AGENDA

A G E N D A
SPECIAL MEETING OF THE GOVERNING BOARD
OF THE GOLETA SANITARY DISTRICT
A PUBLIC AGENCY

One William Moffett Place
Goleta, California 93117

September 3, 2020

CALL TO ORDER: 6:30 p.m.

ROLL CALL OF MEMBERS

BOARD MEMBERS: Sharon Rose
Robert O. Wageneck
Jerry D. Smith
Steven T. Majoewsky
George W. Emerson

CONSIDERATION OF THE MINUTES OF THE BOARD MEETING

The Board will consider approval of the Minutes of the Regular Meeting of 08/17/2020.

PUBLIC COMMENTS - Members of the public may address the Board on items within the jurisdiction of the Board.

POSTING OF AGENDA – The agenda notice for this meeting was posted at the main gate of the Goleta Sanitary District and on the District's web site 24 hours in advance of the meeting.

BUSINESS:

1. PRESENTATION ON THE USE OF ULTRAVIOLET LIGHT FOR CORONAVIRUS-19 DISINFECTION

2. REVIEW AND CONSIDERATION OF DRAFT PRELIMINARY DESIGN REPORT FOR BIOSOLIDS AND ENERGY STRATEGIC PLAN PHASE 1 IMPROVEMENTS
   (Board may take action on this item.)

3. CONSIDERATION OF A PROFESSIONAL SERVICES AGREEMENT FOR THE EVALUATION OF THE EXISTING RECLAMATION FACILITY FILTER SYSTEM
   (Board may take action on this item.)

4. GENERAL MANAGER'S REPORT

5. LEGAL COUNSEL'S REPORT

6. COMMITTEE/DIRECTOR'S REPORTS AND APPROVAL/RATIFICATION OF DIRECTOR'S ACTIVITIES

7. PRESIDENT'S REPORT

8. ITEMS FOR FUTURE MEETINGS

9. CORRESPONDENCE
(The Board will consider correspondence received by and sent by the District since the last Board Meeting.)

10. APPROVAL OF BOARD COMPENSATION AND EXPENSES AND RATIFICATION OF CLAIMS PAID BY THE DISTRICT
(The Board will be asked to ratify claims.)

ADJOURNMENT

Any public records which are distributed less than 24 hours prior to this meeting to all, or a majority of all, of the District's Board members in connection with any agenda item (other than closed sessions) will be available for public inspection at the time of such distribution at the District's office located at One William Moffett Place, Goleta, California 93117.

Persons with a disability who require any disability-related modification or accommodation, including auxiliary aids or services, in order to participate in the meeting are asked to contact the District's Finance & H.R. Manager at least 2 hours prior to the meeting by telephone at (805) 967-4519 or by email at info@goletasanitary.org.

MINUTES

MINUTES
REGULAR MEETING OF THE GOVERNING BOARD
GOLETA SANITARY DISTRICT
A PUBLIC AGENCY
DISTRICT OFFICE CONFERENCE ROOM
ONE WILLIAM MOFFETT PLACE
GOLETA, CALIFORNIA 93117

August 17, 2020

CALL TO ORDER: President Rose called the meeting to order at 6:30 p.m.

BOARD MEMBERS PRESENT: Sharon Rose, Robert O. Wageneck, Jerry D. Smith, Steven T. Majoewsky, George W. Emerson

BOARD MEMBERS ABSENT: None

STAFF MEMBERS PRESENT: Steve Wagner, General Manager/District Engineer, Rob Mangus, Finance and Human Resources Manager/Board Secretary and Richard Battles, Legal Counsel from Howell Moore & Gough LLP.

OTHERS PRESENT: Tom Evans, Director, Goleta Water District

APPROVAL OF MINUTES: Director Majoewsky made a motion, seconded by Director Smith, to approve the minutes of the Regular Board meeting of 08/03/20. The motion carried by the following vote:

(20/08/2119)

AYES:	5	Rose, Wageneck, Smith, Majoewsky Emerson
NOES:		None
ABSENT:		None
ABSTAIN:		None

POSTING OF AGENDA: The agenda notice for this meeting was posted at the main gate of the Goleta Sanitary District and on the District's website 72 hours in advance of the meeting.

PUBLIC COMMENTS: None

BUSINESS:

1. BIENNIAL REVIEW OF DISTRICT'S CONFLICT OF INTEREST CODE
Mr. Wagner gave the staff report.

Director Wageneck made a motion, seconded by Director Emerson to determine that no changes to the District's Conflict of Interest Code are required and authorize and direct the General Manager to submit a written statement to Santa Barbara County to that effect prior to October 1, 2020.

The motion carried by the following vote:

(20/08/2120)

AYES:	5	Rose, Wageneck, Smith, Majoewsky, Emerson
NOES:		None
ABSENT:		None
ABSTAIN:		None

2. CONSIDERATION OF ISSUANCE OF NOTICE OF COMPLETION FOR THE GOLETA SANITARY DISTRICT 2020 PIPELINE REHABILITATION PROJECT

Mr. Wagner gave the staff report.

Director Smith made a motion, seconded by Director Wageneck to approve and accept the 2020 Pipeline Rehabilitation Project as complete and direct the General Manager to file a Notice of Completion with the Santa Barbara County Recorder.

The motion carried by the following vote:

(20/08/2121)

AYES:	5	Rose, Wageneck, Smith, Majoewsky, Emerson
NOES:		None
ABSENT:		None
ABSTAIN:		None

3. CONSIDERATION OF A MULTI-JURISDICTIONAL AGREEMENT WITH GOLETA WEST SANITARY DISTRICT FOR PRETREATMENT SERVICES

Mr. Wagner gave the staff report.

Director Majoewsky made a motion, seconded by Director Wageneck to approve the multi-jurisdictional agreement with Goleta West Sanitary District for pretreatment services.

The motion carried by the following vote:

(20/08/2122)

AYES:	5	Rose, Wageneck, Smith, Majoewsky, Emerson
NOES:		None
ABSENT:		None
ABSTAIN:		None

4. <u>CONSIDERATION AND ADOPTION OF RESOLUTION NO. 20-655 APPROVING REVISED ORGANIZATION CHART AND EMPLOYEE PAY SCHEDULE</u>
Mr. Wagner gave the staff report.

Director Smith made a motion, seconded by Director Emerson to approve and adopt Resolution No. 20-655 updating the Employee Organizational Chart and Pay Schedule for FY 2020-21.

The motion carried by the following vote:

(20/08/2123)

AYES:	5	Rose, Wageneck, Smith, Majoewsky, Emerson
NOES:		None
ABSENT:		None
ABSTAIN:		None

5. <u>GENERAL MANAGER'S REPORT</u>
Mr. Wagner gave the report.

6. <u>LEGAL COUNSEL'S REPORT</u>
Mr. Battles reported on a California Supreme Court case opinion from August 3, 2020 relating to a Proposition 218 challenge, first by unsuccessful protest, then by initiative and then by referendum. The initiative would allow voters to propose new measures, the referendum would have reversed the rate change measure. The court found that a water rate increase was exempted from the referendum as a tax or levy and the appeal found for the defendants.

7. <u>COMMITTEE/DIRECTORS' REPORTS AND APPROVAL/RATIFICATION OF DIRECTORS' ACTIVITIES</u>

Director Majoewsky – Reported on the Goleta West Sanitary District meeting he attended via Zoom.

Director Emerson – No report.

Director Wageneck – No report.

Director Smith – No report.

8. <u>PRESIDENT'S REPORT</u>
President Rose – No report.

9. ITEMS FOR FUTURE MEETINGS
No Board action was taken to return with an item.

10. CORRESPONDENCE
The Board reviewed and discussed the list of correspondence to and from the District in the agenda.

11. APPROVAL OF BOARD COMPENSATION AND EXPENSES AND RATIFICATION OF CLAIMS PAID BY THE DISTRICT

Director Majoewsky made a motion, seconded by Director Wageneck, to ratify and approve the claims, for the period 08/04/20 to 08/17/20 as follows:

Running Expense Fund #4640	$ 283,791.10
Depreciation Replacement Reserve Fund #4655	$ 4,197.13

The motion carried by the following vote:

(20/08/2124)

AYES:	5	Rose, Wageneck, Smith, Majoewsky, Emerson
NOES:		None
ABSENT:		None
ABSTAIN:		None

ADJOURNMENT

There being no further business, the meeting was adjourned at 7:49 p.m.

Sharon Rose
Governing Board President

Robert O. Mangus, Jr.
Governing Board Secretary

Robert O. Wageneck

Jerry D. Smith

Steven T. Majoewsky

George W. Emerson

AGENDA ITEM #1

AGENDA ITEM: **1**

MEETING DATE: **September 3, 2020**

I. NATURE OF ITEM

Presentation on the Use of Ultraviolet Light for Coronavirus-19 Disinfection

II. BACKGROUND INFORMATION

A type of ultraviolet light known as FAR-UVC could be safely used to disinfect air in public places which could help in the fight against coronavirus, according to new research.

FAR-UVC light disinfection of 222nm wavelength provides the first human and animal safe, practical and effective countermeasure for infectious disease and pathogens in occupied spaces.

This light can autonomously and continuously disinfect the occupied spaces from any known virus, bacteria or fungi, which is essential for containing and mitigating the emerging threat of the coronavirus and similar outbreaks where potentially-infected human carriers in occupied locations are often not distinguishable from the non-carriers.

Along with effective diagnostics, vaccines, and therapies, the elimination of pathogens in occupied spaces is an essential element of infectious disease eradication. This FAR-UVC technology is an essential addition to existing sanitation practices, as part of a multi-pronged approach to prevent the spread of existing and emerging infectious disease.

Director Wageneck will provide a brief presentation on the potential use of this technology for Board consideration

III. COMMENTS AND RECOMMENDATIONS

This presentation is for informational purposes only. As such, no Board action is recommended at this time.

IV. REFERENCE MATERIAL

None

AGENDA ITEM #2

AGENDA ITEM: 2

MEETING DATE: September 3, 2020

I. NATURE OF ITEM

Review and Consideration of Draft Preliminary Design Report for Biosolids and Energy Strategic Plan Phase 1 Improvements

II. BACKGROUND INFORMATION

On September 3, 2019 the District adopted a comprehensive Biosolids and Energy Strategic Plan (BESP) to determine the best combination of biosolids treatment, disposal and energy recovery improvements to move the District towards its vision of energy sustainability. The final list of recommended BESP improvements were grouped into the following three phases:

1. Install a new digester to resolve firm capacity issue and install 1st phase of a Combined Heat and Power (CHP) system to convert the existing biogas to energy
2. Install a high strength waste receiving station to increase biogas production and install 2nd phase of CHP system to convert additional biogas to energy
3. Install a thermal dryer to produce class A biosolids and reduce hauling costs

On January 6, 2020 the District approved a professional services agreement with Hazen & Sayer (Hazen) for the preparation of a preliminary design report (PDR) on the recommended phase 1 improvements. The purpose of the PDR is to further define the overall scope of the project and identify any potential design and/or environmental issues now, in order to complete the project's design and environmental review process.

Over the last several months District staff has worked closely with the Hazen team to evaluate the basis of design and select the best-suited types of equipment for the phase 1 improvements. Two technical memorandums on this process were prepared along with preliminary plans and cost estimates. This information has been compiled into a draft PDR that is presented herein for Board consideration.

The PDR appendices include a significant amount of the background information and data used to support the PDR recommendations. Given the overall volume of information included in the appendices (over 360 pages), a copy is available for review at the District office.

III. COMMENTS AND RECOMMENDATIONS

The final list of recommended BESP improvements were grouped into the following three phases:

1. Install a new digester to resolve firm capacity issue and install 1st phase of a CHP system to convert the existing biogas to energy
2. Install a high strength waste receiving station to increase biogas production and install 2nd phase of CHP system to convert additional biogas to energy
3. Install a thermal dryer to produce class A biosolids and reduce hauling costs

While the attached PDR is focused on the phase 1 improvements, much consideration was given to the future BESP improvements to ensure that what is eventually built in phase 1 will complement the future improvements.

The development of the PDR included the following tasks:

1. Preliminary design of new anaerobic digestor to replace digestor #1
   - ✓ Review of existing information
   - ✓ Determination of digester volume
   - ✓ Assessment of digester systems and features
   - ✓ Digester equipment selection of sizing

2. Preliminary design of combined heat and power (CHP) facility
   - ✓ CHP system selection and sizing evaluations
   - ✓ Biogas pretreatment and conveyance preliminary design
   - ✓ Gas storage evaluations
   - ✓ System enclosure alternative
   - ✓ Heat recovery evaluations
   - ✓ Electrical connections evaluation
   - ✓ System and equipment siting
   - ✓ Summary report preparation

3. Regulatory/Permitting
   - ✓ Data collection
   - ✓ Emissions calculations
   - ✓ Air quality and CEQA regulatory analysis
   - ✓ Summary report preparation

4. Preparation of an implementation/construction sequencing plan

5. Development of preliminary cost estimates

6. Phases 1, 2 and 3 conceptual layouts

The attached PDR includes information gathered through the completion of the above tasks. A summary of the PDR recommendations and preliminary costs are included in the executive summary. The total estimated cost of all phase 1 BESP improvements are shown below.

BESP Phase 1 Component	**Estimated Cost**
New Concrete Anaerobic Digester with Fixed Lid	$6,852,000
New CHP System with Pretreatment System	$2,347,000
Conversion of Digester No. 1 to Biogas Storage Facility	$815,000
Total Cost:	**$10,014,000**

This report is for informational purposes only. As such, no Board action is required at this time. The next step in the development of the recommended phase 1 improvements is preliminary design and environmental review. The proposal for this next phase of work will be brought to the Board for consideration in the future.

IV. REFERENCE MATERIAL

Goleta Sanitary District Biosolids & Energy – Phase 1– Draft Preliminary Design Report

Hazen and Sawyer
11260 El Camino Real, Suite 102
San Diego, CA 92130 • 858-764-5520

Goleta Sanitary District Biosolids & Energy – Phase 1 Preliminary Design Report

Draft Report
Project # 20063-012
August 28, 2020

Table of Contents

Executive Summary 1

1. Introduction 1-1

2. Anaerobic Digester 2-2

2.1 Design Criteria 2-2

2.1.1 Solids Production 2-2

2.1.2 Digester Gas Production 2-3

2.1.3 Heating Requirements 2-4

2.2 Digester Tank 2-5

2.3 Digester Mixing 2-6

2.4 Digester Cover 2-7

2.5 Digester Heating System 2-8

2.5.1 Boilers 2-9

2.5.2 Heat Exchangers 2-9

2.5.2.1 Heat Exchanger Circulating Pumps 2-9

2.6 Digester Siting Requirements 2-10

2.7 Structural and Geotechnical Evaluations 2-10

2.7.1 Governing Code 2-11

2.7.2 Supplemental Design Codes 2-11

2.7.3 Codes and Standards for Specific Materials 2-11

2.7.3.1 All Materials 2-12

2.7.3.2 Concrete 2-12

2.7.3.3 Steel 2-12

2.7.3.4 Stainless Steel 2-12

2.7.4 Design Loads 2-12

2.7.4.1 Dead Loads 2-12

2.7.4.2 Live Loads 2-13

2.7.4.3 Equipment Loads 2-13

2.7.4.4 Piping Loads 2-13

2.7.4.5 External Soil and Groundwater Loads 2-13

2.7.4.6 Wind Loads 2-14

2.7.4.7 Seismic Loads ... 2-14
2.7.5 General Basis for Design ... 2-15
2.7.5.1 Loading Combinations ... 2-15
2.7.5.2 Seismic Design ... 2-15
2.7.5.3 Concrete Design ... 2-15
2.7.6 Structural Metals Design ... 2-17
3. New Combined Heat and Power ... 3-18
3.1 CHP System Sizing - Design Conditions ... 3-18
3.2 Biogas System Evaluation (Gas Pretreatment and Conveyance) ... 3-19
3.3 Gas Storage Evaluations ... 3-20
3.4 System Enclosure and Sound Attenuation Alternatives ... 3-22
3.5 Heat Recovery Evaluations ... 3-23
3.6 Emissions Control Equipment ... 3-23
3.7 Electrical Interconnections Evaluation ... 3-24
3.8 Siting Requirements ... 3-25
4. Phase I Electrical Evaluations ... 4-1
4.1 Main Switchgear Modifications ... 4-1
4.2 MCC-B Modifications ... 4-1
4.2.1 Ductbank Re-Routing ... 4-1
4.2.2 Temporary Power ... 4-2
4.2.3 Raceways and Conduits ... 4-2
4.2.4 Electrical Codes and Standards ... 4-3
4.3 Instrumentation and Control (I&C) Evaluations ... 4-3
4.4 Area Standards and Classifications ... 4-4
5. Regulatory/Permitting Requirements ... 5-2
5.1 Air Quality/CEQA Regulatory analysis ... 5-2
5.1.1 Air Permitting and New Source Review ... 5-3
5.1.2 Evaluation of Emissions Compared to NSR Thresholds ... 5-4
5.2 Archaeological Analysis ... 5-8
5.2.1 Archaeological Records Summary ... 5-8
5.2.2 AB-52 Native American Consultation ... 5-10

5.2.3 Historical Aerial Review 5-10
5.2.4 Field Investigation 5-10
5.2.5 Impact Analysis 5-11
5.2.6 CEQA Requirements 5-1
5.2.7 Recommendations 5-1

6. Phase I Implementation / Construction Sequencing Plan 6-3
6.1 Phase 1 Implementation Plan 6-3
6.2 Construction Sequencing Plan 6-3

7. Phases 1-3 Conceptual Layout 7-6
7.1 Phase 1 7-6
7.2 Phases 2 and 3 7-6

8. Cost Estimates 8-8
8.1 Anaerobic Digester 8-8
8.2 Combined Heat and Power 8-9
8.3 Biogas Storage 8-10

9. Schedule 9-1

10. Conclusions and Recommendations 10-2

List of Tables

Table 2-1. Summary of Existing Digester Features 2-2
Table 2-2. Current (Year 2020) and Anticipated Future (Year 2040) Sludge Production 2-3
Table 2-3. Current (Year 2025) and Anticipated Future Baseline (Year 2040) Digester Gas Production 2-4
Table 2-4. Estimated Average Digester Heating Requirement (Based on 2040 Conditions) 2-4
Table 2-5. Proposed Mesophilic Digester Tank (Digester 4) 2-5
Table 2-6. Digester Mixing Equipment Design Criteria 2-7
Table 2-7. Proposed Digester Heat Exchanger System for Digester 4 2-9
Table 2-8. Digester 4 Circulating Pumps 2-10
Table 2-9. Load Combinations 2-15
Table 2-10. Concrete Design Criteria 2-16
Table 2-11: Structural Metals Design Criteria 2-17
Table 3-1. Current (Year 2025) and Anticipated Future Baseline (Year 2040) Digester Gas Production 3-18
Table 3-2. Power and Heat Output of a 450 KW CHP Unit 3-19
Table 8-1. Anaerobic Digester Cost Estimate 8-9

List of Figures

Figure 4-1: 2020 NFPA 820 Chapter 6 Table 6.2.2(a) Row 16 4-1
Figure 4-2: 2020 NFPA 820 Figure A.6.2 (a) 4-1
Figure 5-1: Archaeological Impact Analysis (by Dudek) 5-1

List of Appendices

Appendix A: TM 1 - Basis of Design for Anaerobic Digestion and Combined Heat and Power
Appendix B: TM 2 - Anaerobic Digestion Replacement and Combined Heat and Power System
Appendix C: Preliminary Drawings
Appendix D: Digester Gas Engine and Flare Letter 08-14-20
Appendix E: Dudek Archaelogical Impact Analysis
Appendix F: GSD Digester Cost Estimate
Appendix G: GSD CHP Cost Estimate
Appendix H: GSD Biogas Storage Cost Estimate
Appendix I - GSD Biosolids and Energy Phase 1 May 22 2020 Cost Estimate

Executive Summary

Goleta Sanitary District's (GSD) Biosolids and Energy Strategic Plan (BESP) developed a roadmap for future sustainability, to be implemented in a phased timeline. GSD is now moving forward with Phase 1 improvements at its water resource recovery facility (WRRF), which includes adding a new anaerobic digester and combined heat and power (CHP) system, and converting the existing Digester 1 for biogas storage. The installation of a new, larger digester will restore firm capacity and provide additional capacity for future High Strength Waste (HSW) co-digestion. The increased digester capacity combined with the addition of a new (CHP) system for digester gas beneficial use is GSD's first step towards their strategic goal of energy neutrality.

Hazen's role in assisting GSD included conducting design calculations for the new anaerobic digester and CHP system; contacting technology vendors; evaluating alternative technologies auxiliary units such as digester covers, mixing and heating systems; sizing new systems; and preparing a preliminary site layout. The results of Hazen's investigations were presented in technical memorandums (TM 1 and TM 2) and subsequent virtual meetings were conducted to gain GSD's input. The collaboration has resulted in recommendations for GSD's Biosolids and Energy Phase 1 project, summarized in Table ES-1 below:

Table ES-1. Summary of Recommendations

System Component	Equipment	Quantity	Location
Anaerobic Digester (Digester 4)	Concrete	1	North of Anaerobic Digester 3
Digester Cover	Non-submerged Concrete	1	Anaerobic Digester 4
Digester Mixing	Submersible Mixing	2	inside Anaerobic Digester 4
Heat Exchangers	Tube-In-Tube Type	1	East side of Anaerobic Digester 4 - outside
Recirculation Pumps	Recessed Impeller	1	East side of Anaerobic Digester 4 - outside
Hot Water Loop Pumps	Centrifugal	1	East side of Anaerobic Digester 4 - outside
Gas Storage	Dual membrane gas holder cover	1	on existing Anaerobic Digester 1
Biogas Pretreatment System	Moisture, H_2S and siloxane removal	1	near the Maintenance and Electrical Building
Biogas Booster Blower	Single stage centrifugal	1	near the Maintenance and Electrical Building
CHP Unit	450 kW unit	1	Between Maintenance Building and Anaerobic Digester 3

Appendix C provides the drawings for recommended system components and presents detailed information on site layouts and recommended upgrades on existing piping, electrical, and instrumentation. The estimated total Phase I project cost is $10 million. The preliminary cost estimates for the individual components of Phase 1 are presented in Tables ES-2, ES-3 and ES-4. The project start date is estimated to be the second quarter of 2021 and the end date is estimated to be by the end of 2022.

Table ES-2. Anaerobic Digester Total Probable Component Cost

	Assumed Percentage	**Anaerobic Digester**
General Conditions	*10%*	$226,000
Digester Tank and Cover		$1,600,000
Tank Mixing (Submersible Mixer)		$445,000
Heat Exchanger Assembly		$104,000
Sludge Recirculation System		$51,000
Gas Discharge Assembly		$65,000
Site Work		$576,000
Electrical and I&C		$384,000
	Subtotal:	$3,451,000
Total Probable Construction Cost with *Contractor Markup*[1]	**Subtotal:**	**$4,434,000**
Project Cost		
Contingency	*30%*	$1,109,000
Engineering	*10%*	$443,400
Environmental Documentation	*LS*	$150,000
Environmental Monitoring (3 months)		$138,320
Permitting	*1%*	$44,340
Construction Management	*10%*	$443,400
Legal	*1%*	$44,340
Administration	*1%*	$44,340
Total Probable Component Cost		**$6,852,000**

Table ES-3. CHP System Total Probable Component Cost

	Assumed Percentage	CHP System
General Conditions	7%	$82,000
450 KW CHP Unit with Heat Recovery		$581,000
Electrical	9%	$118,000
Power Metering, SCADA and I&C	2%	$18,000
Biogas Booster Blower		$11,000
Biogas Pretreatment System		$122,000
Biogas Piping	LS	$74,000
Natural Gas Blending System and Piping	LS	$44,000
Hot Water Piping	LS	$21,000
Modifications to Flare		$8,000
Equipment Installation	20%	$178,000
	Subtotal:	$1,254,000
Contractor Markup	*22%*	$351,000
Total Probable Construction Cost		**$1,605,000**
Contingency	*30%*	$376,000
Engineering	*10%*	$126,000
Environmental Documentation	*LS*	$100,000
Environmental Monitoring (3 weeks)	*LS*	$15,000
Permitting	*1%*	$13,000
Construction Management	*7%*	$88,000
Legal	*1%*	$13,000
Administration	*1%*	$13,000
Total Probable Project Cost		**$2,347,000**

Table ES-4. Biogas Storage Total Probable Component Cost

	Assumed Percentage	Biogas Storage
General conditions	7%	$29,000
Demolition		$75,000
Site preparation		$94,000
Install cover		$165,000
Install air system		$53,000
Electrical and I&C		$28,000
	Subtotal:	$443,000
Contractor Markup	*21%*	$120,000
Total Probable Construction Cost		**$562,000**
Contingency	*25%*	$141,000
Engineering	*10%*	$57,000
Permitting	*1%*	$6,000
Construction Management	*7%*	$40,000
Legal	*1%*	$6,000
Administration	*1%*	$6,000
Total Probable Project Cost		**$815,000**

1. Introduction

GSD owns and operates the Goleta WRRF with an annual average design flow capacity of 9.6 million gallons per day (mgd). The GSD WRRF is currently treating an annual average flow 4.9 mgd. The treatment process at the WRRF begins with bar screens to remove large debris and aerated grit tanks and two cyclone separators to remove grit and sand. The wastewater then flows into three primary clarifiers prior to secondary treatment for solids removal. The secondary treatment at the WRRF includes biofilters, an aeration basin, and four secondary clarifiers.

Currently, GSD's WRRF has the following solids and gas handling processes for treatment of the solids to achieve Class B biosolids:

- Waste activated sludge (WAS) generated from secondary treatment flows through two screw thickeners and is thickened up to 6% solids.
- Primary sludge (PS) coming from primary clarifiers and thickened WAS (TWAS) are combined prior to the digestion process.
- Combined PS and TWAS solids are stabilized in three mesophilic anaerobic digesters, operated in parallel.
- Digested sludge is dewatered via screw presses prior to sending out as a Class B product.
- A small portion of the digested sludge also goes into sludge drying beds for further stabilization and managed as a Class A product.
- The biogas produced in the digesters is currently utilized for heating at the WRRF. Surplus biogas that is not required for heating is disposed of through the waste gas flare.

GSD is committed to being a good community steward of the environment and public health and funds. This includes diversifying biosolids beneficial use options and pursuing energy self-sufficiency practices. As part of this commitment GSD developed the BESP for the WRRF. The BESP aims to mitigate regulatory uncertainties affecting biosolids disposition, to diversify beneficial use outlets, and to approach energy neutrality for the facility. As part of the roadmap developed in the BESP, GSD is now moving forward with Phase 1 which includes the following main tasks:

1) Design of a new digester: One of the existing digesters (Digester 1), is nearing the end of its useful life and will be taken offline. The new digester will provide more digester volume and restore firm capacity for future flows and loads conditions (Year 2040).

2) Design of a CHP system: Parallel to the objectives and the vision GSD adopted in the BESP, digester gas produced will be beneficially used in a new CHP system.

The objective of this Preliminary Design Report (PDR) is to establish the design conditions for the proposed new digester and CHP system including sizing of units, digester cover, mixing, heating, gas storage, biogas treatment, and other auxiliary equipment. The PDR also addresses siting requirements, electrical, and instrumentation and control (I&C) improvements.

2. Anaerobic Digester

There are currently three mesophilic anaerobic digesters at the WRRF that were built at different times. Digester 1, Digester 2, and Digester 3 were installed in 1950, 1970, and 1988, respectively. Hazen conducted a condition assessment of the WRRF assets in 2016 and concluded that Digester 1, Digester 2, and Digester 3 would reach the end of their useful life in 2023, 2040, and 2049, respectively. A summary of the existing digesters and system features are shown in Table 2-1. Each digester at the WRRF is a concrete vessel equipped with a gas-mixing system and a floating cover combined with gas holder. The three digesters differ by size and volume, which complicates existing operations.

Table 2-1. Summary of Existing Digester Features

Parameters	Digester 1	Digester 2	Digester 3
Diameter, ft	43	45	55
Side Water Depth, ft	24.5	24.5	29.0
Volume, gal	266,300	291,700	515,400
Digester mixing system	One Pearth™ Mixing system (Siemens/Evoqua) per digester, with moisture separator, sediment trap, flame arrester, and gas compressor/blower		
Recirculation Pumps	One recirculation centrifugal recessed impeller pump per digester		
Heat Exchanger	One external tube-in-tube heat exchanger per digester		
Hot water circulation pump	One in-line centrifugal pump per digester		

The BESP concluded that replacing Digester 1 with a higher capacity digestion tank would provide GSD firm capacity (with the largest unit offline) to handle anticipated future (2040) flows and loads. The replacement of Digester 1 was included in Phase 1 improvements recommended in BESP. The following sections provide the details of the new mesophilic anaerobic digester that will replace Digester 1.

2.1 Design Criteria

This section presents the basis for design for the proposed new Digester 4. Historical data analysis and future projections of solids production and gas production were evaluated in detail, and the results were presented in a separate technical memorandum (TM 1- Basis of Design for Anaerobic Digestion and Combined Heat and Power) found in Appendix A.

2.1.1 Solids Production

Table 2-2 presents the estimated future solids production for consideration during design of the digester upgrades. GSD aims to enhance energy neutrality through HSW co-digestion and CHP system. Although, the HSW program is currently not implemented at GSD, it is anticipated to adopt the HSW program before Year 2040 as part of Phase 2 improvements defined in the BESP. Therefore, two separate digester feed conditions were identified (Digester Feed with HSW and w/o HSW). Based on the initial assessments and recent input from GSD during the development of TM 2, it was decided to limit the

HSW application with 6,000 gpd of fats, oils and grease (FOG) addition due to availability of the HSW material and also energy neutrality goals. Preliminary assessments indicate that GSD can reach energy neutrality accepting approximately 6,000 gpd of FOG. More details on HSW availability and limitations were discussed in TM 2.

GSD anticipates changing some operational parameters/processes that might increase the solids generation in the future. The Future Baseline scenario considers the current operation in the primary clarifiers and activated sludge with similar solids yield. The Future Conservative scenario takes into account enhanced primary clarification with 80% TSS removal. More details about these scenarios are provided in TM 1and Appendix A. Table 2-2 also presents the estimated solids production for these conservative scenarios.

Table 2-2. Current (Year 2020) and Anticipated Future (Year 2040) Sludge Production

	Current (Year 2020)			Future Baseline (Year 2040)			Future Conservative (Year 2040)		
Parameters	**Annual Average**	**Max 30 Days**	**Max 7 Days**	**Annual Average**	**Max 30 Days**	**Max 7 Days**	**Annual Average**	**Max 30 Days**	**Max 7 Days**
Influent Flow, mgd	4.9	5.9	6.9	5.4	6.5	7.6	5.4	6.5	7.6
Primary Sludge Production									
lbs PS/MG (AA flow)	2,300	2,750	3,200	2,300	2,750	3,200	3,000	3,600	4,200
Secondary Sludge Production									
lbs WAS /MG (AA flow)	1,200	1,600	1,700	1,200	1,400	1,700	600	700	900
Digester Feed (w/o HSW)									
Feed Flow (gpd)	41,200	50,800	57,600	44,500	52,900	62,200	41,500	49,600	58,700
Solids Load (lbs/d TS)	16,900	21,000	23,600	18,600	22,100	26,100	19,300	23,100	27,300
Volatile Solids Load (lbs/d VS)	13,300	16,500	18,600	14,700	17,400	20,500	15,600	18,700	22,100
Digester Feed (with HSW)[1,2]									
Feed Flow (gpd)	--	--	--	50,500	58,900	68,200	47,500	55,600	64,700
Solids Load (lbs/d TS)	--	--	--	21,600	25,100	29,100	22,300	26,100	30,300
Volatile Solids Load (lbs/d VS)	--	--	--	17,500	20,200	23,300	18,400	21,500	24,900

1. Considering 6,000 gpd of FOG addition by 2025.
2. FOG solids concentration is 6% and 94% VS/TS.

2.1.2 Digester Gas Production

Table 2-3 presents an estimate of future biogas production based on the future baseline solids loadings presented in Table 2-2, a volatile solids destruction rate (VSR) of approximately 55% with all digesters in service. This value is parallel to the historical data provided and model predictions. HSW co-digestion enhances VSR and biogas generation rate. Considering all digesters are in service (the total digester volume of 1.3 MG and HRT of 22.5 days) at max month loading conditions with HSW, VSR can reach up to 58% and gas production rate can increase to 20 cf per lb VS destroyed.

Table 2-3. Current (Year 2025) and Anticipated Future Baseline (Year 2040) Digester Gas Production

		2025		2040	
Parameter	**Units**	**Annual Average**	**Max Month**	**Annual Average**	**Max Month**
Biogas Production without HSW[1]	scfm	90	110	110	130
Biogas Production with HSW [2,3]	scfm	120	140	140	160

1. The assumed PS and TWAS VSR (max) is70%, and 45%, respectively.
2. Assuming 6,000 gpd of FOG addition by 2025.
3. FOG solids concentration is 6% and 94% VS/TS, VSR Rate of 90% VSR.

2.1.3 Heating Requirements

Sizing of the boilers for hot water heating of the digesters is based on the required digester temperatures. The heating capacity requirements consist of the following demands:

- Process heating demands to raise the temperature of the incoming flow to between 95°F to 100°F (mesophilic conditions).
- Space heating demands to overcome heat loss from the digester tanks during summer and winter conditions.

Digester heat demands were calculated based on solids loading and digester heat losses for a variety of conditions (summer, winter average, winter extreme, etc.). The estimated average heating requirements are summarized in Table 2-4.

Table 2-4. Estimated Average Digester Heating Requirement (Based on 2040 Conditions)

Weather Condition	Low	Average	High
Summer, Average[1], MMBTU/hr	0.45	0.48	0.51
Winter, Average[2], MMBTU/hr	0.57	0.61	0.65
Winter, Extreme[3], MMBTU/hr	0.59	0.71	0.75

1. Based on the historical average air temperature recorded for the months between May and October in Santa Barbara, CA.
2. Based on the historical average air temperature recorded for the months between November and April in Santa Barbara, CA.
3. Based on the historical minimum air temperature recorded in Santa Barbara, CA.

The maximum heat condition is typically selected based on future maximum month conditions at the WRRF that corresponds to a demand of 0.75 MMBTU/hr to operate all the digesters in operation including the new digester. Each boiler installed in 2016 and 2020 is sized for approximately 2.0 MMBTU/hr output. The reported average heating demand at the GSD WRRF (building and digester) was 0.7 MMBTU/hr in the summer months (May to October) and 0.96 MMBTU/hr in winter months (November to April) based on average values provided for 2018.

2.2 Digester Tank

There are currently three mesophilic anaerobic digester (MAD) at the WRRF; Digester 1, Digester 2, and Digester 3. The new digester (Digester 4) will replace Digester 1 to restore firm digester capacity for current and future conditions. The minimum volume required for Digester 4 was calculated based on the anticipated future baseline solid flows and loads that are summarized in Table 2-2. Table 2-5. The recommended digester geometry is summarized in Table 2-5. With the proposed straight shell tank height (29.0 - feet liquid side water depth), the straight shell tank volume corresponds to approximately 0.52 mgal. Including the bottom cone volume, the total tank volume reaches approximately 0.55 mgal. Considering the current configuration of existing digesters, and ease of construction and operations, Digester 4 will have the same 0.55 mgal capacity, 55 ft inside diameter and other dimensions as Digester 3.

GSD's WRRF is located close to Santa Barbara Airport and therefore subject to Federal Aviation Administration (FAA) rules and regulations. FAA limits the height of objects around the airports. Hence, GSD should file a notification for a new structure to be built at the WRRF. Had the height of the proposed digester exceeded the height of the existing units, GSD might have been subject to a lengthy process to get permission; therefore, the height of Digester 4 will be kept the same as the existing digesters.

Table 2-5. Proposed Mesophilic Digester Tank (Digester 4)

Parameters	Design Criteria
Tank inside diameter ft	55
Unit volume straight shell, gal/ft	17,800
Tank Freeboard	3ft
Straight shell Average side water depth, ft	29
Straight shell Maximum Side water Depth	32
Total cylindrical volume, gallons	515,400
Bottom cone diameter, feet	3
Cone Depth, ft	6
Bottom cone volume, gallons	36,000

Firm capacity is defined as the ability to maintain 15 days HRT with the largest unit offline at max Month Conditions. The addition of Digester 4 will provide firm capacity under current and future conditions. The exception is if GSD initiates a HSW program with 6,000 gpd of FOG addition, they will need to operate 3 digesters when they receive maximum month flow and load conditions in the future (year 2040). GSD will have the capacity to take one big digester offline (either Digester 3 or 4) and still be able to accept 6000 gpd of FOG under average flow and load conditions in the future. Replacing Digester 2 with a larger volume tank might be considered in the future if at max month conditions and HSW application, firm capacity should have to be met. Based on the condition assessment, Digester 2 will reach the end of its useful life by Year 2040.

2.3 Digester Mixing

Complete mixing of the anaerobic digesters is critical for uniform stabilization of the solids. Adequate mixing energy is required to maintain solids in suspension while preventing formation of stagnant areas. Management of foam and scum formation is another consideration with the implementation of anaerobic digester mixing systems.

The following digester mixing alternatives were evaluated for implementation at the WRRF:

- Gas mixing similar to existing mixing equipment at the WRRF
- Pumped mixing
- Draft tube mixing
- Linear motion mixing
- Submersible mixing

The technology evaluation for the digester mixing system is detailed in TM 2 – Anaerobic Digestion Replacement and Combined Heat and Power System (Appendix B).

The digester mixing technology recommended for implementation is submersible mixing. The major benefits of the proposed technology are:

- Ability to adequately mix the digester contents with varying liquid levels.
- Relatively low energy consumption and ease of operation (can be maintained without draining the digesters).
- Ability to handle higher solids concentrations.
- Ability to mix higher solids content at a solids feed concentration of 10-12% to the digester Using this type of mixer allows the WRRF to practice high solids feed in the future, thus eliminating the potential need to build additional digesters to maintain firm capacity.

The submersible mixers are equipped with a variable speed permanent magnet synchronous motor (PMS) with integrated three blade propellers. The motor is driven directly without a gear or any other transmitting elements, which allows for high mixing efficiency at low energy demand. The mixer is installed on a vertical shaft inside the tank so it can operate at different heights. The vertical shaft is mounted to a pedestal on the digester floor. The proposed submersible mixers are designed to provide flexibility to mix digesters with varying solids concentrations from less than 1% TS to greater than 10% TS. Each mixer is equipped with an automatic positioning system. The positioning system has the ability to position the mixer close to the surface to breakup any floating/scum layers, or near the bottom of the tank to prevent stratification in the tank. Adjusting the height of the mixers to work in the lower portion of the tank can also resuspend solids that may have settled onto the bottom of the tanks.

Table 2-6. Digester Mixing Equipment Design Criteria

Parameters	Design Criteria
Mixing Type	Submersible mixer
Quantity	2
Potential Manufacturer(s)	Anaergia
Mixer Model	PSM 1500
Mixer Design Criteria	Maintain active mixing volume of 90% or more at velocities greater than 4 in/sec (0.33 ft/s)
Horsepower	16 hp
Average Estimated Power Draw	7 kW/mixer
Operating Water level	29.5 ft
Maximum Water Level	31 ft

The following design features will be implemented with the digester mixing system:

- Submersible mixer service box will be installed on the non-submerged concrete cover. Non-submerged concrete covers will be designed to accommodate submersible mixer equipment weight.
- Submersible mixer will be mounted on a vertical shaft that is anchored at the bottom of the digester.
- Equipment manufacturer will be required to provide site specific computational fluid dynamics (CFD) models to validate the performance of proposed design, including adequate mixing energy and complete mixing with variations in operating levels. This CFD analysis will be used by the manufacturer to propose the locations of the mixers within the digester tank and submit the design for approval.
- System will be designed for continuous operation with automatic controls.
- Service Box will allow removal of the mixer without taking the digester out of service. One mixer will be designed to provide adequate mixing energy to digester, therefore with two mixers placed in one tank, submersible mixing technology will provide redundancy.

2.4 Digester Cover

Digester covers provide two major functions for anaerobic digesters:

1. Maintain anaerobic conditions by sealing digesters from atmospheric air intrusion.
2. Provide containment and storage of digester gas produced during the anaerobic process.

The contained digester gas currently has value for fueling the hot water boilers for process and building heating. This projects also aims to add a CHP system to utilize the digester gas to reach their energy neutrality goals. Therefore, containment and storage of digester gas has significant operational cost savings and revenue potential for the GSD, which should be maximized.

The following digester cover alternatives were evaluated for implementation at the WRRF:

- Floating gas storage covers
- Fixed covers: Options included top mounted metal covers, and non-submerged concrete covers
- Dual membrane gas storage covers: Options included digester attached dual membranes

Appendix B provides a detailed analysis of the various cover and storage alternatives considered for implementation at the WRRF.

Fixed non-submerged concrete covers were selected as the recommend digester cover system. Due to the limited digester gas storage capacity of the fixed non-submerged concrete covers, a separate gas storage tank was selected as the preferred digester gas storage system. More details on gas storage evaluations are provided in **Section 3.3.**

The fixed non-submerged concrete covers allow operating level variations required for the dewatering operation. These covers will maintain the digester pressures and seal the anaerobic digesters with connection to the digester walls. The concrete covers have a significant dead load that might require interior concrete columns to support the weight and span of the covers. The following features will be implemented with the fixed non-submerged concrete covers:

- Digester cover safety equipment, including flame trap assemblies, pressure relief valves, and weighted manhole cover for emergency overflow to prevent solids from entering the digester gas piping system.
- Operating level with a minimum of three feet freeboard to accommodate potential rapid volume expansion in the digester.
- Foam separation equipment in digester gas system.
- Foam, sediment, and condensate removal in digester gas piping.
- Microbial inhibiting coating (MIC) for corrosion protection from corrosive gases and liquids for the underside of the concrete covers and digester wall interiors.
- Exterior cover insulation to reduce thermal heat losses with surface top coating for pedestrian traffic for insulation protection.

2.5 Digester Heating System

Anaerobic digester heating systems consist of two major equipment components:

1. Heat production (with gas-fired boilers).

2. Heat transfer to the digester contents (typically with heat exchangers).

2.5.1 Boilers

The GSD WRRF is currently equipped with two Hurst boilers to provide hot water for digester and building heating. Each boiler has a heating output of approximately 2.00 MMBTU/hr. A complete process flow diagram of the hot water loop is provided in sheet G001 found in Appendix C.

The existing boilers are set up to provide heat to the digesters and buildings. Table 2-4 summarizes the projected total heat demand under 2040 flow and load conditions with the new Digester 4. It should be noted that these values do not include the heating demand of the buildings. When the CHP system is in place, the waste heat from CHP is anticipated to provide 100% of the digester heat demands. Therefore, it is projected that GSD will not run the boilers when CHP is operating under normal conditions.

2.5.2 Heat Exchangers

The three existing digesters are heated via heat exchangers, which are located outside of the digesters and contain concentric tubes within tubes for exchanging heat from hot water to the solids flowing in inner tubes. The existing hot water recirculation pumps and sludge recirculation pumps are centrifugal pumps and recessed impeller pump, respectively. Table 2-7 summarizes the heat exchanger design criteria for the proposed Digester 4.

Table 2-7. Proposed Digester Heat Exchanger System for Digester 4

Parameters	Design Criteria[1]
Number of Units	1
Type	Tube-in-Tube
Heat Transfer Rating	0.70 MMBTU/HR
Sludge Inlet Temperature	94°F
Hot water Inlet Temperature	150°F
Tube diameter	
Sludge	6-inch
Water	8-inch
Sludge flow total [1]	350 gpm
Water Side Flow [1]	55 gpm

1. Based on manufacturer information found in Appendix C. The values presented herein will be confirmed in detailed design.

2.5.2.1 Heat Exchanger Circulating Pumps

Based on the recommended piping, the head loss through the recirculation loop and the head loss through the tube-in-tube heat exchanger, the heat exchanger loop is projected to have a total dynamic head of approximately 5 feet. This will be confirmed through hydraulic calculations to be performed during detailed design.

The tube-in-tube heat exchanger requires 350 gpm of sludge recirculation. Based on the recommended piping and the head loss through the tube-in-tube heat exchanger, the sludge recirculation piping loop is projected to have a total dynamic head requirement of approximately 20 feet through the 6-inch circulating sludge pipe to match existing digesters configuration.

The digester heating system design criteria is summarized in Table 2-8.

Table 2-8. Digester 4 Circulating Pumps

Parameters	Design Criteria
Heat Exchanger (HEX) Circulating Pump	
Number of Units	1
Type	Centrifugal
Design Capacity	55 gpm
Total Dynamic Head	10
Maximum Motor Horsepower	0.75
Sludge Circulating Pump	
Number of Units	1
Type	Recessed Impeller
Design Capacity	350 gpm
Total Dynamic Head	30ft
Solids Concentration (%)	6%
Maximum Motor Horsepower	10 hp
Minimum Suction Diameter (in.)	6 inch
Minimum Discharge Diameter (in.)	6 inch

2.6 Digester Siting Requirements

The proposed location for the new Digester 4 is north of the existing Digester 3, as shown in the site layout drawing sheet C001 found in Appendix C. Existing tie-in connections for 6-inch pipe primary sludge/TWAS pipe, 3-inch hot water return and supply, 6-inch digester sludge and digester gas are currently in place for Digester 4. The existing 24-inch primary effluent (PE) pipe and vault and electrical ductbank will be rerouted as shown in Drawing Sheet C002 included in Appendix C. The primary effluent flow control valve and flow meter vault will be relocated north to clear the area for Digester 4. **Section 6** details the construction sequence to reroute conflicting utilities to prevent extended plant operation interruption. **Section 4** details electrical rerouting of the ductbank and temporary power to maintain plant power. Other conflicting utilities, including 3W pipe, will be rerouted without interrupting main plant operation.

2.7 Structural and Geotechnical Evaluations

The basis of the structural design for the new Digester 4 at the Goleta WRRF is presented in this section, including the codes and standards being followed, the design loads being used, and the design requirements of specific materials that are being incorporated.

The new Digester 4 will replace Digester 1 to restore firm capacity in the digesters. Considering the current configuration of existing digesters, and ease of construction and operations, Digester 4 will have the same capacity and dimensions as Digester 3, with 55 ft diameter and total tank volume of approximately 0.55 MG based on straight shell tank type. The circular digester tank will be designed as a wire and strand-wound prestressed concrete tank in accordance with ANSI/AWWA D110. In geographic locations prone to high seismic accelerations, the Type I prestressed concrete tank is used. The Type I tank is comprised of a cast-in-place concrete core wall system with vertical prestressing and seismic base restraint cables to transfer loads from the core wall to the foundation using an anchored flexible base connection. Concrete structures housing process water shall be designed in accordance with the requirements of ACI 350 - Code Requirements for Environmental Engineering Concrete Structures.

A geotechnical investigation will be needed to determine design parameters and foundation requirements for structural design. Based on previous construction at the site, foundation requirements will likely consist of reinforced concrete mat foundations. This assumption will require verification by an independent geotechnical investigation conducted by a qualified geotechnical consultant. The geotechnical investigation will also address issues including the impact of groundwater on design and construction, excavation support and backfill recommendations, consideration of means for resisting buoyant forces due to any elevated groundwater conditions, potential soil corrosivity, potential for soil liquefaction, and estimate soil settlement.

2.7.1 Governing Code

The strength, serviceability, and quality standards shall not be less than stipulations required by the governing code. The governing code used for the proposed design is the 2019 California Building Code.

Materials and construction shall be designed in accordance with the California Building Code, and other codes as presented within this report. The California Building Code consists of the 2018 International Building Code as adopted and amended by the State of California.

2.7.2 Supplemental Design Codes

- ASCE 7 – Minimum Design Loads for Buildings and Other Structures, American Society of Civil Engineers.
- ACI 350.4 – Design Considerations for Environmental Engineering Concrete Structures, latest edition, American Concrete Institute.
- AISC – Manual of Steel Design, 15th Edition, American Institute of Steel Construction.

2.7.3 Codes and Standards for Specific Materials

Design of specific materials will be performed in accordance with the standards, codes, and specifications adopted by the governing code as listed below.

2.7.3.1 All Materials

The American Society for Testing and Materials (ASTM) standards, as referenced by the governing code or the other codes, standards, or specifications listed herein.

2.7.3.2 Concrete

- ACI 318 – Building Code Requirements for Structural Concrete, Latest Edition, American Concrete Institute.
- ACI 350 – Code Requirements for Environmental Engineering Structures and Commentary, 2006 Edition, American Concrete Institute.
- ACI 350.3 – Seismic Design of Liquid-Containing Concrete Structures and Commentary, 2006 edition, American Concrete Institute.
- ACI 301-Specifications for Structural Concrete, Latest Edition, American Concrete Institute.

2.7.3.3 Steel

- AISC 360 – Specification for Structural Steel Buildings, Latest Edition, American Institute of Steel Construction.
- AISC 303 – Code of Standard Practice for Steel Buildings and Bridges, Latest Edition, American Institute of Steel Construction.

2.7.3.4 Stainless Steel

- ASCE 8 – Specifications for the Design of Cold-Formed Stainless Steel Structural Members, Latest Edition, American Society of Civil Engineers.
- AWS D1-6 – Structural Welding Code – Stainless Steel, Latest Edition, American Welding Society.

2.7.4 Design Loads

2.7.4.1 Dead Loads

Dead loads are those resulting from the weight of all permanent non-removable stationary construction, such as walls, floors, framing, and equipment bases. Loads from process liquids within the structure and from soil and groundwater outside the structure will not be considered as dead loads. Dead loads will be in accordance with the California Building Code.

2.7.4.2 Live Loads

Live loads technically include all nonpermanent loadings that can occur, in addition to the dead loads. Live loads are those resulting from occupancy, furnishings, and equipment. Live loads will be used in accordance with the California Building Code.

2.7.4.3 Equipment Loads

Process area operating floors are designed for the load case resulting in the maximum stresses from the following live load conditions:

- 300 psf on the entire floor area, with no additional load from equipment included.
- 150 psf on the areas not directly under equipment, plus actual equipment loads.

Equipment loads obtained from manufacturers will be used when available, and other equipment loads will be assumed for the preliminary design. These loads will be confirmed prior to completion of design. In addition to the equipment's operating weight (including any fluids contained), other loads due to moving parts, malfunction, and maintenance will also be part of design.

2.7.4.4 Piping Loads

For preliminary design, the live loads listed above will be considered to include the loads from process piping that are supported by the floor below the piping. On floors that will support process piping suspended below, an additional live load allowance will be included for the preliminary design. This allowance ranges from 25 psf to 100 psf, depending on the size and quantity of piping.

Upon completion of the piping layout, these allowances will be reviewed for accuracy with the actual pipe configurations for pipes less than 18 inches in diameter, and the actual concentrated loads from pipes 18 inches and larger will be considered.

2.7.4.5 External Soil and Groundwater Loads

External soil and groundwater loads shall be based on data and recommendations to be furnished by the Geotechnical Engineer. For preliminary designs where geotechnical information is not yet available, density of soils may be assumed to be 130 pcf and density of aggregate fills may be assumed to be 135 pcf.

Static loads from external soil and groundwater include the following:

- Soil Pressure "At-Rest" – The Soil Pressure "At-Rest" on the external walls is the static distribution of the soil based on the soil parameters and groundwater levels.
- Surcharge Pressure Live Load – The Surcharge Pressure is based upon 300 psf live load on top of final grade.

- Surcharge Pressure of Soil/Foundation – The Surcharge Pressure of Soil/Foundation is based upon soil cover over tanks and spread footings of adjacent structures, where applicable.
- Hydrostatic Pressure – The Hydrostatic Pressure on external walls is the static pressure distribution that the groundwater level produces.

Seismic loads from external soil and groundwater are determined as stated in Section 2.7.4.7.

2.7.4.6 Wind Loads

Wind loads on any above grade structures will be in accordance with the California Building Code and ASCE 7.

2.7.4.7 Seismic Loads

Seismic loads resulting from seismic acceleration of the structure dead and live loads, including equipment and piping, will be determined in accordance with the California Building Code and ASCE 7. A site-specific ground motion study in accordance with 2019 CBC and ASCE 7 guidelines will be required and will be included as part of the geotechnical investigation.

Walls subject to internal liquid loads shall be analyzed and designed to resist seismic loads in accordance with ACI 350.3, "Seismic Design of Liquid-Containing Concrete Structures", in addition to the static loads indicated in Section 2.7.4.5. The seismic design loads are:

- Wall Inertia – Seismic pressure is the lateral inertial force due to the weight of the tank wall per unit height of the tank wall, acting at any given height, y, above the base of the wall.
- Impulsive Forces – Seismic load is the force of the effective mass of liquid that moves rigidly with the tank.
- Convective Forces – Seismic load is the force of the effective mass of the sloshing liquid that is in motion during an earthquake.

Walls subject to external soil loads shall be analyzed and designed to resist seismic loads in accordance with ACI 350.3, "Seismic Design of Liquid-Containing Concrete Structures" and data to be furnished by the Geotechnical Engineer, in addition to the static loads indicated in Section 2.7.4.5. The seismic design loads include:

- Seismic Pressure of soil (including the effects of the soil, surcharge, and ground water level) – Seismic loads resulting from seismic acceleration of soil and groundwater will be in accordance with recommendations established in the geotechnical report. If groundwater will be drained with a permanent free draining or pumped underdrain system, then groundwater loads will not be applicable.
- Wall Inertia – (as described above)

2.7.5 General Basis for Design

2.7.5.1 Loading Combinations

The following load combinations (Table 2-9) shall be used in the design of structures. Additional load combinations, which may produce a maximum stress condition, are also to be considered, as appropriate. Note that combinations which clearly do not govern will not need to be fully analyzed.

Table 2-9. Load Combinations

Load Combinations
Dead Load + Construction (if unusual construction loads occur)
Dead Load + Live Load + Permanent Equipment Load
Dead Load + Normal Operating Equipment Load + Seismic

2.7.5.2 Seismic Design

The basis for determining acceleration values and corresponding factors for design are given in the section presenting load criteria. Structures shall be designed according to the California Building Code and ASCE 7 requirements using the values given in the appropriate code formulas.

Seismic forces due to vertical acceleration result from all dead loads. The direction of force (up or down) shall be selected to create maximum stresses when combined with horizontal seismic forces. The design of foundations resisting overturning must assume that balancing dead loads are reduced by vertical accelerations.

Transitory live loads are not to be used to produce seismic loading nor combined with seismic with the following exceptions. In storage areas, the loading which is anticipated to be in place the majority of the time shall be used, but not less than 25% of the total live load. Equipment, partition walls, and other fixed items shall be considered as dead loads for determining seismic forces.

Because the performance of non-structural components (e.g., equipment, pipe supports, etc.) and non-building structures (vessels, tanks, etc.) can adversely impact the cost and recovery time associated with earthquakes, non-building structures and non-structural components will be restrained and braced for earthquake forces such that displacements shall not impede component functionally or containment immediately following a seismic event. Seismic resistant elements and supports will be designed to minimize damage to building contents during a seismic event, thereby limiting disruption of service.

2.7.5.3 Concrete Design

All portions of the structure that are in contact with soil or that contain process liquids will be designed using Ultimate Strength Design, per ACI 318 with revised load factors and durability coefficients as recommended in ACI 350. Portions of the structure not included above may be designed per ACI 318 without including the ACI 350 recommendations.

Minimum required amounts of reinforcing would be determined per ACI 318 recommendations depending on the spacing of movement joints provided. Amounts of reinforcing used will be as required for structural strength, but not less than these minimum amounts. Maximum spacing of reinforcing bars will be 12 inches on-center for environmental concrete structures designed per ACI 350, and 18 inches on-center for all other structures.

Finishes on concrete surfaces will be provided in accordance with ACI 301, and as is appropriate for their use and exposure. Floors of tanks and floors in areas likely to be intermittently wet due to washdown or maintenance of equipment will receive a floated finish.

Materials for use in concrete design will be specified to have the following minimum properties shown in Table 2-10.

Table 2-10. Concrete Design Criteria

Concrete Class A1 – Structural: (Environmental Concrete Structures – ACI 350)	
28-day compressive strength (f'c)	4,500 psi
Cementitious Materials	ASTM C150 Type II plus mandatory addition of pozzolan such as Class F fly ash or slag cement is required in all process or fluid retaining structures. (dependent upon project location and availability)
Maximum water/cementitious materials ratio	0.42
Air content	3.0% to 5.0% (dependent upon project location)
Concrete Class A2 – Structural: (all applications unless otherwise noted)	
28-day compressive strength (f'c)	4,000 psi
Cementitious Materials	ASTM C150 Type II. Addition of pozzolan such as Class F fly ash or slag cement is optional (dependent upon project location and availability) unless required to meet other durability requirements for concrete mix.
Maximum water/cementitious materials ratio	0.42
Air content	3.0% to 5.0% (dependent upon project location)

2.7.6 Structural Metals Design

Structural steel will be designed in accordance with AISC Steel Construction Manual, with modifications as stated in the governing code.

Cold-formed stainless-steel structural members will be designed in accordance with ASCE 8 Specification for the Design of Cold-Formed Stainless Steel Structural Members.

Materials for use as structural metals will be specified to have the following minimum properties shown in Table 2-11.

Table 2-11: Structural Metals Design Criteria

Minimum Properties for Structural Metals	
Structural steel shapes, plates, and bars	ASTM A572, Grade 50
Structural steel tubing	ASTM A500, Grade B
Structural steel pipe	ASTM A53, Type E or S, Grade B
High strength steel bolts	ASTM A325 or ASTM A490
Steel anchor bolts and threaded rods	ASTM A307
Stainless steel shapes	ASTM A276, Type 316
Stainless steel plates and sheet	ASTM A167, Type 304 or 316
Stainless steel bolts	ASTM F593, Type 304 or 316

3. New Combined Heat and Power

Biogas from the three existing digesters is used in two existing boilers to heat the digesters and buildings. Excess biogas is flared in an existing, fully enclosed waste gas burner rated for 180 scfm with a candlestick flare as emergency backup. BESP determined CHP is the most desirable biogas utilization technology for GSD to move towards energy neutrality.

The basis of design conditions that will be used for sizing the new CHP system are included in TM 1 - Basis of Design for Anaerobic Digester and Combined Heat and Power. More details on the CHP design criteria, electrical interconnection, heat recovery, biogas systems, and site layout are included in TM 2 – Anaerobic Digestion Replacement and Combined Heat and Power System.

The following sections discuss individual components of the CHP system and biogas storage. Each section provides an overview of the proposed equipment design. Impacts to air quality and environmental and archaeological permitting are discussed in Section 5 of this report. The CHP system and biogas storage are part of Phase 1 improvements, as discussed in Sections 6 and 7. Detailed cost estimates of the equipment and installation are provided in Section 8 of this report.

3.1 CHP System Sizing - Design Conditions

The proposed CHP system will use a reciprocating internal combustion engine with heat recovery from both the engine jacket and exhaust gas to generate a combination of electric and thermal energy to offset purchased power and heat the digesters and buildings. The sizing of the CHP system is based around the current and future biogas production conditions and the WRRF electric demand. Table 3-1 summarizes the biogas production conditions that will be used for sizing the new CHP system.

Table 3-1. Current (Year 2025) and Anticipated Future Baseline (Year 2040) Digester Gas Production

		2025		2040	
Parameter	Units	Annual Average	Max Month	Annual Average	Max Month
Biogas Production without HSW[1]	scfm	90	110	110	130
Biogas Production with HSW [2,3]	scfm	120	140	140	160

1. The assumed PS and TWAS VSR (max) is70%, and 45%, respectively.
2. Assuming 6,000 gpd of FOG addition by 2025.
3. FOG solids concentration is 6% and 94% VS/TS, VSR Rate of 90% VSR.

Based on the projected biogas production with HSW, a single 450 KW CHP unit is recommended. It should be noted that the biogas production projections included in this report are based on estimated HSW quantities and characteristics. A co-digestion pilot project is currently underway which may change the project biogas production estimates. The CHP size will be re-evaluated once the data from the co-digestion pilot is available. Figure 3-1 shows the range of biogas utilization of various CHP units compared to the WRRF electric demand and biogas production with and without HSW.

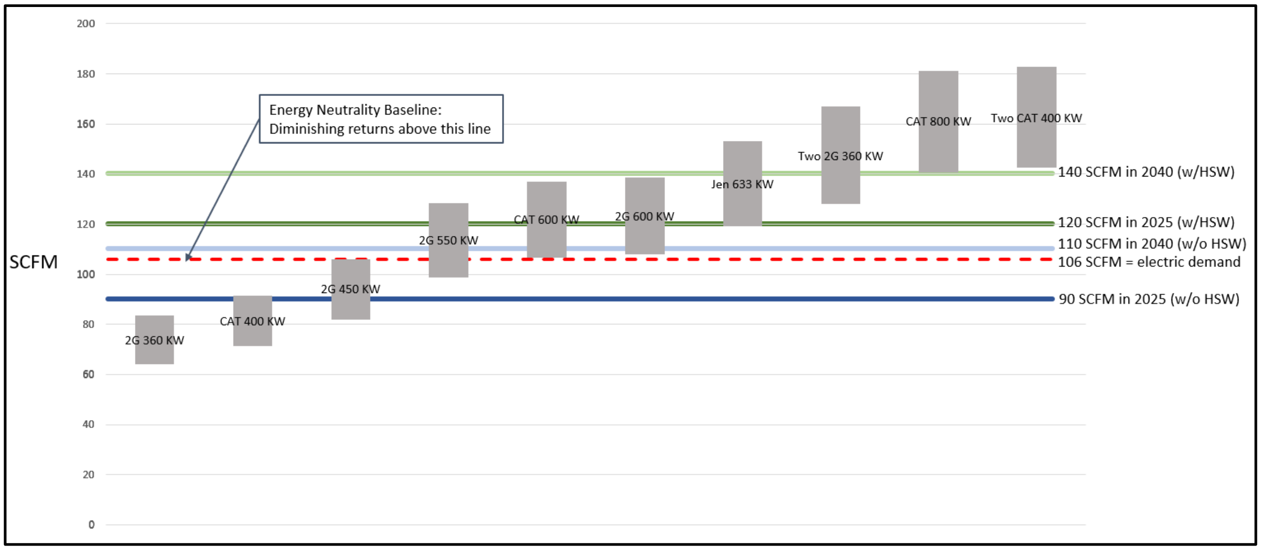


Figure 3-1. Range of Biogas Utilization of CHP Units Compared with Biogas Production

The design of the CHP system will be based around 2G's Agenitor 412 BG unit rated for 450 KW. Other acceptable CHP system manufacturers include Caterpillar and Jenbacher's offerings in the 400KW to 450KW size range. Table 3-2 shows the biogas consumption, power and heat output used as the basis of design of the CHP system.

Table 3-2. Power and Heat Output of a 450 KW CHP Unit

2G 450 KW CHP Unit			
Parameter	**Units**	**100% Load**	**75% Load**
Electric power output	KW	450	338
Biogas consumption*	scfm	106	82
Recoverable thermal output	MMBTU/hr	1.658	1.306

*Assuming a heat content of 600 BTU per scfm of biogas

The 450 KW CHP unit will meet the heating demands of the digesters and buildings, as discussed in Section 3.5 below.

A natural gas/biogas blending system will be provided with the CHP engine so the minimum engine loading can be achieved if the biogas production is below the 75% system rating. Natural gas can also supplement the biogas to operate the engine at 100% load to offset the electric demand of the WRRF. The existing 4-inch natural gas piping will be sufficient for the required natural gas flows.

3.2 Biogas System Evaluation (Gas Pretreatment and Conveyance)

The CHP system will be furnished with biogas pretreatment to protect the CHP engine from hydrogen sulfide (H_2S), siloxanes and moisture. The design of the pretreatment system will include gas chillers and condensate traps for moisture removal, an iron sponge to remove hydrogen sulfide compounds and a fixed bed activated carbon media system to remove siloxanes. The biogas pretreatment system design will be based on the biogas characteristic tests during final design.

A third, larger biogas booster blower will be needed to meet the pressure and flow required to send the biogas through the biogas pretreatment system and to the CHP unit. The design of the new biogas booster blower will be coordinated with the CHP system supplier. The biogas booster blower will be installed in a prepared space alongside the existing biogas booster blowers near the Maintenance and Electrical Building. The new biogas booster blower will be controlled by a new motor controller installed in the existing motor control center MCC-B.

Drawing G001 shows the biogas conveyance diagram. The configuration pretreats all biogas before it is utilized by CHP, the boilers and/or flare. Valving will be provided to bypass the biogas pretreatment system. The existing 6-inch and 12-inch biogas piping between the existing digesters and the existing biogas booster blowers will be sufficient for the future biogas production.

GSD currently flares biogas using two waste gas burners. The primary flare is a fully enclosed waste gas burner manufactured by Varec. A second smaller candlestick flare is used as emergency backup. The Varec flare is rated for 180 scfm at 8" WC pressure upstream of the pressure relief and flame trap assembly. In TM 2, Hazen evaluated adding a new flare sized for 290 scfm, which is two times the average biogas flow in 2040 with HSW, however the cost estimated was roughly $1 million. This cost can be avoided by upgrading the existing Varec flare to 200 scfm. A flare sized for 290 scfm is a worst-case scenario for the Year 2040, if no biogas storage is available and the CHP unit and boilers are not operating, which is an overly conservative scenario. Oversizing a flare has disadvantages because it may need to be cycled on and off frequently. Flare on/off cycling does not impact the life expectancy of the flare; however, it does result in additional NOx emissions that may impact the plant's air permit. The existing Varec flare can achieve a complete turndown as long as a 10" WC pressure is maintained.

The proposed biogas storage can be used to make the biogas flow to the flares more consistent. With biogas storage, the flare capacity can be designed around 1.5 times the average biogas flow. In the Year 2025 with HSW, this would be 186 scfm, and it would be 215 scfm in 2040 with HSW. Biogas can also be flared in the existing candlestick flare in an emergency situation.

The cost of upgrading the existing Varec flare is low. Hazen recommends upgrading the existing flare instead of adding a new flare. A new flare can be re-evaluated once the average biogas flow approaches 130 scfm. Upgrading the existing flare would involve changing the four orifices in the flare. A Varec technician can perform the work in one day and provide the required parts.

There is an existing 6-inch biogas pipe from the digesters to the existing flares. Based on the 2040 average biogas production with HSW and maintaining a maximum velocity of 12 feet per second, the minimum pipe diameter is 6 inches. Therefore, the existing 6-inch biogas pipe with be sufficient for the future biogas production.

3.3 Gas Storage Evaluations

Biogas storage provides a consistent biogas flow to the CHP system, minimizes CHP system shutdowns from abrupt changes in gas characteristics, and minimizes flare on/off cycling. Digester 1 can be repurposed for biogas storage by rehabilitating the tank, sealing and coating the interior, removing the existing floating cover, and installing a new dual membrane biogas storage cover and associated equipment. Repurposing Digester 1 is advantageous compared to a new standalone biogas storage vessel because it utilizes existing infrastructure and footprint. Section 8 of this report provides details on the cost estimate for converting Digester 1 to biogas storage. There is some additional cost of demolishing the existing cover and rehabilitating the digester compared to a new standalone biogas storage vessel, however about half of the additional cost is offset by not needing a new concrete pad. The demolition of the existing cover and will involve:

- Draining and cleaning the digester, including disposing of settled materials.
- Removing the existing cover including handrails and deck piping.
- Capping the existing sludge piping into and out of the digester.
- Removing the existing heat exchanger, circulating sludge pump, digester hot water circulation pump, and gas mixing blower.

Rehabilitating the digester will involve:

- Sandblasting the interior surface.
- Concrete repair as needed.
- Applying a sealing coating to the interior.

Converting to biogas storage will involve:

- Installing a dual membrane gas holder cover.
- Installing an air system including small fans to maintain air pressure.
- Installing the related electrical and instrumentation.
- Replacing the existing above ground 4-inch biogas piping with 6-inch piping.
- Installing new biogas flow meters and sediment traps.

An Evoqua Dystor dual membrane gas holder cover is used as the basis of design. Figure 3-2 shows a section view of a cover. Other acceptable membrane gas holders include WesTech's DuoSphere™ and Ovivo's ULTRASTORE™.

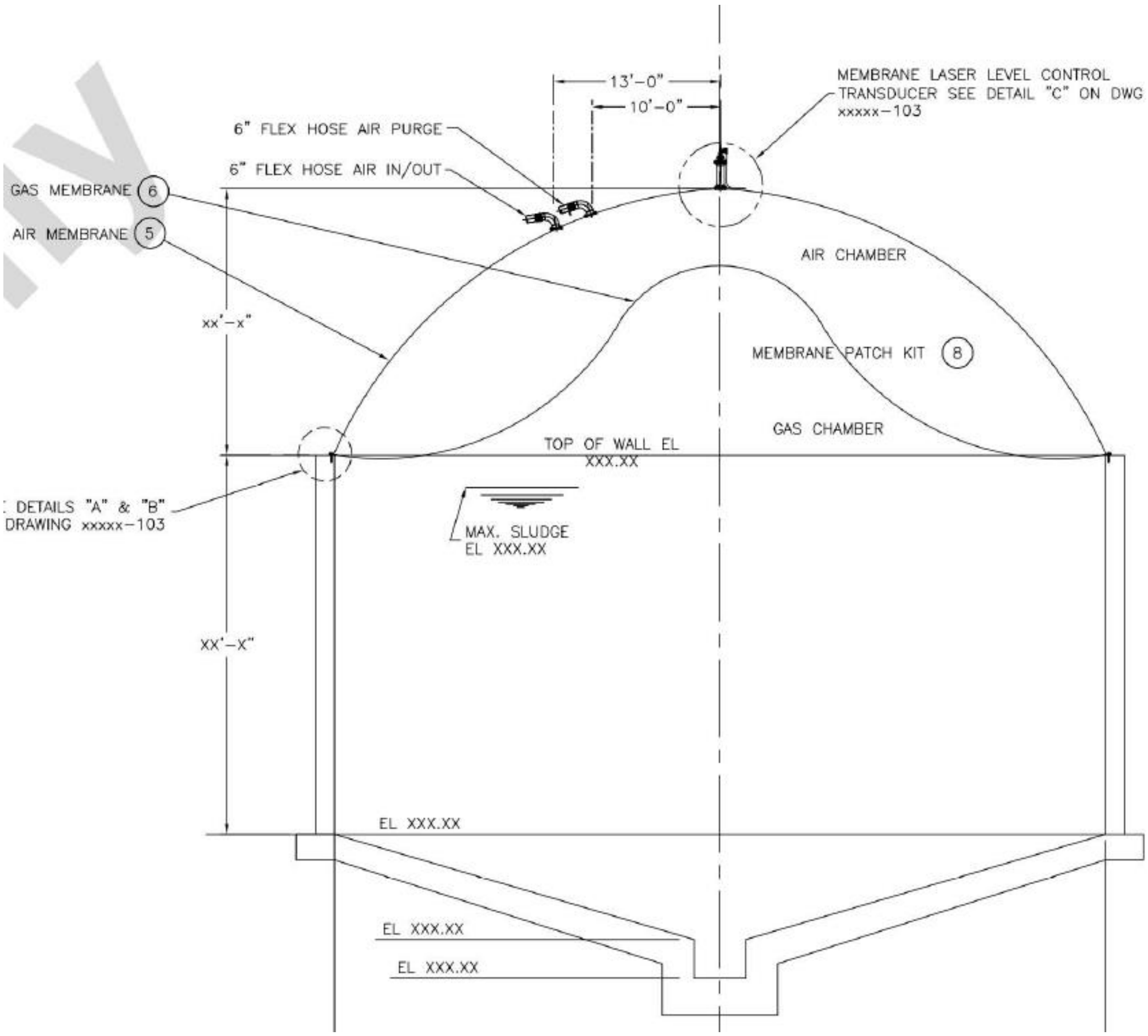


Figure 3-2. Section view of a membrane biogas storage cover (Courtesy of Evoqua)

3.4 System Enclosure and Sound Attenuation Alternatives

The CHP system will be provided inside a prefabricated, sound attenuated enclosure which will house the CHP system engine, generator, circuit breaker, paralleling controls, and heat recovery system. The system noise will be designed not to exceed 78 dB(A) within 7 meters from the enclosure exterior walls. The walls, ceiling, and doors of the enclosure are metal with flame retardant insulation. Air supply and exhaust openings are in the roof of the enclosure to assure the necessary air exchange rates. A dump radiator, intercooler, and exhaust gas silencer are also located on the roof. Container lifting eyes on the roof rail around the perimeter enable the unit to be lifted and installed by an 80-ton truck-mounted crane. Figure 3-3 shows an example layout of the CHP system used as the basis of design.

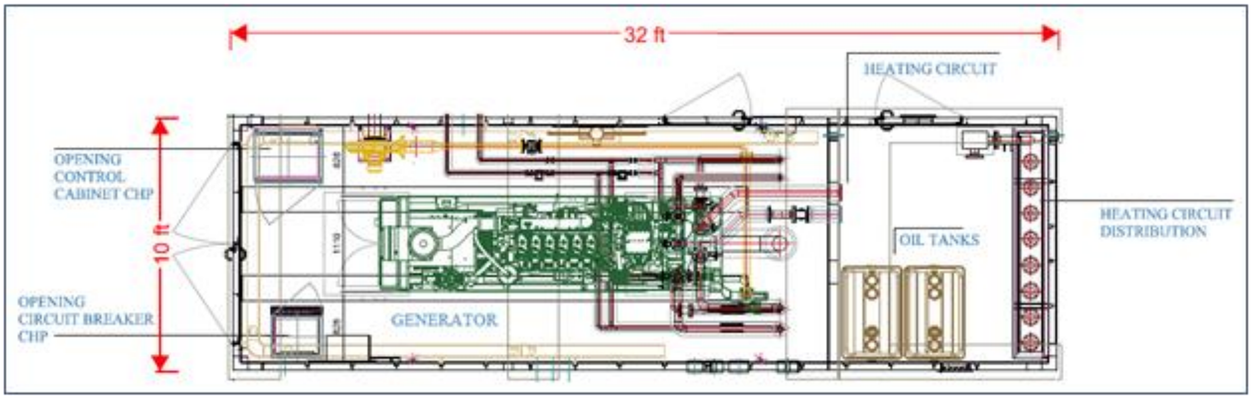


Figure 3-3. Example Layout of a 450 KW CHP Unit

3.5 Heat Recovery Evaluations

The CHP system will use a hot water loop to recover thermal energy from the engine and exhaust system to meet the digester and building heating demands. In this configuration, the CHP system will have the capacity to meet 100% of the digester heating demands. Drawing G001 shows a diagram of the hot water loop from the CHP generator through a CHP heat exchanger to transfer heat to the existing biogas fueled boiler hot water loop to heat the digesters. Heat will be recovered from the engine using a separate glycol heat recovery loop and heat exchanger to transfer heat to the digester heating loop. The CHP hot water loop will be designed with a three-way valve to balance the heat demand of the digesters with the cooling requirements of the CHP generator. It is anticipated that excess heat in the CHP hot water loop will need to be dissipated through an air to water radiator before returning to cool the CHP generator. The CHP hot water loop can be bypassed when the CHP generator is down for maintenance in order to heat the digesters directly with the existing boilers. The CHP hot water loop can connect to the existing 4-inch heat reservoir return (HRR) and heat reservoir supply (HRS) piping just to the east of the Power and Maintenance Building. Based on preliminary assessments, and considering the total flow to digesters, the 4-inch hot water piping will not need to be replaced. Detailed assessments will be conducted in design phase. Hot water flows and temperature will be coordinated with the CHP system supplier.

3.6 Emissions Control Equipment

The CHP system will be designed to meet the requirements of 40 CFR 60, Subpart JJJJ and Santa Barbara County Air Pollution Control District (SBCAPCD) Rule 333. Hazen recommends the CHP system be designed with a low-NOx engine and a catalytic converter. The additional cost for this hardware is low. The cost estimate in Section 8 of this report includes a low-NO_x engine with a catalytic convertor. The biogas pretreatment system will be designed to meet the sulfur content limits of SBCAPCD Rule 311. Biogas characteristic tests will be conducted during the final design of the biogas pretreatment system to determine the metals content in the biogas. The tests may find lower metals than the default SBCAPCD toxic air containment emission factors, which may lower risks in the Health Risk Assessment (HRA) that will likely be required by SBCAPCD. Varec has confirmed that the upgraded flare will maintain the same air quality emission performance as the existing flare. For more information on air quality permitting and regulatory analysis, see Section 5 of this report.

3.7 Electrical Interconnections Evaluation

The CHP system will require an electrical connection to the WRRF's distribution system to offset the purchased electric energy. This can be accomplished by connecting the CHP system to a new 480VAC 1000A circuit breaker in the WRRF's main switchgear, located inside the Power and Maintenance Building. As a result of there being no prepared space in the existing main switchgear, a new section of switchgear will be required for the new circuit breaker.

Figure 3-4. Anticipated CHP System Connection

Southern California Edison (SCE) has a governing rule (Electric Rule 21) for facilities that generate electricity while remaining connected to the utility grid (parallel operation). SCE Electric Rule 21 requires electrical protective and disconnect devices to be included at the plant service entrance to protect against the on-site generation sources from supplying power to the grid (reverse power) and to safeguard against inadvertently energizing the SCE facilities while they are in a de-energized state (i.e., power outage). The design of the CHP system will include an SCE electric utility interconnection study to identify if any upgrades are required to install the CHP system. GSD may also request an optional pre-application report from SCE for information on the SCE substation, peak line load estimates, limiting conductor rating, protective devices, and voltage regulating devices already installed. At a minimum, a new multifunction protection relay will be added to the utility service entrance device to provide reverse power, over/under voltage, and over/under frequency protection.

With the addition of HSW, the 450 KW unit can operate at 100% load and produce enough power to meet or exceed the electric demand of the WRRF. There may be times when the unit produces more power than the WRRF can use, so GSD may want to consider entering into a net metering agreement with SCE.

3.8 Siting Requirements

The CHP system site location and layout must consider the size of the CHP system enclosure and biogas pretreatment equipment and the proximity to the heat recovery loop, biogas piping, natural gas piping, and the electrical connection point. Drawing C001 shows a proposed site plan for the CHP system, new biogas booster blower, biogas pretreatment system, and converting Digester 1 to biogas storage. Drawing C002 shows the underground piping associated with the CHP system including the hot water, biogas, and natural gas piping.

The proposed location of the CHP unit enclosure between the Power and Maintenance Building and the digesters makes the best use of available open footprint on the site and allows for truck access to the adjacent roadway and parking lot. The proposed layout of the CHP system enclosure, new biogas booster blower, and biogas pretreatment system minimizes heat recovery and gas piping costs. The biogas pretreatment system can be located over the existing equipment pads not in use, that were originally intended for a natural gas dilution system that was never needed. The new biogas booster blower can be located adjacent to the existing two blowers. A blind flange is available for connecting into the existing biogas piping.

4. Phase I Electrical Evaluations

4.1 Main Switchgear Modifications

The Main Switchgear is a 4000 Amp, 480V, 3 phase, 3 wire, 200kA rated switchgear located in the Power and Maintenance Building. To facilitate a new 1000A circuit breaker required for the CHP system, as described in Section 3.7, a new section of switchgear will be required. The new section of switchgear will be provided by Schneider/Square D with a 4000A horizontal copper bus, to match the existing switchgear sections. The new 1000A circuit breaker provided in this section will be a MasterPact NW type circuit breaker manufactured by Schneider/Square D to match existing. Refer to Drawings E-1: Main Switchgear Single Line and E-2: Main Switchgear Elevation located in the appendices for more information.

4.2 MCC-B Modifications

Existing MCC-B is a 1000 Amp, 480V, 3 phase, 3 wire motor control centers located in the Power and Maintenance Building. This motor control center powers loads associated with the existing Digesters, as well as lighting panel LP-B. As outlined in Sections 2.3 and 2.5, a new Digester 4 will be installed. The new Digester 4 Hex Circulating Pump and Sludge Circulating Pumps are proposed to be powered from spare motor starters located in MCC-B reserved for these loads. The new Digester 4 Mixers 1 and 2 will require a new thermal magnetic circuit breaker installed in MCC-B, utilizing existing space, to supply the new Digester Mixer Vendor Control Panels. The Digester Mixer Vendor Control Panels will be provided with an integral VFD and PLC panel.

The new MSG Booster Blower 3 is proposed to be powered from a spare motor starter located in MCC-B reserved for this load. Additionally, the gas pretreatment system will require new thermal magnetic circuit breaker installed in MCC-B, utilizing existing space.

Once the existing Digester No.1 has been repurposed for gas storage, a new Biogas Storage Air Fan System will be installed, as described in Section 3.3. The new Biogas Storage Air Fan System is proposed to be powered from a spare motor starter in MCC-B. Additionally, the exiting Digester loads will be disconnected from MCC-B and these motor starter buckets will be re-labeled as spares.

4.2.1 Ductbank Re-Routing

Based on the proposed location of the new Digester 4, existing Ductbanks 5 and 11 will need to be intercepted and re-routed. Ductbank 5 runs from MH-2 to MH-4/HH-4 whereas Ductbank 11 runs from MH/HH-2 to MH/HH-9. A new Ductbank will need to be routed from MH-2 to a new Manhole along the path of Ductbank 5 to the north-east of new digester, to replace the conduits being demolished as a result of the conflict with the new digester. Additionally, in order to replace the conduits currently terminating at MH/HH-9 near the Biofilter, a new Ductbank will need to be routed from MH/HH-2 to new manhole and handhole (MH-9B and HH-9B) near the Biofilter. Refer to Drawing C002 for more information. As a conduit schedule was not able to be identified in the review of the 1989 Record Drawings the contents of the conduits associated with Ductbanks 5 and 11 have not been able to be fully identified. However, the 1989 Record Drawings do show the power conductors for MCC-E: Headworks and Primary

Sedimentation MCC and MCC-G: Effluent Pump Station MCC in Ductbank 5. Any conductors currently in Ductbank 5 and 11 will need to be removed and new conductors provided from source to load, including the power conductors supplying MCC-E and MCC-G. This will need to be further evaluated during detailed design.

4.2.2 Temporary Power

Power outages will be required during installation, startup, and commissioning to implement the electrical infrastructure upgrades associated with this project.

In order to tie-in the new switchgear section for Main Switchgear "MSG", required to connect the CHP System, a power outage to Main Switchgear "MSG" will be required. During this power outage, temporary power will likely be required to supply power to critical loads on downstream motor control centers which will need to be further evaluated during detailed design. The following MCC's are powered from this main switchgear:

- MCC-F: GSD Pump Station
- MCC-A: Power and Maintenance Building
- MCC-B: Digesters
- MCC-C: Biofilter Pump Station
- MCC-D: Secondary Sedimentation and Equipment Building
- MCC-DA: Aeration Building
- MCC-E: Headworks and Primary Sedimentation
- MCC-G: Effluent Pump Station
- MCC-H: Chlorination Building
- MCC-J: Solids Handling Building

The re-routing of Ductbank 5 as described in Section 2.8.3 will also require power outages and likely temporary power. As described in Section 2.8.3, all contents of this Ductbank are not fully known, and thus the associated power outages will need to be further defined during detailed design. However, at a minimum, MCC-E: Headworks and Primary Sedimentation and MCC-G: Effluent Pump Station will be affected by the re-routing of this Ductbank and thus temporary power will need to be evaluated for critical loads on these motor control centers during final design.

4.2.3 Raceways and Conduits

Several pieces of equipment will require new conduit to be routed in ductbank, whereas some of the new equipment can be supplied via existing conduit and ductbank.

Based on the 1989 and 2011 Record Drawing Sets it is anticipated that spare conduits, allocated for the new digester loads, can be utilized for the new loads associated with Digester 4:

- Sludge Circulation Pump 4
- Digester Hex Circulating Pump 4
- Digester 4 Mixer No. 1

- Digester 4 Mixer No. 2
- Biogas Storage Air System Fan

It is anticipated that the remaining loads would require new conduit routed in ductbank:

- CHP System Co-Gen Unit
- MSG Booster Blower 3
- Gas Pretreatment System

Underground conduit, where required, will be either Schedule 40 PVC or 80 PVC rigid conduit. These conduits will be routed in concrete encased Ductbanks.

Exposed conduit will primarily consist of PVC coated galvanized rigid conduit. Final equipment connections will be made with liquid tight flexible metal conduit. Conduit seals will be provided as required based on area of classification.

Conductors for power will typically consist of XHHW-2 or THHN/THWN. Conductors installed on the load-side of a VFD will be VFD cable consisting of phase conductors and triple ground conductors in an armored and shielded overall PVC jacket. VFD Cable installed in hazardous locations will be special purpose for that area.

4.2.4 Electrical Codes and Standards

The latest version of all applicable local, state, and national codes and standards will be adhered to as part of the electrical design. These include:

- NFPA 70 - National Electric Code (NEC)
- California Electrical Code
- California Energy Code
- National Fire Protection Association (NFPA)
- National Electric Manufacturers Association (NEMA)
- Institute of Electrical and Electronic Engineers (IEEE)
- The American National Standards Institute (ANSI)
- Underwriters’ Laboratories (UL)
- Occupational Safety and Health Administration (OSHA)
- InterNational Electrical Testing Association (NETA)
- National Institute of Standards and Technology (NIST)
- Local Electrical Codes

4.3 Instrumentation and Control (I&C) Evaluations

The Power and Maintenance Building contains PMPLC: Power and Maintenance PLC Panel. It is understood that the equipment and instruments associated with the existing Digesters and MSG Booster Blowers are controlled and monitored by PMPLC. The new equipment and instrumentation associated with the new Digester, converting Digester 1 to biogas storage, new MSG Blower, Gas Pretreatment System, and CHP System will be monitored by PMPLC. It should be noted that the new Digester mixers will be provided with a Vendor Control Panel which will contain an integral VFD and PLC. The standard Vendor Control Panel is from Siemens, but an Allen-Bradley version can be provided at additional cost, if desired. A fiber optic connection between the Digester Mixer PLC to PMPLC is anticipated. During Final Design, PMPLC will need to be evaluated to ensure spare I/O cards and available space within the control panel is sufficient for the new monitoring points. New SCADA screens will be provided to monitor the new processes.

4.4 Area Standards and Classifications

One of the currently applicable standard for this facility is the 2020 National Fire Protection Association 820 “Standard for Fire Protection in Wastewater Treatment and Collection Facilities” (NFPA 820). The applicable section of NFPA 820 is Chapter 6, Table 6.2.2(a), Row 16 Line a, and b. An excerpt from this table is shown in Figure 4-1:.

Row[a]	Line[a]	Location and Function	Fire and Explosion Hazard	Ventilation[b,c,d]	Extent of Classified Location	*NEC* Hazardous Location Classification (All Class I, Group D)[d]	Materials of Construction[e]	Fire Protection Measures
16	a	ANAEROBIC DIGESTERS, BOTH FIXED ROOF AND FLOATING COVER Generation of sludge gas from digesting sludge	Leakage of gas from cover, piping, emergency relief valves, and appurtenances	Not enclosed, open to atmosphere	Tank interior; areas above and around digester cover; envelope 3 m (10 ft) above the highest point of cover, when cover is at its maximum elevation, and 1.5 m (5 ft) from any wall	Division 1	NC	H and FE
	b			Not enclosed, open to atmosphere	Envelope 4.6 m (15 ft) above Division 1 area over cover and 1.5 m (5 ft) beyond Division 1 area around tank walls	Division 2	NC	H and FE

Figure 4-1: 2020 NFPA 820 Chapter 6 Table 6.2.2(a) Row 16

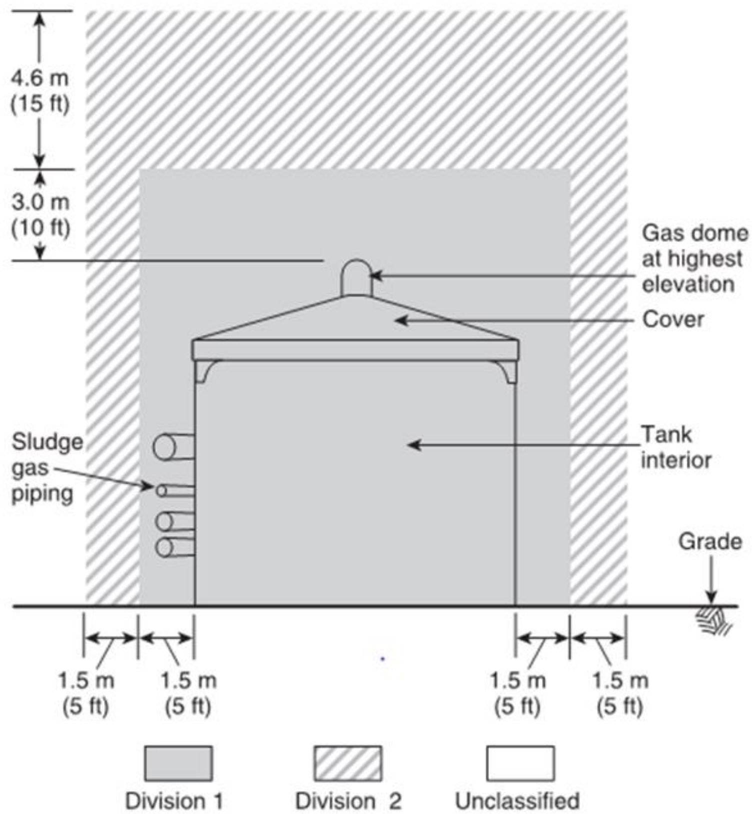


Figure 4-2: 2020 NFPA 820 Figure A.6.2 (a)

Based on the designations in this table, as well as the definitions and clarifications throughout the rest of NFPA 820, a Class I, Division 1 envelope will surround the Digester. As shown in the figure above, the Class I, Division 1 envelope will extend 10 feet above the highest point of the digester and 5 feet horizontally from the digester walls. Additionally, a Class I, Division 2 envelope will extend an additional 15 feet vertically and 5 ft horizontally beyond the Class I, Division 1 envelope.

The Mixer Vendor Control Panel (VCP), which will contain the Mixer VFDs, will be located outside of the classified area. Consideration will be given to installing the VCP in a climate-controlled space within the Power and Maintenance Building. The Mixers will be submerged in the Digester and thus the mixer motors will need to be rated for the Class I, Division 1 area in which they will be installed. The exact location of the Sludge Recirculation Pump 4 and the Hot Water Circulation Pump 4 have not been defined but will likely be in or near the Class I, Division 2 area, and thus the motors for these loads shall be rated accordingly. All instrumentation associated with digester gas piping will have a minimum rating of Class I, Division 2 as well. Lastly, all equipment, electrical materials, and wiring methods in the classified area shall be in accordance with the latest adopted edition of the NEC.

5. Regulatory/Permitting Requirements

5.1 Air Quality/CEQA Regulatory analysis

Hazen selected Yorke Engineering, LLC (Yorke) to prepare an Air Quality Permitting and California Environmental Quality Act (CEQA) Regulatory Analysis. The scope of the analysis included the new digester, CHP system and flare.

Digesters are pressure vessels that do not have direct pollutant emissions. Although there will be some fugitive emissions of Reactive Organic Compounds (ROCs) associated with the infrastructure and piping components (e.g., valves, flanges, and connections), this relatively small source of ROC emissions is generally not addressed in the permit. For example, the existing air Permit to Operate (PTO) #08561-R9 issued by the Santa Barbara County Air Pollution Control District (SBCAPCD) for this facility has little information or requirements related to the three existing digesters.

The CHP system basis of design is based 2G’s 450 kW Agenitor 412 BG engine with a lean-burn spark ignition fueled by biogas from the digestors. This engine is available in four configurations: high- or low-nitrogen oxides (NOx) versions and with or without a catalytic convertor. Although the high-NOx version is compliant with SBCAPCD Rule 333, Yorke recommends that the low-NOx version be selected. The catalytic convertor primarily reduces carbon monoxide (CO) emissions from the engine exhaust. Both the high- and low-NOx models are compliant with SBCAPCD Rule 333 with or without a catalytic converter. Yorke has based their analysis on the CO emissions without a catalytic converter in order to present a worst-case scenario because SBAPCD is not as focused on reducing CO emissions. Although a catalytic converter may not be required, Yorke recommends selection of an engine with a catalytic converter to advise SBCAPCD that the CHP system will minimize CO emissions.

The design of the CHP system will be around a low-NOx engine with a catalytic convertor. There is no cost difference between the low-NOx and high NOx options and a small price difference between the unit with or without a catalytic converter. The cost estimate in Section 8 of this report includes 2G’s low-NOx engine with a catalytic convertor.

The upgraded flare will have the same emission performance as the existing Varec flare. The 2019 Annual Report submitted to the SBCAPCD indicates that the existing Varec flare operated on 365 days that year, however the frequency of use of the upgraded flare may change after the CHP system is installed in Phase 1 and the HSW is added to the digesters in Phase 2. An air quality analysis has not been prepared for Phase 2 because it would primarily affect the digesters which are not a major issue related to air permitting. Phase 3 may include installing a thermal dryer; however, the design of the thermal dryer is not far enough along to be able to complete detailed emission calculations and an air quality analysis for Phase 3.

This section summarizes the results of Yorke’s analyses of the air quality permitting and CEQA requirements based on the preliminary engineering information Hazen provided to Yorke. Further information can be found in Yorke’s full report with appendices in Appendix D of this report.

5.1.1 Air Permitting and New Source Review

Goleta's WRRF is located within the jurisdiction of the SBCAPCD. The SBCAPCD has several regulations that are relevant to air quality permitting and CEQA requirements, specifically:

- Regulation I contain general provisions and definitions. This section refers to Rule 102 for definitions.
- Regulation II has rules pertaining to permitting. Rule 201 pertains to when permits are required, and Rule 202 discusses permitting exemptions. This project will require an Authority to Construct (ATC) and PTO. This regulation also contains the requirements related to permit fees.
- Regulation III contains prohibitory rules. In this case, Rules 311 and 333 appear to be applicable to the project. Rule 311 limits sulfur [as hydrogen sulfide (H_2S)] in gaseous fuels in the SBCAPCD's southern zone (which includes Goleta) to 15 grains per standard cubic foot (gr/scf), which is approximately 239 parts per million (ppm). This sulfur limit will be applicable to the CHP engine and the flare.
- Regulation VIII governs New Source Review (NSR) for new or modified stationary sources and includes the requirements related to Best Available Control Technology (BACT), offsets, air quality impact analyses, etc.
- Regulations IX and X include the requirements of the federal New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAPs) by reference. In this case, the NSPS under Code of Federal Regulations (CFR) Title 40 Part 60, Subpart JJJJ *(Standards of Performance for Stationary Spark Ignition Internal Combustion Engines)* is expected to be applicable to the CHP engine.
- Regulation XIII implements the requirements for the federal operating permits program under Title V of the Clean Air Act given in 40 CFR Part 70. The GSD WRRF is not currently a Title V source and is not expected to become a Title V source based on its potential to emit (PTE) after the implementation of this project.

Generally, these rules are concerned with the regulation of emissions of "criteria pollutants" and toxic air contaminants (TACs). Criteria pollutants have been assigned health-based ambient air quality standards (AAQS). Criteria pollutants include NO_x, ROCs, CO, fine and respirable particulate matter (PM_{10} and $PM_{2.5}$), oxides of sulfur (SO_x), and H_2S (California only). TACs are chemicals determined by the State of California to be carcinogenic, acutely toxic, and/or chronically toxic. Within the SBCAPCD, the NSR thresholds that apply to nonattainment criteria pollutants or their precursors, i.e., pollutants for which the area has been designated as not meeting the AAQS, are different than the thresholds that apply to pollutants that have been designated as attainment (i.e., meeting the AAQS) or are unclassified). Santa Barbara County is one of the few areas within California that has been designated as attainment for ozone for both the National and California AAQS. The only pollutant for which the County has been designated as nonattainment is PM_{10} with respect to the California AAQS only.

5.1.2 Evaluation of Emissions Compared to NSR Thresholds

The NSR air permitting requirements are generally determined based on the PTE of the new or modified stationary source, where the stationary source is the entire facility. In the case of a modification, SBCAPCD Rule 802 indicates that the PTE is that of the "Project" which Yorke assumed to be the installation of a new CHP engine and the replacement of the existing candlestick standby flare with a new larger enclosed flare. Hazen is now recommending modifying the existing fully enclosed flare to increase its capacity to 200 scfm instead of replacing the existing candlestick flare with a new larger enclosed flare. Please refer to Section 3.2 for more information on that recommendation. However, the modifications to the existing flare would require similar permitting as a new flare and therefore the discussions below still apply. As stated in the overview, the installation of a new digester is not expected to increase the facility PTE, so is not discussed in this section.

BACT, offsets, and other thresholds in the SBCAPCD are determined by Project emissions, in most cases on a pounds (lbs) per day basis. For the purposes of this analysis, Yorke looked at two potential scenarios. The first scenario is the flare burning all the digester gas produced. This scenario will be called the "flare only" case. The second scenario is the CHP engine running at full capacity (100% load) and the flare burning any digester gas produced in excess of the CHP engine capacity. This scenario will be called the "CHP engine and flare" case. Yorke included a flare only scenario in case the CHP engine is down for some reason, as that was suspected of being the worst-case PTE for permitting.

In any permitting action for the flare, Yorke recommends including a specified amount of time where the flare may need to operate under "emergency" conditions. If the power is out, the gas pretreatment system may be offline, leading to increased H_2S in the digester gas and increased SO_x emissions. Emergency emissions are exempt from normal permitting requirements, but the SBCAPCD will want to know that this is a potential use case and will institute recordkeeping requirements accordingly. Emergency use is normally limited to 200 hours per year.

Several emission standards will apply to the project, including:

- 40 CFR Part 60, Subpart JJJJ
- SBCAPCD Rule 333
- SBCAPCD Rule 311

40 CFR Part 60, Subpart JJJJ imposes the following emission standards:

- 2.0 grams per horsepower-hour (g/hp-hr) or 150 parts per million by volume (ppmv) for NOx;
- 5.0 g/hp-hr or 610 ppmv for CO; and
- 1.0 g/hp-hr or 80 ppmv for volatile organic compounds (VOCs[1]).

The basis of design of the CHP system is the 2G Agenitor 412 BG engine which has high-NO_x and low-NO_x versions with or without a catalytic converter. The highest emitting engine option is the high-NO_x

[1] VOC is assumed to be equivalent to ROC. VOC is used in this context because that is the terminology used in the underlying regulation.

model without a catalytic converter; however, all of the Agenitor 412 BG models will be compliant with the emission standards in Subpart JJJJ.

The high-NO_x and low-NO_x versions of the Agenitor 412 BG are also compliant with SBCAPCD Rule 333. However, the low-NO_x model will be preferred by SBCAPCD. SBCAPCD Rule 333 requires that lean-burn spark-ignition engines meet the following emission standards:

- NOx 125 ppmv at 15% oxygen (O2);
- ROCs 750 ppmv at 15% O2; and
- CO 4,500 ppmv at 15% O2.

Based on this analysis, while any of the four Agenitor 412 BG configurations are within the NSPS JJJJ and Rule 333 limits, Yorke recommends GSD should plan to purchase the low-NOx model of the Agenitor 412 BG with the catalytic convertor.

SBCAPCD Rule 311 limits sulfur (as H_2S) in gaseous fuels in the SBCAPCD's southern zone to 15 gr/scf (~239 ppm). This limit will be applicable to the flare and the CHP engine. The biogas pretreatment system will be designed to meet the Rule 311 H_2S limit of 239 ppmv.

The BACT performance standards for NO_x is 0.06 lbs/MMBtu and for ROCs is 0.30 lbs/MMBtu. BACT thresholds are found in SBCAPCD Rule 802. BACT applicability is based on uncontrolled emissions. The results of Yorke's uncontrolled emission calculations indicate that the CHP engine and flare do not trigger BACT for any criteria pollutant. Although Yorke's calculations indicate that BACT will not be triggered for the proposed Project, the primary flare in GSD's current permit was required to meet BACT, which was triggered on a facility-wide basis for that permitting action. Varec has confirmed that the modifications to the primary flare will meet the same emission rates as the current flare. This should be conveyed to ensure that the SBCAPCD is satisfied that emissions have been minimized.

Yorke's analysis relied on engine emission factors for the CHP engine without a catalytic converter to determine if the CHP engine would trigger BACT requirements and rule requirements. However, the SBCAPCD would probably prefer to see the CHP engine permitted with the low-NO_x option and a catalytic converter, since catalytic converter technology is often used and is relatively easy to implement. It may also be advantageous in a permit application to be able to say Hazen has selected the lowest emission engine option.

Yorke's analysis indicates that BACT is not triggered. However, the SBCAPCD does have BACT Guideline 3.6 for Digester Gas Fired Engines that requires the use of selective catalytic reduction (SCR) and oxidation catalysts. Therefore, it is recommended that this preliminary determination be confirmed with the SBCAPCD before proceeding with the design.

For the purposes of determining offset requirements (SBCAPCD Rules 804 and 802), Yorke calculated emissions under both the "flare only" and the "engine and flare" scenarios. Both emission scenarios do not require offsets.

The Air Quality Impact Analysis (AQIA) thresholds in Rule 802 are 120 lbs per day for all the criteria pollutants, except for CO, which has a threshold of 500 lbs per day. The project emissions are below these thresholds and, therefore, an AQIA is not required as part of a permit application per SBCAPCD Rule 802.

5.1.3 Health Risk Screening Evaluation

The SBCAPCD has published TAC emission factors for digester gas-fired engines[2]. The SBCAPCD has not published TAC emission factors for digester gas flares. In the absence of SBCAPCD TAC emission factors, Yorke utilized South Coast Air Quality Management District (SCAQMD) factors from the Supplemental Instructions for AB25883 and Annual Emissions Report (AER) guidance4 for the TAC emission factors. TAC emissions are calculated for the flare only scenario and the CHP engine and flare scenario to determine if the SBCAPCD is likely to require a Health Risk Assessment (HRA).

The published SBCAPCD emission factors for the digester gas engine have relatively high values for metals. These values are a significant contributor to the toxic screening exceedances. Biogas characteristic tests will be conducted during the next stage of design to determine the metals content in the biogas. The tests may find lower metals than the default SBCAPCD emission factors.

The SBCAPCD does not have a published screening tool for determining if TAC emissions may cause a potentially significant health risk. Therefore, Yorke applied screening methods published by the SCAQMD and the Bay Area Air Quality Management District (BAAQMD). The BAAQMD and SCAQMD screening methods are not directly applicable to a SBCAPCD permitting action, but they are useful for determining if the project emissions are likely to cause health risk impacts that would require a more refined health risk analysis.

The TAC emissions were compared to the SCAQMD and BAAQMD screening emission thresholds. Both screening tools suggest that a more refined HRA may be required by the SBCAPCD when processing applications for this equipment.

The TAC calculations indicate that an HRA may be required for both the flare only scenario and the CHP engine and flare scenario. The facility may be sufficiently far away from any receptors that the health risks are low enough so that the proposed equipment could be permitted without additional TAC emissions or risk reductions. Unless alternate emission factors are available, an HRA would likely be required to determine if additional emissions reductions are required on either new device.

5.1.4 SBCAPCD Permitting and Schedule Analysis

In addition to the costs for preparing the ATC permit application, SBCAPCD Rule 210 requires an application filing fee of $230. Additionally, the SBCAPCD will charge an applicant for all reimbursable costs (e.g., direct labor, including overtime). A similar fee based on District labor will be reassessed every three years during the SBCAPCD's triennial review of active permits. The minimum fee for triennial

---

[2] https://www.ourair.org/tac-efs/

[3] http://www.aqmd.gov/docs/default-source/planning/annual-emission-reporting/supplemental-instructions-for-ab2588-facilities.pdf?sfvrsn=12.

[4] http://www3.aqmd.gov/webappl/help/newaer/index.html.

reviews is $250. The reevaluation fee in 2015 was $15,165 and we would anticipate permitting and reevaluations to be a similar cost.

SBCAPCD Rule 208 gives the timelines within which the air district is required to take action on permits once the application is deemed complete. Different schedules are given for small, medium, and large sources. Hazen anticipates that the engine and flare would be considered large sources per the definition in SBCAPCD Rule 102, since it is likely that an HRA will be required.

Per SBCAPCD Rule 208, the District has 30 days from application submittal to deem an application complete or incomplete. If it is deemed incomplete, the District will provide an additional data request. Once the application is deemed complete, the District has 180 days to approve, conditionally approve, or deny a permit application, or until the project is approved by the CEQA Lead Agency, whichever is longer.

Although these timelines are specified in the SBCAPCD rule, Yorke anticipates that the application process will require 8 to 12 months for a large project such as this.

5.1.5 CEQA Requirements

CEQA is required for a project that requires a discretionary permit or approval from an agency, and which is not otherwise exempt. The Lead Agency under CEQA is generally the agency with responsibility over the discretionary permit. In this case, GSD will act as the Lead Agency for this Project.

An air permit application, by itself, would not trigger CEQA review. Section 8 of the permit engineering evaluation for the prior permitting of this facility's PTO 08561 – R9 states:

"The District is the lead agency under CEQA for this project. This project is exempt from CEQA pursuant to the Environmental Review Guidelines for the Santa Barbara County APCD (revised April 30, 2015). Appendix E (*APCD Projects Exempt from CEQA and Equipment or Operations Exempt from CEQA*) provides an exemption specifically for permits to operate and reevaluations thereof. No further action is necessary."

However, it is Yorke's understanding that due to other permits and the potential for impacts to cultural resources, GSD intends to complete a Mitigated Negative Declaration (MND) for this Project to address CEQA. Therefore, an analysis of the potential air quality and greenhouse gas (GHG) emissions will be needed for the MND. In addition to the stationary source criteria pollutant and TAC emissions from operation of the planned sources, it will also be necessary to calculate emissions (including GHGs) from construction/installation of the new emissions units, as well as mobile sources, e.g., worker travel, deliveries, and waste removal, associated with the Project. These emissions are then compared to relevant emissions thresholds to determine if there is the potential for significant impacts. Additional analyses, such as an HRA, may be needed if not already prepared for the permitting.

When a CEQA document is prepared for a project, the SBCAPCD cannot issue the ATC permit until the CEQA document is approved. The ATC application can be processed in parallel with the CEQA document preparation, but it may add time to the schedule to allow for this extra approval.

5.1.6 Conclusions

Yorke's conclusions regarding this analysis are that the proposed Project should be permittable without triggering SCR add-on controls for the CHP engine or the need for offsets, which would be substantial requirements.

Although Yorke found that BACT should not be required per SBCAPCD Rule 802, Yorke recommends that the:

- CHP engine be the low-NOx option including a catalytic convertor.
- CHP engine be able to meet the requirements of 40 CFR 60, Subpart JJJJ and SBCAPCD Rule 333.
- Flare meet the same emissions limits as the current primary flare.
- Biogas pretreatment system meet the sulfur content limits of SBCAPCD Rule 311.
- BACT finding be confirmed with the SBCAPCD prior to finalization of the Project design.

Yorke determined that an AQIA should not be required but that an HRA would likely be required based on the default TAC emission factors, for the CEQA analysis and/or the ATC application. Biogas characteristic tests for metals could alter the emission factors and lower risks in an HRA.

Since GSD has indicated that a MND will be prepared for the project, an Air Quality and Greenhouse Gas (GHG) Emissions Technical Report should be prepared that determines the potential impacts of the Project related to air quality and GHG emissions significance thresholds for both the construction and operation of the proposed Project.

Yorke anticipates that the application process will require 8 to 12 months and the fee will be in the range of $15,000 to $20,000.

5.2 Archaeological Analysis

Since the proposed project might affect a unique archeological resource, a detailed archeological analysis was conducted as part of the PDR. Hazen collaborated with Dudek Engineering (Dudek) to prepare a Cultural Resources Investigation Report. The scope of the analysis included the area that will be disturbed by the proposed project. The detailed report from Dudek can be found in Appendix E, and is summarized below.

5.2.1 Archaeological Records Summary

On February 19, 2019, Dudek conducted a search of the California Historical Resources Information System (CHRIS) at the Central Coast Information Center, located on the campus of University of California, Santa Barbara. The search included any previously recorded cultural resources and investigations within a 0.5-mile radius of the project area. The CHRIS search also included a review of the National Register of Historic Places (NRHP), the California Register of Historic Resources (CRHR), the California Points of Historical Interest list, the California Historical Landmarks list, the Archaeological Determinations of Eligibility list, and the California State Historic Resources Inventory lists. The records indicate that one (1) previously recorded cultural resource, CA-SBA-46, has been identified within the Project site and Nineteen (19) cultural resources have been previously recorded within the 0.5-mile radius of the Project site.

CA-SBA-46 is a large, rich archaeological site with both historic and prehistoric components. It sits on a large mound, itself a remnant of Mescalitan Island, formerly an island in Goleta Lagoon. Prior to the infilling of the Lagoon during the 19th century, and prior to 20th century grading, Mescalitan Island was ~0.35 square km, 21 m above the slough, and accessible only by boat (Glassow etal 1986; Gamble 2008). CA-SBA-46 is approximately 457 meters north to south and 305 meters east to west (1,500 by 1,000 ft) at an elevation of 25-70 ft amsl and overlaps the proposed Project area. The site is considered to be the location of the ethnohistoric village of Helo', and was occupied continuously from the Middle Period through the historic era, for approximately 2,000 years (Gamble 2020).

The most comprehensive, scientific studies of the historic portion of the site, affiliated with the village Helo', were conducted in the 1970s and 80s when the Goleta Sanitation District, which runs the sewage treatment plant on the northern end of the site, wanted to expand their facilities into the historic portion of the site. According to Lynn Gamble (who excavated there in 1986 and 1987 while at UCSB), the historic portion of the site was 80% undisturbed prior to expansion of the sanitation facilities in 1987. As part of the proposed expansion, Scientific Resource Surveys (SRS) conducted an assessment in 1978, and in 1985 excavated 37 1x1 m units. Over the next couple of years, Gamble conducted a detailed excavation of two historic era house floors in this part of the site, providing a rare glimpse of Chumash domestic life prior to and during the establishment of both the Presidio and the Mission (Gamble 1991, 2008, 2020)

The site has produced a large and diverse range of features and artifacts, such as fire hearths, caches, points, pendants, beads, flakes, charmstones, net-weights. Chartkoff, Charthoff, and Kona (1967) described it as "very rich". Famously, and regrettably, one of the burials from CA-SBA046 excavated by Orr in 1943 was on display at the Santa Barbara Museum of Natural History, and widely known locally as the "Queen of Mescalitan Island." The site is also famous for an unusually large "bathtub" mortar decorated with beads, an abalone shell dish full of unburned Red Maids seeds, and a small model of a canoe carved from steatite. The historic portion of the site also produced an abundance of organic implements (like soap-root brushes, redwood planks, and even a full-size redwood canoe) that do not typically preserve in older sediments.

Results of the CHRIS search indicates that ninety-four (94) previously conducted studies were identified within the 0.5-mile records search radius between 1979 and 2017. Of these studies, thirteen (13) overlap the current project area. The previous cultural resource studies addressing the proposed Project site area that were available and considered relevant were reviewed as part of this task.

The review of Environmental Impact Assessment prepared for GSD's WRRF Upgrade Project from 1986 concluded that the project would have significant impacts to cultural resource CA-SBA-46 and recommended mitigation measures. The findings from other archeological investigations from 1990's and 2000's had similar results, observing cultural deposits. Previous studies indicate the area had been highly disturbed. Subsurface test excavations were recommended for some previous projects to determine if a significant cultural deposit remained within the proposed project site. Also, archaeological and Native American monitoring was also recommended for all ground disturbing activities previously.

5.2.2 AB-52 Native American Consultation

A search of the Native American Heritage Commission's (NAHC's) Sacred Land File was requested on April 13, 2020, and was conducted on April 14, 2018 (Sarah Fonseca, Cultural Resource Analyst) to determine the presence of any Native American cultural resources within the proposed Project site (see Appendix E). The Sacred Land File search results were positive for known Native American heritage resources within the proposed Project site. The NAHC identified nine Native American individuals who potentially have specific knowledge on the cultural resources identified within the Project site that could be at-risk. GSD sent notification letters regular certified mail on May 1, 2020 to the nine Native American representatives identified by the NAHC. Follow-up phone calls were made on the following weeks.

Three (3) Native American representatives have responded to the notification letter: Fred Collins, of the Northern Chumash Tribal Council, Freddie Romero, of the Santa Ynez Band of Chumash Indians and Eleanor Arrellanes, Barbareno/ Ventureno Band of Mission Indians. Mr. Collins responded on May 11, 2020 via email and declined consultation stating that "NCTC supports the local Tribal Governments recommendations, our focus is in San Luis Obispo County." Mr. Freddie Romero, representative for SYBCI, responded via email May 13, 2020 requesting formal consultation. GSD responded to Mr. Romero's request on May 13, 2020 confirming receipt and stating that further communication was forthcoming. Based on mutual agreement, a formal consultation meeting occurred on June 10, 2020 between GSD and Mr. Romero of SYBCI via Zoom. Ms. Heather McDaniel McDevitt of Dudek, GSD's archaeological consultant, was present to provide any information regarding the ongoing cultural investigation. On behalf of the SYBCI, Mr. Romero expressed concerns regarding impacts to TCRs located within GSD's project site and requested that the Tribe be notified throughout the design and implementation process of the proposed Project.

Ms. Eleanor Arrellanes, representative for Barbareno/ Ventureno Band of Mission Indians (BVBMI), responded via email May 14, 2020, requesting formal consultation. GSD responded to Ms. Arrellanes's request on May 14, 2020 confirming receipt and stating that further communication was forthcoming. Based on mutual agreement, a formal consultation meeting occurred on June 16, 2020 between GSD and Mr. Arrellanes, of BVBMI, via Zoom. Ms. Heather McDaniel McDevitt of Dudek, GSD's archaeological consultant, was also present to provide any information regarding the ongoing cultural investigation. On behalf of the BVBMI, Ms. Arrellanes expressed concerns regarding impacts to TCRs and the area, that she stated is very archaeologically sensitive, located within GSD's project site. Ms. Arrellanes requested that the Tribe be notified throughout the design and implementation process of the proposed Project.

5.2.3 Historical Aerial Review

Aerial images from years 1928, 1938, 1941, 1944, 1956, 1971, 1986, 1992, 2001, 2010 and 2018 (UCSB 2020) were carefully reviewed to better understand land use and previous ground disturbing activities.

5.2.4 Field Investigation

An intensive archaeological survey of the proposed Project area was completed on February 19, 2020 by Dudek Senior Archaeologist, Heather McDaniel McDevitt, M.A., RPA. All exposed ground surfaces were walked in no less than 3-meter (10-foot) parallel transects. Since at the time of the survey, the proposed

Project area was not yet determined, a larger area than the current proposed Project area was surveyed. Boot scrapes were employed where needed to expose surface soils. Careful attention was given to barren ground including at the base of trees, within dirt and paths and landscape beds as well as subsurface soils exposed by burrowing animals. The exposed soils under vegetation and within landscape beds accounted for approximately 30 percent of the proposed improvement area and provided very good to excellent ground surface visibility (80-100 percent). Areas developed with structures and pavement accounted for approximately 70 percent of the proposed improvement area and provided none to poor ground surface visibility (0-30 percent). A considerable amount of fragmented and weathered shell was observed in most areas including exposed soils. No other cultural material, such as tools or lithic material, was observed within the proposed Project area.

5.2.5 Impact Analysis

An impact analysis has been conducted by considering background research, archaeological records search results, field investigation and information gathered as a result of ongoing consultation with local Tribal entities who have formally requested involvement pursuant to AB-52.

As mentioned in Section 5.2.1, the proposed Project site is located within the northern portion of ethnohistoric village of Helo' which was occupied continuously from the Middle Period through the historic era, for approximately 2,000 years (Gamble 2020). Several archaeological investigations have analyzed the site from 1875 to 2015 with the most comprehensive studies being conducted in the 1970s and 80s. A large portion of CA-SBA-46 was graded in the 1940s and removed to provide fill for portions of the Goleta Slough in preparation of the Santa Barbara Airport and Ward Boulevard construction. Although the site has been exposed to extensive disturbance, archaeological excavations have proven portions of the site, including the area currently proposed for ground disturbances, do possess intact cultural deposits. Figure 5-1provides the results from Impact Analysis.

The current preliminary design includes ground disturbances of approximately 8,000 square feet (sf) at varied depths: 1,200 sf at depth of 5 feet (illustrated in Figure 5-1 as bold pink outline), 2,800 sf at depth of 10 feet (illustrated in Figure 5-1as bold blue outline) and 3,800 sf at depth of 15 feet (illustrated in Figure 5-1 as bold red outline). These proposed Project locations exist within an area of CA-SBA-46 that has been subject to several archaeological investigations that have verified intact cultural deposits consistent with the prehistoric occupation of the area. Both Scientific Resource Surveys in 1985 and Lynn Gamble in 1991 conducted data recovery excavations within and surrounding the proposed Project areas.

Additionally, subsurface testing was conducted by David St one and Ken Victorino in 2011 to better determine the vertical and horizontal extent of intact cultural deposits. Each of these studies confirmed the presence of intact cultural deposits within the general proposed Project area. Based on the results of the background research, CHRIS records search, NAHC Sacred Land Files search, pedestrian survey, impact analysis considering all previous excavation results and ongoing consultation with Native American stakeholders, the potential of encountering cultural material during proposed ground disturbance activities is considered highly likely. Therefore, the proposed Project, as designed, could have potentially significant impacts to cultural and Tribal cultural resources.

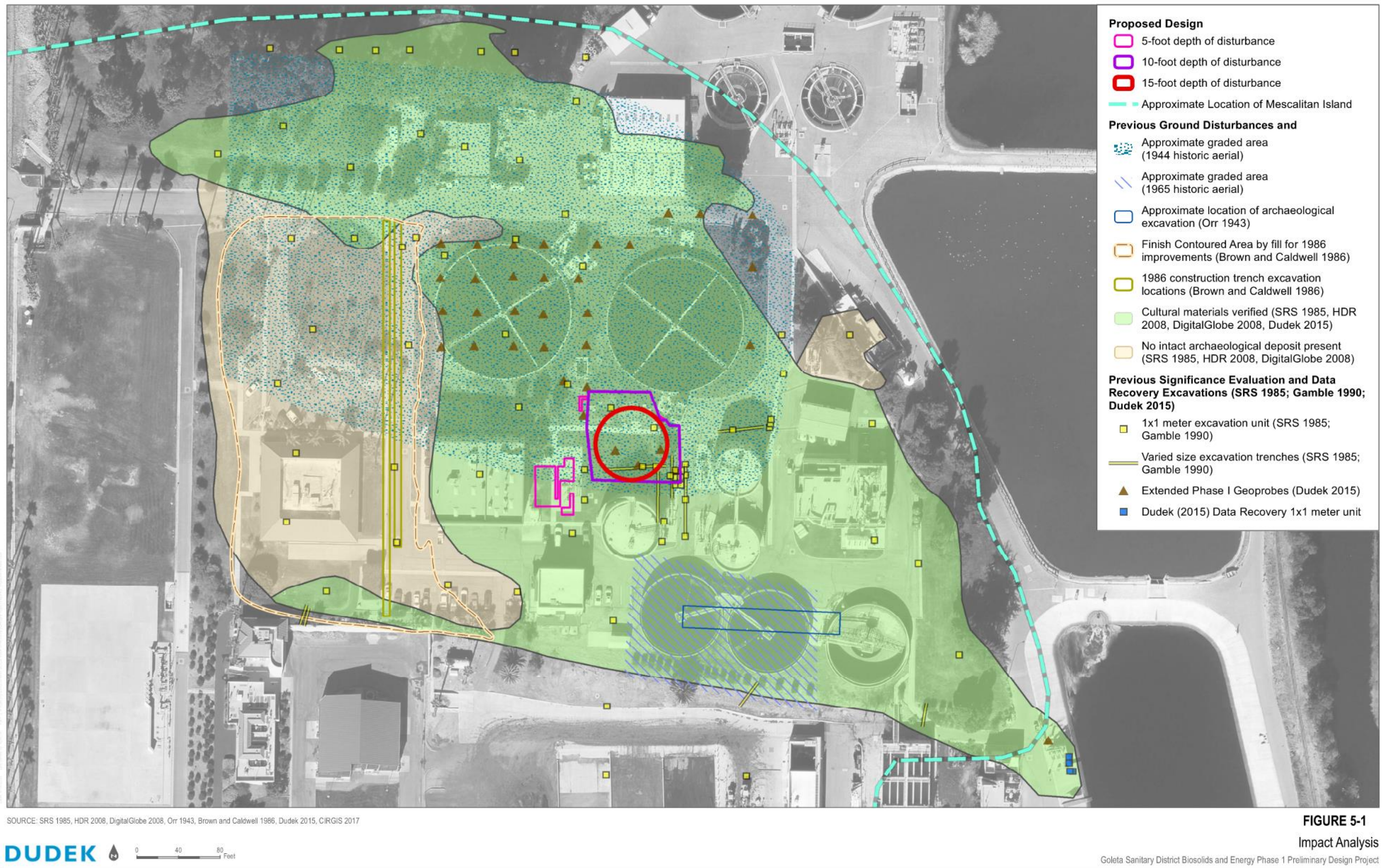


Figure 5-1: Archaeological Impact Analysis (by Dudek)

5.2.6 CEQA Requirements

Under CEQA, a project may have a significant effect on the environment if it may cause "a substantial adverse change in the significance of an historical resource" (California Public Resources Code section 21084.1; CEQA Guidelines section 15064.5(b)).

When a project significantly affects a unique archeological resource, CEQA imposes special mitigation requirements. Specifically, "[i]f it can be demonstrated that a project will cause damage to a unique archeological resource, the lead agency may require reasonable efforts to be made to permit any or all of these resources to be preserved in place or left in an undisturbed state" (Pub.Res.Code § 21083.2(b)(1)–(4)). Examples of that treatment include the following (Pub.Res.Code § 21083.2(b)(1)–(4)):

- Planning construction to avoid archeological sites.
- Deeding archeological sites into permanent conservation easements.
- Capping or covering archeological sites with a layer of soil before building on the sites.
- Planning parks, greenspace, or other open space to incorporate archeological sites.

If these "preservation in place" options are not feasible, mitigation may be accomplished through data recovery (Pub.Res.Code § 21083.2(d); CEQA Guidelines § 15126.4(b)(3)(C)). Public Resources Code Section 21083.2(d) states that "[e]xcavation as mitigation shall be restricted to those parts of the unique archeological resource that would be damaged or destroyed by the project. Excavation as mitigation shall not be required for a unique archeological resource if the lead agency determines that testing or studies already completed have adequately recovered the scientifically consequential information from and about the resource, if this determination is documented in the environmental impact report." These same statutes apply to Tribal Cultural Resources under CEQA, including data recovery as a recommended form of mitigation when avoidance is not feasible.

5.2.7 Recommendations

Should avoidance of intact deposits within archaeological site CA-SBA-46 not be feasible through implementation of CEQA's four preservation in place options mentioned above (i.e., project redesign, conservation easements, capping, or greenspace), Dudek recommends the following mitigation measures for archaeological deposits that have the potential to convey the significance of CA-SBA-46:

1. Development of an archaeological data recovery plan, for areas not previously subject to data recovery, that specifies levels of effort and methods intended to:
    - Obtain a statistically representative sample of significant archaeological deposits that have not already been subject to data recovery consistent with applicable regulations.
    - Guide implementation of a scientifically sound research design.
    - Ensure proper treatment of all materials, including documentation of results and curation of the archaeological collection.

- Submit to the governing agency and consulting Tribal stakeholders for review prior to implementation.

2. Implementation of the authorized data recovery plan focusing on impacted areas within CA-SBA-46.
3. Native American monitoring of all subsurface excavations.
4. Archaeological and Native American monitoring of ground disturbing activities.

6. Phase I Implementation / Construction Sequencing Plan

6.1 Phase 1 Implementation Plan

The implementation of Phase I consists of the design, permitting, construction, start-up and placing into safe consistent operation of the new Digester 4, CHP system and biogas storage. The WRRF operates 24 hours a day 7 days a week. For this reason, maintaining plant operations is of paramount importance. The design is anticipated to progress in accordance with industry standard practice with design submittals being prepared for GSD review at the 30%, 60%, 90% and 100% stages. As the design progresses, the implementation and construction sequencing plans as presented here will be developed in further detail.

At the 60% design, the CEQA document (likely a mitigated negative declaration) will likely begin to be prepared. The CEQA document will need to be complete prior to construction bids being solicited so the Contractor and GSD will be able to implement the mitigation and monitoring measures required for construction. Cultural monitoring will be required during construction and therefore GSD will need a contract for the monitoring in advance of the construction. Likewise, an update to Santa Barbara County Air Pollution Control District Permit may be required (see Section 5). However, this will be required for operation and is not critical for construction.

6.2 Construction Sequencing Plan

The construction of the new Digester 4, CHP system and biogas storage will require shutdowns of various facilities within the WRRF. For this reason, construction sequencing and coordination with Operations staff is critical to maintaining plant operations. The key items requiring shutdowns and coordination include the following:

1. Ductbank 5 which provides power to MCC-E: Headworks and Primary Sedimentation MCC and MCC-G: Effluent Pump Station MCC requires relocation to the north to install Digester 4.
2. Ductbank 11 which provides power to Biofilter 1 and to the flowmeter serving the 24-inch diameter Primary Effluent Line to Biofilter 1 to install Digester 4.
3. The 24-inch diameter Primary Effluent Line to Biofilter 1 requires relocation to the north to install Digester 4.
4. Installation of the CHP system requires a tie-in to the WRRF main switchgear.

Digester 4 must be constructed, functionally tested, commissioned, and placed into stable operations prior to removing Digester 1 from service. Digester 1 will then be repurposed for biogas storage. The CHP system can start construction as Digester 4 is finishing construction so that the CHP system and repurposed Digester 1 can be completed, functionally tested, commissioned, and placed into operations by the end of 2022.

The following is a recommended sequence of construction:

1. Construct the relocated segment of Ductbank 11.

2. Work with GSD to take Biofilter 1 offline.
3. Demo the existing Ductbank 11. Construct the new portions of Ductbank 5 in the space vacated by demolishing Ductbank 11.
4. Provide temporary power to MCC E and MCC G. Construct the reconnection portions of Ductback 5, pull new conductors and reconnect. Restore main power to MCC E and MCC G.
5. Shutdown 36-inch PE line to install isolation on 24-inch PE line (note this shutdown is limited to 12 hours) – this can be done in parallel with step 4 if desired.
6. Remove 24-inch PE line, meter, FC valve; retain flow meter for re-use; purchase new FC valve of similar make and model.
7. Digester 4 construction
    a. Excavate and clear area for Digester 4 construction. Designated stockpile area is shown in drawing C001 in Appendix C.
    b. Install digester tank.
    c. Furnish and install submersible mixers and electrical conduit in the tank.
    d. Commission electrical service for the mixer. Concurrently, construct the digester cover and coordinate with the submersible mixer vendor to install the service box mounted on the cover.
    e. Install digester recirculation pump including new piping to digester.
    f. Install new heat exchanger, hot water pump and new piping.
    g. Commission electrical service for all new equipment and inspect all new equipment. The new equipment will be fed from MCC-B.
8. Relocate PE line, meter, FC valve (if possible, suggest doing this after Digester 4 is complete to avoid damage; if not possible need to move this up prior to Item 7), Contractor shall re-use existing pre-cast concrete vaults.
9. Digester 4 Commissioning, Start-up, Steady state operations. GSD will equalize and transfer sludge from existing digesters to seed and begin starting up Digester 4. Final filling will have to be new sludge feed from the Plant.
10. CHP construction
    a. Clear area for CHP enclosure.
    b. Place concrete pads for CHP enclosure, biogas booster blower and biogas pretreatment system.
    c. Furnish and install CHP unit, biogas booster blower and biogas pretreatment system.

   d. Install new biogas piping, natural gas piping and hot water piping.

   e. Commission electrical service for all new equipment and inspect all new equipment. The new equipment will be fed from the Power and Maintenance Building.

11. Repurpose Digester 1 to Biogas Storage

    a. Drain and clean the digester and cap sludge piping.

    b. Remove the existing cover, heat exchanger, pumps and blower including decommissioning the related electric connections.

    c. Repair and seal the digester and install new aboveground biogas piping and appurtenances.

    d. Install the new dual membrane cover, air system and related equipment including electrical commissioning fed from MCC-B.

12. At the same time as the work to Digester 1, complete connection of Digester 1 to CHP system.

13. Install electrical tie-ins.

14. Digester 1 and CHP system commissioning, start-up and operations.

7. Phases 1-3 Conceptual Layout

The BESP established the planning roadmap as shown in the figure to the right. Phase 1 includes implementing a new digester, CHP system and biogas storage that is the focus of this preliminary design report. Phase 2 includes implementation of HSW and FOG, but no longer includes Phase 2 Cogeneration facilities as this is not necessary to power the WRRF. Phase 3 includes implementation of a thermal dryer to achieve Class A Biosolids. Sections 7.1 and 7.2 identifies the plan and conceptual layout for locating these facilities on the WRRF.

7.1 Phase 1

The conceptual layout for Phase I is shown on drawing C001 in Appendix C.

Digester 4 will be located just north of Digester 3. Digester 4 has been located to avoid interference with the 36-inch primary effluent line (to the west) and the hot water and gas lines (to the south). Relocation of the ductbanks to the north and of the 24-inch primary effluent line that crosses the Digester 4 site will be necessary.

Construction of Digester 4 will require substantial excavation to provide working space for construction of the below ground portions of the digester. Excavated soils will be stored in the sludge drying beds, prior to use for backfilling.

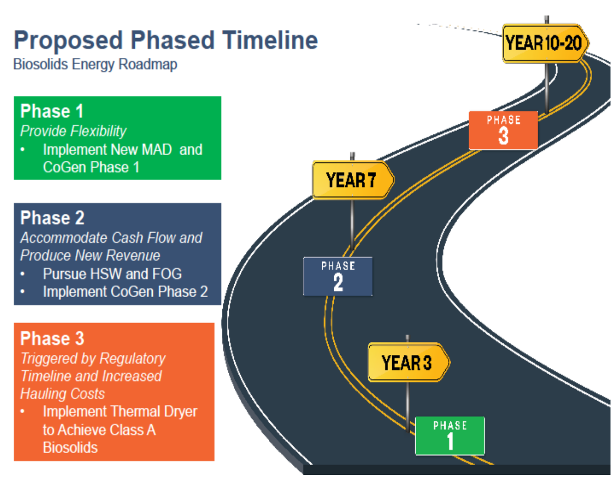
The CHP system will be located just east of the Power & Maintenance Building. This location will result in minimal impacts on existing facilities and provides an easy route for connection of gas and electrical lines.

Digester 1 will be repurposed for biogas storage which will avoid building a new ground storage vessel.

The Contractor's material laydown, construction trailers and parking are located on the lawn northwest of the Administration Building.

7.2 Phases 2 and 3

The Conceptual Layout for Phases 2 and 3 are shown on drawing C001 in Appendix C. The FOG/HSW receiving station is located south of the Headworks Building just west of the Odor Reduction Tower. This location was selected to minimize the hot water loop piping required to flush the FOG/HSW delivery lines. This location may require road widening at the northeast corner of the Headworks Building for larger delivery trucks. Details of the HSW receiving station and improvement will be discussed during the Phase 2 design.



The future solids drying facility is located to the west of the existing solids dewatering facility and shown on Drawing C-

001 in Appendix C. The existing loadout facility will be retained in between these two facilities. The conveyor system can be rearranged to carry dewatered solids to the drying facility.

8. Cost Estimates

The previous sections discussed the individual components of GSD's BESP Phase 1 project. Each section provided an overview of the proposed equipment design capacity. This section summarizes the cost estimates for the new Digester 4, CHP and biogas storage components at GSD's WRRF. Detailed cost estimates are provided in Appendices F, G, and H – Cost Estimates. The total estimated Phase 1 project cost is $10 million.

8.1 Anaerobic Digester

The probable component cost for GSD's BESP Phase 1 new digester is **$6.85 M,** as shown in Table 8-1**.** The estimate serves for budget authorization and alternative analysis and is considered to be an AACE Class 4 level. Class 4 has a typical accuracy range of -30% on the low side and +50% on the high side. A 30% design contingency has been added to the estimate based on current status of the design documents, the nature of the project and the estimate classification.

Base Assumptions are as follows:

1. Construction NTP is assumed to be third quarter 2021 (See **Section 9** for a discussion of schedule).
2. Construction Duration is assumed to be 12 months.
3. The project is assumed to be procured as a single prime contract through a traditional design/bid/build process.

The basis on which the costs were developed include the following:

1. Wage rates utilized are based on prevailing wages published for Santa Barbara County current to June 30, 2021.
2. A 40-hour work week is assumed, no shift, weekend or other premium time is provided.
3. Wherever possible, equipment rates are based on current published rental rates as listed in the AED Blue Book, supplemented by RS Mean's data, the AED Green Book and local rental suppliers.
4. Crews, equipment, and productivity used for work items are based mostly on standards specific to each trade. Some information was supplemented by RS Mean's data modified where necessary by estimator judgment.
5. The following item costs were based upon vendor quotes:
    - Anaergia Submersible Mixer
    - Heat exchanger
    - Prestressed Tank (Type 1)Vendor

Table 8-1. Anaerobic Digester Cost Estimate

	Assumed Percentage	Anaerobic Digester
General Conditions	*10%*	$226,000
Digester Tank and Cover		$1,600,000
Tank Mixing (Submersible Mixer)		$445,000
Heat Exchanger Assembly		$104,000
Sludge Recirculation System		$51,000
Gas Discharge Assembly		$65,000
Site Work		$576,000
Electrical and I&C		$384,000
	Subtotal:	$3,451,000
Total Probable Construction Cost with *Contractor Markup*[1]	**Subtotal:**	**$4,434,000**
<u>Project Cost</u>		
Contingency	*25%*	$1,109,000
Engineering	*10%*	$443,400
Environmental Documentation	*LS*	$150,000
Environmental Monitoring (3 months)		$138,320
Permitting	*1%*	$44,340
Construction Management	*10%*	$443,400
Legal	*1%*	$44,340
Administration	*1%*	$44,340
Total Probable Component Cost		**$6,852,000**

1.Contractor markup assumed percentages are detailed in Appendix C.

8.2 Combined Heat and Power

The probable cost for GSD's BESP Phase 1 new CHP component is **$2.35 M,** as shown in Table 8-2. The estimate serves for budget authorization and alternative analysis and is considered to be an AACE Class 4 level. A 30% design contingency has been added to the estimate based on current status of the design documents, the nature of the project and the estimate classification.

Base Assumptions are as follows:

1. Construction NTP is assumed to be second quarter 2022.
2. Construction Duration is assumed to be 9 months.
3. The project is assumed to be procured as the same single prime contractor as the new digester through a traditional design/bid/build process.

The basis on which the costs were developed are the same as the new Digester 4. The costs are based on vendor quotes from 2G for the CHP unit including an enclosure, new biogas booster and biogas pretreatment system. Varec provided an estimate for modifying the existing flare.

Table 8-2. Combined Heat and Power Cost Estimate

	Assumed Percentage	CHP System
General Conditions	7%	$82,000
450 KW CHP Unit with Heat Recovery		$581,000
Electrical	9%	$118,000
Power Metering, SCADA and I&C	2%	$18,000
Biogas Booster Blower		$11,000
Biogas Pretreatment System		$122,000
Biogas Piping	LS	$74,000
Natural Gas Blending System and Piping	LS	$44,000
Hot Water Piping	LS	$21,000
Modifications to Flare		$8,000
Equipment Installation	20%	$178,000
	Subtotal:	$1,254,000
Contractor Markup	*22%*	$351,000
Total Probable Construction Cost		**$1,605,000**
Contingency	*30%*	$376,000
Engineering	*10%*	$126,000
Environmental Documentation	*LS*	$100,000
Environmental Monitoring (3 weeks)	*LS*	$15,000
Permitting	*1%*	$13,000
Construction Management	*7%*	$88,000
Legal	*1%*	$13,000
Administration	*1%*	$13,000
Total Probable Component Cost		**$2,347,000**

8.3 Biogas Storage

The probable cost for GSD's BESP Phase 1 to convert the existing Digester 1 to biogas storage with a dual membrane cover is **$0.82 M,** as shown in Table 8-3. The estimate serves for budget authorization and alternative analysis and is considered to be an AACE Class 4 level. A 30% design contingency has been added to the estimate based on current status of the design documents, the nature of the project and the estimate classification.

Base Assumptions are as follows:

1. Construction NTP is assumed to be third quarter 2022.
2. Construction Duration is assumed to be 6 months.
3. The project is assumed to be procured as the same single prime contractor as the new Digester 4 and CHP system through a traditional design/bid/build process.

The basis on which the costs were developed are the same as the new Digester 4 and new CHP. The costs are based on vendor quotes from Evoqua for a Dystor gas holder cover, air system and control panels.

Table 8-3. Biogas Storage Cost Estimate

	Assumed Percentage	Biogas Storage
General conditions	7%	$29,000
Demolition		$75,000
Site preparation		$94,000
Install cover		$165,000
Install air system		$53,000
Electrical and I&C		$28,000
	Subtotal:	$443,000
Contractor Markup	*21%*	$120,000
Total Probable Construction Cost		**$562,000**
Contingency	*25%*	$141,000
Engineering	*10%*	$57,000
Permitting	*1%*	$6,000
Construction Management	*7%*	$40,000
Legal	*1%*	$6,000
Administration	*1%*	$6,000
Total Probable Component Cost		**$815,000**

9. Schedule

It is anticipated GSD would engage an engineering firm to begin design for the BESP Phase 1 Improvements by November 2020, including development of the Mitigated Negative Declaration. The anticipated duration for completion of bid phase documents and the MND is six months. The project schedule is then anticipated to proceed as follows:

Bid Phase	May – June 2021
Construction	July 2021 – December 2022

GSD would begin operations and maintenance of Phase 1 improvements January 2023.

10. Conclusions and Recommendations

Hazen has evaluated installation of a new anaerobic digester, repurposing existing Digester 1 for biogas storage, and a new CHP system for beneficial use of biogas as part of GSD's BESP Phase 1 project. Table 9-1 presents a summary of the recommendations for each design component.

Table 9-1. Summary of Recommendations

System Component	Equipment	Quantity	Location
Anaerobic Digester (Digester 4)	Concrete	1	North of Anaerobic Digester 3
Digester Cover	Non-submerged Concrete	1	Anaerobic Digester 4
Digester Mixing	Submersible Mixing	2	inside Anaerobic Digester 4
Heat Exchangers	Tube-in-Tube Type	1	East side of Anaerobic Digester 4 - outside
Recirculation Pumps	Recessed Impeller	1	East side of Anaerobic Digester 4 - outside
Hot Water Loop Pumps	Centrifugal	1	East side of Anaerobic Digester 4 - outside
Gas Storage	Dual membrane gas holder cover	1	on existing Anaerobic Digester 1
Biogas Pretreatment System	Moisture, H_2S and siloxane removal	1	near the Maintenance and Electrical Building
Biogas Booster Blower	Single stage centrifugal	1	near the Maintenance and Electrical Building
CHP Unit	450 kW unit	1	Between Maintenance Building and Anaerobic Digester 3

Based on preliminary cost estimates, the total probable project cost is $10 million and includes the component cost for the new anaerobic digester, CHP and converting Digester 1 to biogas storage. The component cost for a new anaerobic digester and appurtenances (including, cover, mixing, heat exchangers, pumps) is $6.8 million. The component cost for CHP including biogas pretreatment, booster blower and other piping upgrades is $2.3 million. The component cost to convert the existing Digester 1 to biogas storage with a dual membrane cover is $0.8 million. The project start date is estimated to be the second quarter of 2021 and the end date is estimated to be by the end of 2022.

AGENDA ITEM #3

AGENDA ITEM: 3

MEETING DATE: September 3, 2020

I. NATURE OF ITEM

Consideration of a Professional Services Agreement for the Evaluation of the Existing Reclamation Facility Filter System

II. BACKGROUND INFORMATION

The Goleta Sanitary District owns and operates a Water Reclamation Facility that provides recycled water for irrigation uses in the Goleta Valley. This facility was constructed in 1994 in cooperation with the Goleta Water District and has produced over 8 billion gallons of exceptional quality recycled water since start up.

Regular maintenance and evaluations of the facility has been conducted to ensure that it is operating according to design. However, aggressive water conservation throughout the community during the recent drought period has resulted in a more concentrated waste stream entering the plant. This change in wastewater quality has presented new ongoing challenges to our treatment processes. Certain chemicals that never caused problems when flows were higher (less concentrated) are now creating toxicity issues.

Several efforts to reduce the impacts of interfering chemicals in the incoming waste stream have already been evaluated and implemented. A thorough root cause analysis of these issues has identified that the original design of the reclamation facility filter system may not be well suited to meet permit requirements given the changed conditions of the wastewater.

In order to fully understand how the changes in water quality are affecting the reclamation facility filter system staff requested a proposal from Hazen and Sawyer (Hazen) to evaluate the performance of the reclamation facility filters and develop potential long and short-term recommendations for any required modifications. Hazen submitted the attached proposal for this effort on August 13, 2020 and it was reviewed by the Board Engineering Committee on September 2, 2020.

III. COMMENTS AND RECOMMENDATIONS

The evaluation of the reclamation facility filter system is included in the District's 2020 Action Plan and funds in the amount of $40,000 for this effort are included in the FY2020-21 Budget.

Staff recommends the Board authorize the General Manager to execute a professional service agreement with Hazen and Sawyer in the form of an addendum to proposal for the evaluation of the Reclamation Facility Filter System, in an amount not to exceed $29,800.

IV. REFERENCE MATERIAL

Hazen and Sawyer Tertiary Filter Surveillance Proposal dated August 13, 2020

Hazen
Hazen and Sawyer
7700 Irvine Center Drive, Suite 200
Irvine, CA 92618 • 949.557.8549

August 13, 2020

Mr. Steve Wagner
General Manager
Goleta Sanitary District
One William Moffett Place
Goleta, CA 93117

Reference: Goleta Sanitary District Tertiary Filter Surveillance Proposal

Dear Mr. Wagner,

The Goleta Sanitary District (GSD) was established in 1942, initially treating residential and domestic wastewater with primary treatment. Treatment processes have been upgraded over time to include secondary treatment and in 1994, in partnership with Goleta Water District, tertiary treatment was added for recycled water use.

The tertiary filters are critical to the production of recycled water that meets California Title 22 regulatory requirements. GSD has experienced periodic detection of coliform in the tertiary filter effluent since 2016. GSD performed an in-depth root cause analysis and identified industrial discharges of bronopol and quaternary amines as the source of the issue. Source control measures implemented by GSD were able to partially alleviate coliform issues. However, coliform breakthrough returned, this time linked to linear anionic surfactants. Surfactants can interfere with the collection of solids by the existing monomedia tertiary filters. The surfactant loading seems to be related to domestic sources, which cannot readily be addressed by the same source control practices used for bronopol and quanternary amines.

GSD wishes to hire a qualified consultant to evaluate the performance of the tertiary filters, assess the condition of filter media, and develop potential short and/or long-term recommendations to reduce effluent coliforms. The enclosed proposal details filter surveillance services that Hazen will perform to support GSD in this assessment.

1. Introduction

The objectives of the proposed scope of work are to evaluate the performance of the tertiary filters, assess the condition of filter media and develop potential short and/or long-term recommendations. The key to meeting these objectives is conducting filter surveillance on GSD's tertiary filter process.

The professional services proposed include:

- Review and evaluation of requested historical plant operational data
- Prepare equipment, materials, and procedures for filter surveillance
- Conduct on-site filter surveillance and debrief GSD upon completion with initial observations
- Analyze filter media samples
- Prepare a technical memorandum summarizing findings and recommendations
- Conduct a virtual meeting with GSD staff to review technical memorandum

2. Scope of Services

TASK 1 Project Management and Data Review

1.1 – Project Administration & Team Coordination Activities

Hazen will coordinate with GSD to ensure that filter surveillance is efficiently conducted, to discuss safety requirements, and to assure that operational impacts are minimized during filter surveillance. Hazen will submit a formal request for information (RFI) that itemizes operational data to be analyzed.

1.2 – Review of Existing Plant Operations and Data

Hazen will review GSD's tertiary filter information. The information to be provided by GSD and reviewed by Hazen prior to the on-site efforts include but are not limited to:

- Process flow diagram, showing all major unit processes, chemical application points, and process monitoring locations for water quality and key operational parameters.
- Filter information, including box dimensions, underdrain types, media specifications, backwash source and backwash sequence description, and a summary of any prior surveillance efforts.
- Operational data, including chemical types and range of dosages, frequency and method of clarifier solids removal, filter backwash triggers (i.e., turbidity, headloss, run time).
- Electronic versions of SCADA screens / human machine interfaces (HMIs) that are focused on filters and any others that could have impacts on filter operations.

TASK 2 Filter Surveillance

2.1 – Prepare for Filter Surveillance

Hazen will prepare procedures and equipment required to conduct filter surveillance. This includes procedures and equipment to safely enter filters. This also includes the purchase and construction of necessary equipment, such as a bed expansion measurement tool.

2.2 – On-Site Field Work

Filter surveillance will be performed over two days. On the first day, Hazen staff will meet GSD staff, receive site specific safety training, Covid-19 safety procedure review, and tour the tertiary filter process and related components to confirm the conditions and concerns specific to GSD. The backwash sequence will be discussed, and we will also confirm that all materials are present for filter surveillance.

One of the four filters will be drained and made available for filter surveillance during the tour. GSD staff are encouraged to be present to participate and gain skills to self-perform filter surveillance in the future.

Ideally, the filter will be drained after a routine run under normal hydraulic and pretreatment conditions. After implementing confined space entry and lockout-tagout (LOTO) procedures, we will initiate filter surveillance on that filter. Specifically, the following filter surveillance techniques will be conducted while the filter in the drained condition:

- Observations of filter components
- Media surface observations
- Media depth measurements to the underdrain to create a gradient depth map
- Floc retention analyses throughout the media depth - before backwash
    - This will indicate where solids are being captured and stored throughout the media depth during filtration
- Media sample collection for off-site sieve analysis
    - Includes a sieve analysis to determine effective size (ES), uniformity coefficient (UC) and acid solubility of the media

A backwash on the first filter will then be performed after personnel and equipment have been removed, and the confined space entry and LOTO have been cleared. The following filter surveillance techniques will be performed during backwash:

- Backwash observations
- Filter bed (media) expansion measurement
- Spent filter backwash turbidity profile

After backwash, the filter will be drained again to conduct a floc retention analysis on the media to determine the effectiveness of the current backwash process to clean the media. Once again, confined space entry and LOTO procedures will be followed to assure safety of personnel.

On the morning of the second day, filter surveillance will be performed on a second filter using the same sequence of techniques described above for the first filter. In the afternoon, filter bed expansion measurements and spent filter backwash turbidity profiles will be collected for the two additional filters.

Prior to leaving the site, Hazen staff will conduct a debrief with GSD personnel to present observations and potential operational modifications that could help improve the desired performance of the tertiary filters.

2.3 – Filter Media Analysis

Two media samples collected during Task 2.2 will be sent to an external laboratory for gradation analysis. This task also includes coordinating with the laboratory and analyzing data.

2.4 – Prepare Technical Memorandum

Hazen will prepare a technical memorandum summarizing findings and conclusions from the filter surveillance activities performed in Task 2.2.

2.5 – Present Findings (Virtual Meeting)

Hazen will prepare a summary presentation to be delivered via virtual meeting. This will include a summary of the findings and recommendations from the written Technical Memorandum. The presentation will be prepared in PowerPoint format, and this file will be delivered to GSD in advance of the virtual meeting.

3. Project Team Profile

Hazen offers the GSD a team with a proven track record in evaluating filter performance issues. Our technical advisors bring a wealth of experience from around the country. The following provides a brief description of the project team.

	**Dawn Guendert, Project Manager / Project Director** Ms. Guendert has served as Project Manager and Project Director for a wide range of projects that Hazen has successfully delivered for Goleta Sanitary District. She has demonstrated her ability to put together a team with the appropriate skill sets needed to deliver the highest level of quality product to GSD and manage the project from kick-off to successful completion.
	**Jim DeWolfe, PE, BCEE, CWO, Technical Advisor** Mr. DeWolfe, Hazen's Water Treatment Operations Leader, has guided drinking water utilities towards optimized operations for over 30 years. He understands the importance of sequencing improvements to optimally adapt facilities to new regulatory requirements and capacities, and the consequences of any changes on the skill requirements of operations staff. Mr. DeWolfe specializes in operator empowerment, filter surveillance and operational forensics.
	**Alex Gorzalski, PhD, PE, PO, Project Engineer** Dr. Gorzalski is a licensed operator with hands-on experience troubleshooting filtration issues. Prior to joining Hazen, Alex worked at a large wholesale water utility, most recently as the chief engineer of a 120 MGD water treatment plant. There he conducted and supervised filter surveillance activities and two facilities containing 48 filters. He has also conducted filter surveillance on tertiary filters, including at Irvine Ranch Water District.

	**Justin Irving, PE, Support Engineer** Mr. Irving has over 10 years of experience in the water/wastewater industry. He has worked for the public and private sectors and takes a team-oriented approach to problem solving. He has in-depth experience in water/wastewater pilot testing, process monitoring, data analysis, data handling, process control, process design, process modeling, pumping system hydraulics, collection system hydraulics, and field engineering.
	**David Nailor, PE, Tertiary Filter Design** Mr. Nailor has extensive experience in the planning and design of wastewater treatment and water/wastewater facilities. He serves as Hazen and Sawyer's Wastewater Mechanical Discipline Group Leader. He is a recognized leader in hydraulic analysis and design, and is the primary developer of "HazenPro", Hazen and Sawyer's hydraulic profile analysis model. His project experience includes all aspects of wastewater treatment from preliminary treatment and biological nutrient removal to solids handling facilities. He has extensive experience in the design and rehabilitation of wastewater tertiary filtration systems and has acted as project, design manager, and as a technical advisor on numerous filtration projects.

4. Summary of Deliverables, Schedule, and Assumptions

Deliverables associated with this scope of work include:

- Preparation of a final technical memorandum
- Delivery of a summary presentation

The date of on-site filter surveillance activities is anticipated to occur within 8 weeks of notice to proceed, with the above deliverables provided within 4 weeks of on-site activities. This schedule includes anticipated turnaround times for media analysis by an external laboratory.

The level of effort proposed here assumes the following:

- GSD shall provide a ladder of sufficient length to safely enter the filter box
- GSD shall provide a davit arm crane, lanyard, and confined space entry attendants in the event personnel extraction is required. Hazen staff will have harnesses.
- The filters are not permit-required confined spaces. If a permit is required, GSD shall prepare the confined space entry permit or Hazen may engage a specialty consultant to provide this service at additional cost.

5. Cost of Services

The total not to exceed fee for this project is $29,800. The table on the following page provides the fee for each Task and Other Direct Costs associated with this scope of work.

We appreciate the opportunity to submit this proposal to Goleta Sanitary District. The Hazen team looks forward to using our technical expertise to help GSD optimize the tertiary filtration process and identify potential long term improvements to meet water quality objectives.

Please contact Dawn Guendert at dguendert@hazenandsawyer.com or 858-764-5523 if you have any questions or comments about any aspect of this proposal.

Sincerely,

Dawn Guendert

Dawn Guendert
Project Director

Hazen and Sawyer
7700 Irvine Center Drive, Suite 200
Irvine, CA 92618 • 949.557.8549

	Project Manager D. Guendert $250	Technical Advisor J. DeWolfe $275	Project Engineer A. Gorzalski $195	Support Enginer J. Irving $195	QA/QC D. Nailor $275	Labor Hours	Labor Cost	ODC's	Subtotal	Subs Subtotal	TOTAL
Task 1: Project Management & Data Review											
Project Administration & Team Coordination Activities	2		2			4	$890	$ -	$890	$ -	$890
Review of Existing Plant Operations and Data		1	4			5	$1,055	$ -	$1,055	$ -	$1,055
TASK 1 - SUBTOTAL	**2**	**1**	**6**	**0**	**0**	**9**	**$ 1,945**	**$ -**	**$ 1,945**	**$ -**	**$ 1,945**
Task 2: Filter Surveillance											
Prepare for Filter Surveillance		4	16	8		28	$5,780	$ 250	$6,030	$ -	$6,030
On-Site Field Work		8	16	16		40	$8,440	$ 2,600	$11,040	$ -	$11,040
Filter Media Analysis		1	4			5	$1,055	$ 2,000	$3,055	$ -	$3,055
Prepare Technical Memorandum	2	4	12	2	3	23	$5,155	$ -	$5,155	$ -	$5,155
Present Findings (Virtual Meeting)	2	3	4	1	1	11	$2,575	$ -	$2,575	$ -	$2,575
TASK 2 - SUBTOTAL	**4**	**20**	**52**	**27**	**4**	**107**	**$ 23,005**	**$ 4,850**	**$ 27,855**	**$ -**	**$ 27,855**
TOTAL FEE (TASK 1-2)	**6**	**21**	**58**	**27**	**4**	**116**	**$ 24,950**	**$ 4,850**	**$ 29,800**	**$ -**	**$ 29,800**

GENERAL MANAGER'S REPORT

GOLETA SANITARY DISTRICT
GENERAL MANAGER'S REPORT

The following summary report describes the District's activities from August 18, 2020 through September 3, 2020. It provides updated information on significant activities under three major categories: Collection System, Treatment/Reclamation and Disposal Facilities, and General and Administration Items.

1. COLLECTION SYSTEM REPORT

LINES CLEANING
Staff is conducting routine lines cleaning in the area of Walnut Lane and San Simeon Drive.

CCTV INSPECTION
Staff continues routine Closed-Circuit Television (CCTV) inspections in the area of University Drive and Berkeley Drive.

COLLECTION SYSTEM MAINTENANCE TECHNICIAN (CSMT) II INTERNAL RECRUITMENT
CSMT I Braden Stribling has been promoted to the CSMT II position.

CITY VENTURES DEVELOPMENT
Inspections continue as required for this project.

2020 PIPELINE REHABILITATION PROJECT
The Notice of Completion has been filed with the Santa Barbara County Clerk-Recorder's office. The retention final payment will be made after the mandatory waiting period.

REPAIR AND MAINTENANCE
Staff replaced several Vactor truck water tank fittings. The Santa Barbara County Public Works department has begun their annual street overlay program. This paving project will affect approximately 40 District manholes. Staff is working with the County as their contractor lowers and raises these manholes during the project, located primarily in the areas of Hollister Avenue, Walnut Drive, University Drive and Ribera Drive.

GREASE AND OIL INSPECTIONS
Staff continues with the grease and oil inspections program.

COMPETENCY BASED TRAINING (CBT)
Staff continues work on the CBT project with DKF Solutions staff.

CITY OF GOLETA OLD TOWN SIDEWALK PROJECT
Staff continues to coordinate inspections of the sewer manhole-related work by the City of Goleta Construction Management team from Filippin Engineering, Inc.

2. TREATMENT, RECLAMATION AND DISPOSAL FACILITIES REPORT
Operations and Maintenance staff continue to work on preparing the new inventory storage containers.

The recruitment for the Maintenance Technician I position has closed; second interviews are being held the first week of September.

The Senior Operator IV recruitment closed on August 28, 2020. First interviews are scheduled for the first week of September.

Plant flows have increased to 4.3 million gallons a day (MGD). We continue to see some interference to the treatment process, likely due to the use of surfactants found in consumer cleaning products. Operations staff has added a biostimulant to the treatment process to help counteract the impacts of surfactants. There have been notable positive results. Operations staff will continue to monitor and quantify the benefits of this new chemical addition.

The Lystek digestor refeed pilot project to quantify increased solids destruction and gas production has officially started. GSD staff has completed the first round of testing and is currently analyzing the results.

Reclamation demand is at 1.5 million gallons a day (MGD).

Centrifuge operations continue as planned. Operations staff is starting to notice the reduction in sludge volume in lagoon number three and systematic dredging across the lagoon to remove the remaining solids has begun.

A heatwave across the State caused an excessive demand for energy. Southern California Edison, the California Independent Special Operator, and the Governor's office requested all entities with emergency standby generators to self-generate electricity. GSD complied and used the backup generators for 3 nights during the peak demand; this helped the State avoid rolling blackouts. During the generator use a minor problem with the fuel delivery system for the generators was discovered and repaired by maintenance staff.

3. GENERAL AND ADMINISTRATIVE ITEMS

Financial Report

The District account balances as of September 3, 2020 shown below are approximations to the nearest dollar and indicate the overall funds available to the District at this time.

Operating Checking Accounts:	$ 776,470
Investment Accounts:	$ 25,869,140
Total District Funds:	$ 26,645,610

The following transactions are reported herein for the period 08/18/20 – 09/03/20.

Regular, Overtime, Cash-outs and Net Payroll:	$ 116,264
Claims:	$ 529,808

Total Expenditures:	$	646,073
Total Deposits:	$	13,733

Transfers of funds:

Community West Bank (CWB) to LAIF:	$	- 0 -
CWB Operational to CWB Money Market:	$	- 0 -
CWB Money Market to CWB Operational:	$	700,000

The District's investments comply with the District's Investment Policy adopted per Resolution No. 16-606. The District has adequate funds to meet the next six months of normal operating expenses.

Local Agency Investment Fund (LAIF)
LAIF Monthly Statement – August, 2020.
LAIF Quarterly Report – Previously submitted.
PMIA/LAIF Performance – Previously submitted.
PMIA Effective Yield – Previously submitted.

Community West Bank (CWB)
CWB Money Market Account – August, 2020.

Deferred Compensation Accounts
CalPERS 457 Deferred Compensation Plan – Previously submitted.
Lincoln 457 Deferred Compensation Plan – Previously submitted.

COVID-19 Response Plan Update
A verbal update will be provided at the meeting.

Personnel Update
A verbal update will be provided at the meeting.

California State Treasurer
Fiona Ma, CPA

Local Agency Investment Fund
P.O. Box 942809
Sacramento, CA 94209-0001
(916) 653-3001

September 01, 2020

LAIF Home
PMIA Average Monthly Yields

GOLETA SANITARY DISTRICT

GENERAL MANAGER
ONE WILLIAM MOFFETT PLACE
GOLETA, CA 93117

Tran Type Definitions

Account Number: 70-42-002

August 2020 Statement

Account Summary

Total Deposit:	0.00	Beginning Balance:	17,942,848.20
Total Withdrawal:	0.00	Ending Balance:	17,942,848.20

Community West Bank

445 Pine Avenue
Goleta, CA 93117

RETURN SERVICE REQUESTED

GOLETA SANITARY DISTRICT
MONEY MARKET
1 WILLIAM MOFFETT PL
GOLETA CA 93117-3901

Statement Ending 08/31/2020

GOLETA SANITARY DISTRICT
Customer Number: XXXXXXXX5554

All Community West Bank branch offices are open to serve you Monday through Friday, 9:00 am to 5:00 pm.

Notice of Change to our Transaction Processing and Posting

Community West Bank changed the way end-of business-day transactions are processed and posted to your account, generally following this order: 1) Deposits and Credits; 2) Cash Withdrawals, In-Person Transactions; 3) Debit Card Transactions; 4) Scheduled Transfers, Online Transfers; 5) ACH Debits; 6) Checks, posting in ascending dollar amount order; 7) Bank Fees; 8) Service Charges.

If you have questions about how transactions are processed and posted to your account, please contact the Community West Bank office most convenient to you, or call (888) 831-5295, Monday – Friday, 8am to 5pm.

Summary of Accounts

Account Type	Account Number	Ending Balance
PUBLIC AGENCY-MMDA	XXXXXXXX5554	$7,926,321.99

PUBLIC AGENCY-MMDA - XXXXXXXX5554

Account Summary

Date	Description	Amount		
08/01/2020	**Beginning Balance**	**$9,419,232.23**	Average Ledger Balance	$8,786,974.16
	1 Credit(s) This Period	$7,089.76		
	2 Debit(s) This Period	$1,500,000.00		
08/31/2020	**Ending Balance**	**$7,926,321.99**		

Account Activity

Post Date	Description	Debits	Credits	Balance
08/01/2020	**Beginning Balance**			**$9,419,232.23**
08/11/2020	Funding Claims & P/R	$800,000.00		$8,619,232.23
08/28/2020	x-fer to Operations	$700,000.00		$7,919,232.23
08/31/2020	INTEREST AT .9500 %		$7,089.76	$7,926,321.99
08/31/2020	**Ending Balance**			**$7,926,321.99**

DISTRICT CORRESPONDENCE

Board Meeting of September 3, 2020

Date:	**Correspondence Sent To:**
1. 08/14/2020	Sielinde Pukke Shubin Donaldson Architects **Subject:** Sewer Service Availability Proposed Sewer Service Connection for One Existing Light Manufacturing Building A.P.N. 077-030-006 at 1351 Holiday Hill, Goleta
2. 08/17/2020	James Campero, Deputy Public Works Director **Subject:** Goleta Sanitary District CCTVI of Facilities within City of Goleta Limits
3. 08/17/2020	Heidi Jones Suzanne Elledge Planning and Permitting Services **Subject:** Sewer Service Availability A.P.N. 071-140-075 at 5385 Hollister Ave., Goleta
4. 08/21/2020	Jeff Helmrich, Technical Services Manager In-N-Out Burger **Subject:** Goleta Sanitary District Permitted Capacity Discharge In-N-Out Store #108 A.P.N. 067-230-040 at 4865 Calle Real, Santa Barbara
5. 08/24/2020	John Margadonna Santa Barbara County Road Encroachment Permit Office **Subject:** Goleta Sanitary District CCTVI of Facilities
6. 08/31/2020	Resident/Homeowner Yaple Ave. **Subject:** Goleta Sanitary District Sewer Maintenance on Yaple Avenue

7. 09/01/2020 — Alan Siebenaler
Subject: Sewer Service Availability
Proposed Sewer Connection for One Existing SFR and One Guest House

8. 09/01/2020 — Industrial Waste Control Temporary Discharge Permit
Subject: La Cumbre Mutual Water Company

9. 09/01/2020 — GSD COVID-19 Weekly Update
Subject: September 1, 2020

10. 09/01/2020 — Mr. Liam Gunst
SB County Resource Recovery & Waste Management
Subject: Industrial User Discharge Permit Application
Letters also sent to:
- Next Energy Technologies, Inc.
- Intriplex Technologies
- Innovative Micro Technology
- Electromatic, Inc.
- University of California, Santa Barbara
- Neal Feay Company
- Microdyn-Nadir US Inc.

Hard Copies of the Correspondence are available at the District's Office for review