories which have been generated for WWTP, STEP systems, and Lift Stations but further analysis is required.

Table 9.7.1-1, Pipeline Inventory List

Gravity Main					Pressurized Main				
Size (in)	Pipe Type	Age (yrs)	Condition	Length (LF)	Size (in)	Pipe Type	Age (yrs)	Condition	Length (LF)
4	PVC	28	Unk	28,070	2	PVC	28	Unk	4,516
6	PVC	28	Unk	1,531	3	PVC	28	Unk	19,605
8	PVC	28	Unk	2,800	6	PVC	28	Unk	3,037
10	PVC	28	Unk	2,071					

9.7.2 Preliminary Replacement Program (Short-Term and Long-Term)

The GCSD must consider a long-term capital plan that may or may not fully fund their depreciated assets over the projected life span. A preliminary capital replacement fund is presented below and should be developed to assure that revenues are available to design and construct "larger type" replacement and improvement projects prior to the system component's ultimate deterioration, and unplanned emergency repairs, which could result in possible health and safety issues. Some projects may require 18 months of design and planning, including environmental reports, before construction can commence, which, in itself, may last from 6-months to 18-months depending on the size of the project. The final financial strategy will be developed and prepared by the GCSD staff. The required yearly revenue necessary to fund replacement projects is always a difficult decision, but certain factors must be included to provide a realistic approach for funding future capital replacement funds.

Those factors include and are not limited to:

- Proposed and approved revisions to existing Waste Discharge Requirements or other regulatory permits such as Title 22
- Long-term expansion of the facilities affecting size and location and other geographical considerations
- Possible availability of grant and loan funding
- New treatment technologies involving revising/modifying system processes

This report does not address the legalities of establishing long-term capital reserve funds nor the method used to generate an interest bearing account for the future CRP account over time. The amount of yearly CIP reserves will be structured to take into account the ability to replace facilities over prescribed periods within the asset list with a portion of these reserves being placed within a restricted reserve account. The cost for replacements should take into consideration the planning (environmental), design and construction costs, which can be assumed to be approximatley 30% for planning purposes. It is also assumed that prior to bidding, the planning and design phases will take approximately 18-24 months to complete. **Table 9.7.2-1**, **Table 9.7.2-2**, **Table 9.7.2-3**, and **Table 9.7.2-4** present the preliminary system replacement cost tables for short and long-term pipelines (collection system components) and the WWTP. Detailed asset replacement costs for STEP system pumps and interceptor tanks and Lift Stations 1-4 will be completed in a later predesign phase.

It is acknowledged that there may be revisions due to data discrepancies and inaccurate record drawing(s) information that may require future modifications to this preiminary asset management plan.

Table 9.7.2-1 Short and Long-term Pipeline (Collection System) Asset Replacements Cost

Todays Cost	Year of Installation	Typical Useful Life	End of Life (Year)	Remaining Life (Yrs.)	Amortization Multiplier i=1%	Cost to Replace at i=1%	Amortization Multiplier i=3%	Cost to Replace at i=3%
$8,478,383	1993	70	2063	42	1.52	**$12,887,481**	3.67	**$31,146,873**
Sub-Total						**$12,887,481**		**$31,146,873**
Soft costs (Envir, Engr, CM, Legal/Admin) (25%)						$3,221,870		$7,786,718
Sub-Total						**$16,109,351**		**$38,933,592**
Contingency (10%)						$1,610,935		$3,893,359
Total Costs						**$17,720,286**		**$42,826,951**

Table 9.7.2-2 Short and Long-term WWTP Asset Replacements Cost

Todays Cost	Year of Installation	Typical Useful Life	End of Life (Year)	Remaining Life (Yrs.)	Amortization Multiplier i=1%	Cost to Replace at i=1%	Amortization Multiplier i=3%	Cost to Replace at i=3%
$6,823,250	Varies					**$9,180,420**	Varies	**$19,196,101**
Sub-Total						**$9,180,420**		**$19,196,101**
Soft costs (Envir, Engr, CM, Legal/Admin) (25%)						$2,295,105		$4,799,025
Sub-Total						**$11,475,525**		**$23,995,127**
Contingency (10%)						$1,147,552		$2,399,513
Total Costs						**$12,623,077**		**$26,394,639**