DEPARTMENT OF DESIGN AND CONSTRUCTION
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DEPUTY DIRECTOR

WW.P 12-110

November 7, 2012

Mr. Gary Hooser, Director
Office of Environmental Quality Control (OEQC)
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

Dear Mr. Hooser:

Subject: Draft Environmental Assessment (DEA) for Second Egg-Shaped Digester and Sludge Storage Tank Sand Island Wastewater Treatment Plant; Tax Map Key (1) 1-5-041: 005 Honolulu, Island of Oahu, Hawaii

The Department of Design and Construction, City and County of Honolulu has reviewed the Draft Environmental Assessment (DEA) for the subject project, and anticipates issuing a Finding of No Significant Impact (FONSI) determination. Please publish notice of availability of the DEA for public comment in the next OEQC Environmental Notice.

We have enclosed a completed OEQC Publication Form, one (1) hard copy of the DEA and one (1) CDROM containing PDF copies of the DEA and project summary. Should you or your staff have any questions please contact project manager, Roy Tamashiro at 768-8760, or contact our consultant, James Niermann of R. M. Towill Corporation at 842-1133.

Very truly yours,

Lori M.K. Kahikina, P.E.
for Director

Enclosures

AGENCY ACTIONS
SECTION 343-5(B), HRS
PUBLICATION FORM (JULY 2012 REVISION)

Project Name: **Second Egg-Shaped Digester and Sludge Storage Tank**
Sand Island Wastewater Treatment Plant
Island: **Oahu**
District: **Honolulu**
TMK: **(1) 1-5-041: 005**
Permits: **Special Management Area Permit, Air Permit Modification, National Pollutant Discharge Elimination Permit, Building Permit, Grading and Stockpiling Permit**

Proposing/Determination Agency:
(*Address, Contact Person, Telephone*)
Department of Design and Construction
650 South Beretania Street
Honolulu, Hawai'i 96813
Lori M. K. Kahikina, P.E., Director, 768-8480

Consultant:
(*Address, Contact Person, Telephone*)
R. M. Towill Corporation
2024 North King Street, Suite 200
Honolulu, Hawai'i 96819
James Niermann,842-1133
Email: JimN@rmtowill.com

Status (check one only):

_**x**_DEA-AFNSI — Submit the proposing agency notice of determination/transmittal on agency letterhead, a hard copy of DEA, a completed OEQC publication form, along with an electronic word processing summary and a PDF copy (you may send both summary and PDF to oeqc@doh.hawaii.gov); a 30-day comment period ensues upon publication in the periodic bulletin.

__FEA-FONSI — Submit the proposing agency notice of determination/transmittal on agency letterhead, a hard copy of the FEA, an OEQC publication form, along with an electronic word processing summary and a PDF copy (send both summary and PDF to oeqc@doh.hawaii.gov); no comment period ensues upon publication in the periodic bulletin.

__FEA-EISPN — Submit the proposing agency notice of determination/transmittal on agency letterhead, a hard copy of the FEA, an OEQC publication form, along with an electronic word processing summary and PDF copy (you may send both summary and PDF to oeqc@doh.hawaii.gov); a 30-day consultation period ensues upon publication in the periodic bulletin.

__Act 172-12 EISPN — Submit the proposing agency notice of determination on agency letterhead, an OEQC publication form, and an electronic word processing summary (you may send the summary to oeqc@doh.hawaii.gov). NO environmental assessment is required and a 30-day consultation period upon publication in the periodic bulletin.

__DEIS — The proposing agency simultaneously transmits to both the OEQC and the accepting authority, a hard copy of the DEIS, a completed OEQC publication form, a distribution list, along with an electronic word processing summary and PDF copy of the DEIS (you may send both the

summary and PDF to oeqc@doh.hawaii.gov); a 45-day comment period ensues upon publication in the periodic bulletin.

__FEIS — The proposing agency simultaneously transmits to both the OEQC and the accepting authority, a hard copy of the FEIS, a completed OEQC publication form, a distribution list, along with an electronic word processing summary and PDF copy of the FEIS (you may send both the summary and PDF to oeqc@doh.hawaii.gov); no comment period ensues upon publication in the periodic bulletin.

__ Section 11-200-23 Determination — The accepting authority simultaneously transmits its determination of acceptance or nonacceptance (pursuant to Section 11-200-23, HAR) of the FEIS to both OEQC and the proposing agency. No comment period ensues upon publication in the periodic bulletin.

__Section 11-200-27 Determination — The accepting authority simultaneously transmits its notice to both the proposing agency and the OEQC that it has reviewed (pursuant to Section 11-200-27, HAR) the previously accepted FEIS and determines that a supplemental EIS is not required. No EA is required and no comment period ensues upon publication in the periodic bulletin.

__Withdrawal (explain)

Summary (Provide proposed action and purpose/need in less than 200 words. Please keep the summary brief and on this one page)**:**

The CCH, DDC plans to expand the existing In-vessel Bioconversion Facility at the Sand Island WWTP by constructing a Second Egg-shaped Digester and Sludge Storage Tank. The planned Second ESD/SST will be integrated into the existing Bioconversion Facility, adjacent to the existing ESD/SST. The existing ESD/SST has exceeded its design solid loading rate and is susceptible to overloading during peak flow conditions. This is due in part to anticipated increased loads resulting from population increases in the service area, and in part to increased capture of solids resulting from enhancements to the primary treatment system. In addition capacity constraints, there is no facility redundancy to accommodate planned or emergency shut-down for maintenance or repair work. The purpose of the proposed Second ESD/SST is to provide extra process capacity to accommodate existing and projected design loads. The Second ESD/SST will also provide necessary facility redundancy to temporarily shut down one digester while the other undergoes maintenance or repair work, or in the event of an emergency.

DRAFT ENVIRONMENTAL ASSESSMENT
Prepared and submitted in accordance with Chapters 205A and 343, HRS

Sand Island Wastewater Treatment Plant
Second Egg-Shaped Digester (ESD) and Sludge Storage Tank (SST)

Honolulu, Oʻahu, Hawaiʻi

November 2012

APPLICANT
Department of Design and Construction
City and County of Honolulu
650 South Beretania Street, 11th Floor
Honolulu, HI 96813

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City and County of Honolulu
650 South Beretania Street, 11th Floor
Honolulu, Hawai‘i 96813

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APPENDICES

ABBREVIATIONS AND ACRONYMS

ASCE	American Society of Civil Engineers
BMP	Best Management Practices
BWS	Board of Water Supply
CCH	City and County of Honolulu
CEPT	Chemically Enhanced Primary Treatment
Cf	cubic feet
CZMP	Coastal Zone Management Program
DDC	Department of Design and Construction
DLNR	Department of Land and Natural Resources
DNL	decibel noise level
DOH	State of Hawaii Department of Health
DPP	Department of Planning and Permitting
DSP	Division of State Parks
EA	Environmental Assessment
EIS	Environmental Impact Statement
ENV	Department of Environmental Services
EPA	Environmental Protection Agency
ESD	Egg-Shaped Digester
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FL	fill land
FONSI	Finding of No Significant Impact
GT	Gravity Thickener
HAR	Hawaii Administrative Rules
HECo	Hawaiian Electric Company
HRS	Hawaii Revised Statutes
IBC	International Building Code
ICFB	Inorganic Chemical Feed Building
kV	kilovolts
kWH	kilowatt hour

lf	linear feet
LPO	low pressure oxidation
LUO	Land Use Ordinance
Msl	mean sea level
NO_x	nitrogen dioxide
NPDES	National Pollutant Discharge Elimination System
NSP	Non-covered Source Permit
O_3	Ozone
OEQC	Office of Environmental Quality Control, State of Hawaii
OHV	Off-highway vehicle
PCB	polychlorinated biphenyls
$PM_{2.5}$	Particulate Matter, ≤ 2.5 micron size
PS	Pump Station
PUC	Primary Urban Center
ROH	Revised Ordinances of Honolulu
RTO	Regenerative Thermal Oxidizer
sf	square feet
SHPD	State Historic Preservation Division
SMA	Special Management Area
SO_2	Sulfur dioxide
SRA	State Recreation Area
SST	Sludge Storage Tank
TMK	tax map key
UV	Ultraviolet
VOC	volatile organic compound
WSST	Wet Sludge Storage Tank
WWTP	wastewater treatment plant
ZIMPRO	"Zimmerman Process" wet air oxidation treatment process

Project Summary

Project:	Second Egg-Shaped Digester (ESD) and Sludge Storage Tank (SST) Sand Island Wastewater Treatment Plant (WWTP)
Applicant:	Department of Design and Construction (DDC) City and County of Honolulu (CCH)
Accepting Agency:	DDC, CCH
Agent:	R. M. Towill Corporation James Niermann, Senior Planner 2024 North King Street, Suite 200 Honolulu, Hawai‘i 96819 (808) 842-1133
Location:	Honolulu, Island of Oahu
Tax Map Key:	(1) 1-5-041: 005
Proposed Action:	The CCH, DDC plans to expand the existing In-vessel Bioconversion Facility at the Sand Island WWTP by constructing a Second ESD and SST (“Second ESD/SST”). The planned Second ESD/SST will be integrated into the existing Bioconversion Facility. One new ESD and SST will be constructed adjacent to the existing ESD/SST. The existing gas holding tank and flare will be relocated to make room for the new SST. A second gas flare will be installed with the relocated flare. The existing centrifuge and dryer have sufficient capacity to process treated sludge from the new ESD/SST and will not be modified. The purpose of the proposed Second ESD/SST is to provide additional process capacity needed for existing loads, and for projected design loads anticipated prior to the upgrade of the WWTP to secondary treatment. The secondary treatment upgrade is required by the 2010 Consent Decree to be completed by December 31, 2035. The Second ESD/SST will also provide necessary facility redundancy to temporarily shut down one digester while the other undergoes maintenance or repair work, or in the event of an emergency.
Land Area:	Approximately 13,000 sf of land area is affected by the project, including land area occupied by the existing ESD/SST and gasholder tank.
Present Use:	The project site presently includes the existing ESD/SST, gasholder tank, and flare assembly, as well as vacant space reserved for the future ESD.
State Land Use District:	Urban
PUC Development Plan Land Use Designation:	Industrial (Map A.5 Land Use Map, PUC – Central)
County Zoning District:	I-3, Waterfront Industrial
Special Management Area:	Yes

FEMA/FIRM Designation:	X (Outside the 0.2 percent annual chance floodplain)
Permits Required:	*Clearances and permits needed from the various Federal, State and City and County of Honolulu agencies include but are not limited to the following.* **<u>City and County of Honolulu</u>** **DDC** • Finding of No Significant Impact **Department of Planning and Permitting (DPP)** • Special Management Area Permit • Construction plan review and approval • Building Permit • Grading and Stockpiling Permit **<u>State of Hawai‘i</u>** **Department of Health (DOH)** • Construction plan review and approval • Air Permit modification (Covered Source Permit No. 0216-06-C). • National Pollutant Discharge Elimination System (NPDES) Permit for Construction Stormwater

SECTION 1
Introduction

1.1 PROJECT OVERVIEW

The City and County of Honolulu (CCH), Department of Design and Construction (DDC) plans to expand the existing In-vessel Bioconversion Facility at the Sand Island Wastewater Treatment Plant (WWTP) by constructing a Second Egg-Shaped Digester and Sludge Storage Tank ("Second ESD/SST"). The planned Second ESD/SST is to be located within the Sand Island WWTP property on land owned by the State of Hawai'i and identified by Tax Map Key (TMK) parcel (1) 1-5-041: 005. The CCH Department of Environmental Services (ENV) owns and operates the Sand Island WWTP facility. The CCH has a contract with Synagro WWT, Inc. (Synagro) to operate the Bioconversion Facility. See **Figure 1-1, Project Location**.

The Bioconversion Facility is part of the Sand Island WWTP solids handling process, which replaced the energy-consuming LPO (ZIMPRO) system. The facility is designed to treat wastewater sludge for beneficial reuse in compliance with the 1995 Consent Decree (Civil No. 94-0765DAE) executed between the CCH, the State of Hawai'i, and the U. S. Environmental Protection Agency (EPA). In 2004, the CCH contracted Synagro to design, build and operate the In-vessel Bioconversion Facility at the Sand Island WWTP to convert sludge into a pellet fertilizer. This diverts sludge from disposal in the landfill. The main components of the existing In-vessel Bioconversion Facility are an ESD for anaerobic digestion of the sludge, an SST for sludge storage, a gas holding tank to store methane produced by the digestion process, a flare to burn off excess methane, two centrifuges for dewatering, and a dryer for pelletizing.

The planned Second ESD/SST will be incorporated as part of the existing Bioconversion Facility. One new ESD and SST will be constructed adjacent to the existing ESD/SST. The existing gas holding tank and flare will be relocated to make room for the second SST. A second gas flare will be installed with the relocated flare. The existing centrifuge and dryer were sized to accept the additional process treated sludge from the Second ESD/SST and will not be modified. See **Section 2.2** for a detailed project description.

1.2 PROJECT PURPOSE AND NEED

The existing Sand Island WWTP ESD/SST has exceeded its design solid loading rate and is susceptible to overloading during peak flow conditions. This is due in part to anticipated increased loads resulting from population increases in the service area, and in part to increased capture of solids resulting from enhancements to the primary treatment system. In addition to ESD/SST capacity constraints, there is no facility redundancy to accommodate planned or emergency shut-down for maintenance or repair work: the existing ESD must operate continuously.


Legend
Project Area
GIS Layer Source: City & County of Honolulu -HoLIS
Hawaii Statewide GIS Program
Sand Island WWTP
PACIFIC OCEAN
O'ahu
Project Location
FIGURE 1-1
PROJECT LOCATION
SIWWTP Second Anaerobic Digester
Honolulu, O'ahu, Hawai'i
N
0 400 800 1,600 2,400 3,200
Feet
R. M. TOWILL CORPORATION

The purpose of the proposed Second ESD/SST is to provide additional process capacity needed for existing loads, and for projected design loads anticipated prior to the upgrade of the WWTP to secondary treatment. The secondary treatment upgrade is required by the 2010 Consent Decree to be completed by December 31, 2035. The planned improvements will also improve system reliability and redundancy. The second ESD/SST will allow temporary shutdown of one digester for routine maintenance or repair work, or in the event of an emergency.

1.3 BASIS FOR THE ENVIRONMENTAL ASSESSMENT

In accordance with Chapter 343, Section 5, Hawai‘i Revised Statutes (HRS), this project involves the following action that requires the preparation of an environmental assessment (EA):

(1) Propose the use of state or county lands or the use of state or county funds;

In addition, the project is located within the Special Management Area (SMA), therefore the proposed activity is subject to the preparation of an EA per the requirements of Chapter 25, Revised Ordinances of Honolulu, (ROH), and Chapter 205A Hawai‘i Revised Statutes (HRS).

Pursuant to the requirements of Chapter 343 HRS, and Chapter 11-200, Hawai‘i Administrative Rules (HAR), the proposing agency, the DDC, has determined that the proposed project is not expected to have significant environmental effects. Based on analysis and review of environmental conditions, project effects, and proposed mitigation measures, it is anticipated that a Finding of No Significant Impact (FONSI) will be issued for this project.

1.4 PROPOSING AGENCY AND ACCEPTING AUTHORITY

In accordance with HRS Chapter 343, Section 5, the proposing agency and accepting authority for this EA is the CCH DDC.

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SECTION 2
Project Description and Alternatives Considered

2.1 BACKGROUND INFORMATION

2.1.1 PROJECT LOCATION
The Second ESD/SST project site is located on Sand Island near the center of the Sand Island WWTP, adjacent to the existing anaerobic digester and solids handling building. The entrance to the Sand Island WWTP is located on Sand Island Parkway, approximately 0.5 miles southeast from the Kalihi Channel bridge. See **Figure 1-1, Project Location**, and **Figure 2-1, Aerial View of Sand Island WWTP.**

2.1.2 OWNER INFORMATION
The Sand Island WWTP is located on land owned by the State of Hawai‘i and operated by the CCH ENV in accordance with Executive Order No. 3939 issued in 2002. The property is identified by TMK parcel (1) 1-5-041: 005.

The CCH ENV owns all of the WWTP facilities and infrastructure, including the In-Vessel Bioconversion Facilities. The Bioconversion Facilities, including the existing ESD/SST and the Second ESD/SST, are operated by Synagro under contract with the City. The CCH DDC is responsible for overseeing the design and construction of facilities at the Sand Island WWTP.

2.1.3 SAND ISLAND WWTP OPERATIONS
The Sand Island WWTP began operations in 1978 as a primary treatment wastewater treatment plant. The facility treats all of the wastewater flows generated in the Sand Island Sewer Basin service area, which extends from Niu Valley in the east, to Salt Lake / Aliamanu in the west.

The Sand Island WWTP has undergone a number of major modifications in the past decade, including programmed modifications, permit-related modifications and plant expansion work (DDC, 2001). As a result of these projects, the facility capacity was expanded to an average daily flow rate of 90 million gallons per day (mgd) and peak wet weather hydraulic capacity of 271 mgd. The current design data for the existing facility is presented in **Table 2-1**. The facility treatment process is described below in terms of liquid waste streams and solid waste streams.

Table 2-1.
Sand Island WWTP – Current (2009) Design Information

Flows	
Design Average Flow	90 mgd
Intraday Elevated Flow	113 mgd
Design Peak Wet Weather Flow	271 mgd
Design Storm	2 year 6 hour

Figure 2-1, Aerial View of Sand Island WWTP
Source: Google Earth

Liquid Waste Stream Processes

The process flow diagram of the Sand Island WWTP is shown in **Figure 2-2**. The following is a description of the major liquid stream units:

> *Headworks*: This facility was placed in operation in 2005 and replaced the original Screenings Building. An influent receiving area receives flows from the Ala Moana Pump Station (PS), Hart Street PS, Sand Island Parkway PS, and the Fort Shafter PS. The Headworks facility consists of six bar screens with associated screenings washers and compactors for screenings removal, six Parshall flumes for flow measurement and four aerated grit chambers for grit removal. Screenings and grit are conveyed and discharged into a dump truck for disposal at the Waimānalo Gulch landfill.

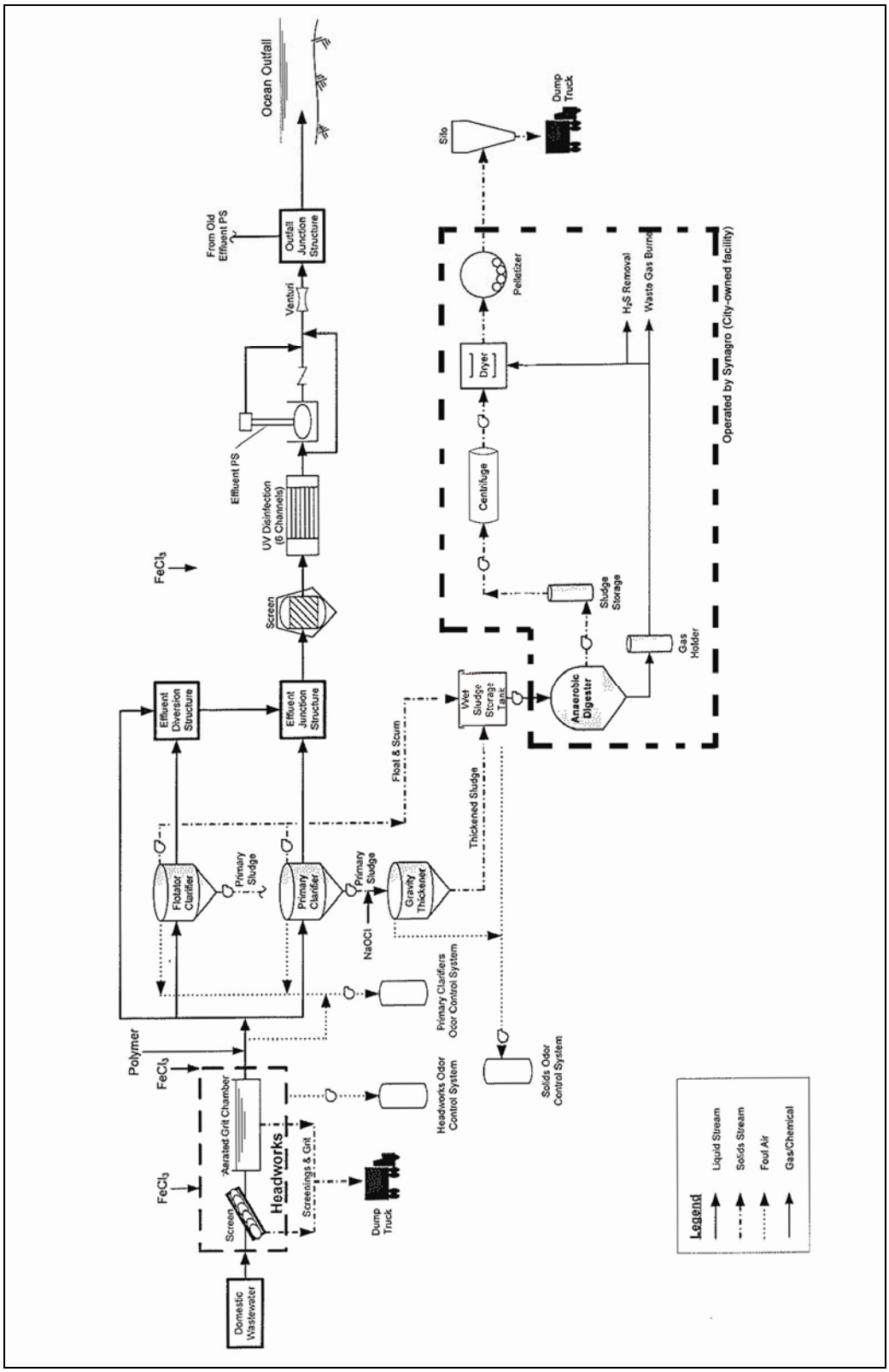


Figure 2-2, Sand Island WWTP Process Schematic (Existing) Solid Waste Stream Processes

Flotator Clarifiers and Primary Clarifiers: The plant consists of six flotator clarifiers and two primary clarifiers. The original Sand Island WWTP had only six flotator clarifiers to provide advanced primary treatment. The flotator clarifiers were originally designed to utilize dissolved air flotation to "float" the solids to the surface where surface skimmers remove the solids. Currently, the flotator clarifiers are typically utilized in gravity mode as traditional primary clarifiers.

Primary Clarifiers 7 and 8 were added to increase the capacity of the clarification system to an average daily flow of 90 mgd. These primary clarifiers were designed as gravity-type primary clarifiers. In recent years, the six flotator clarifiers and the primary clarifiers have all been operated in gravity mode. Four clarifiers are used under normal operations, typically including primary clarifiers 7 and 8 and two of the original six clarifiers.

Inorganic Chemical Feed Building (ICFB): The ICFB allows the injection of chemicals used for chemically enhanced primary treatment (CEPT). Currently iron chloride ($FeCl_3$, ferric chloride) is being utilized for advanced primary treatment and odor control. Polymer is also being used for flocculation.

Ultraviolet (UV) Disinfection Facility: This facility consists of three effluent screens, six UV disinfection channels and an effluent WWPS. Five of the six UV disinfection channels are currently populated with UV lamps. The UV system has room for expansion from the current six UV disinfection channels to ten. Four channels are used under normal operations. During high flow conditions, the effluent pump station is used to provide additional pumping head to discharge the treated primary effluent through the 84-inch diameter ocean outfall pipeline. At low flow conditions, effluent can be discharged through the 84-inch ocean outfall pipeline by gravity.

Ocean Outfall: Effluent is discharged through an 84-inch diameter ocean outfall extending nearly two miles offshore to a depth of over 220 feet. The total length of the outfall is approximately 14,000 linear feet (lf). The wastewater is diffused through the final approximately 3,400 lf of the outfall pipe.

The major solid waste stream processes are as follows:

Gravity Thickeners (GT): Primary sludge from the flotator clarifiers and primary clarifiers is pumped to two of the four gravity thickeners where chlorine is added to control odors and assist in thickening.

Wet Sludge Storage Tanks (WSST): Thickened sludge from the GTs and primary scum from the clarifiers are pumped to the four existing WSSTs. Typically, two WSSTs are used under normal operations, but all four may be called into service at any time. The WSSTs were originally designed to serve as sludge equalization tanks for the original solids handling processes, which formerly included a

thermal conditioning system, centrifuges and sludge incinerators. These systems have been replaced with the sludge drying and pelletizing system now in operation.

Anaerobic Digester: The anaerobic digester involves a continuous feed process from the wet sludge storage tanks into the existing ESD. The digester reduces solids and produces energy in the form of methane. The methane or biogas is used as a fuel source for the sludge heat drying system. A biogas holding tank, hydrogen sulfide scrubber, and associated auxiliary equipment (i.e., piping, valves) and controls are part of the anaerobic digestion process. After completion of the digestion process, the liquid digested biosolids are pumped to the sludge drying and pelletizing system.

Sludge Drying and Pelletizing System: The sludge drying and reuse system consists of digestion containment, centrifuges and final drying and pelletizing. Pelletized sludge is available for use as fertilizer. The anaerobic digester operations, sludge drying and pelletizing system are owned by the City and operated by Synagro WWT, Inc. under an Operation and Maintenance contract. The pellets produced at the facility are beneficially reused as fertilizer for land applications at agricultural farms, golf courses and parks. Residual pellet material not suitable for marketing is disposed of at the Waimānalo Gulch landfill. The majority of the pellet material is being non-commerically used for fertilizer.

Odor Control System

Foul air emissions for the Sand Island WWTP operations directly under the City and County of Honolulu are governed by Non-covered Source Permit (NSP) No. 0216-05-N Application for Renewal No. 0216-13, issued on August 13, 2009. This includes operations from the initial stages of WWTP processing including the headworks, clarifiers, gravity thickeners, and wet sludge storage tanks. The permit is scheduled to expire on August 12, 2014. The permit governs systems as of the date of issuance, a transition period, and the final configuration after scheduled construction is completed. Four electric / diesel engine effluent pumps are covered by the same non-covered source permit governing the foul air systems. Limits on operational hours and emission opacity are included in the permit.

Foul air emissions for Synagro administered operations at the Sand Island WWTP are governed by Covered Source Permit No. 0216-06-C. This includes operations of the anaerobic digester, gas holder, sludge storage, centrifuge, dryer, and the pelletizer. The proposed Second ESD/SST will require processing and application to modify the Covered Source Permit with the State DOH Clean Air Branch.

Electrical Power
The existing ESD/SST requires approximately 12,000 KWH per day of electrical power when in operation. Electrical power will be provided by A 11.5 kV distribution system within the Sand Island WWTP. The system is serviced by two HECo 11.5 kV feeder lines (Sand Island 1 and 2) that connect to a Primary Switching Station Building along Sand Island Parkway. See **Section 3.3.5 Electrical Systems** for further description. In the event of a utility power outage, a system of backup generators located throughout the plant automatically start and provide power to essential equipment.

Water
Water is provided to the Sand Island WWTP through a 12-inch water main which is connected to a Board of Water Supply (BWS) 16-inch water main located along Sand Island Parkway.

The SIWWTP also provides primary effluent water to Synagro for "moisture conditioning" of the dryer exhaust that is returned to the front of the dryer.

2.2 PROJECT DESCRIPTION

The Second ESD/SST will be integrated into the existing Bioconversion Facility. Major components of the existing Bioconversion Facility include the following:

- One (1) 2,350,000 gallon ESD tank, with approximate dimensions of 108 feet in height and maximum diameter of 83.5. A ring wall skirt, 72 feet in diameter and 18 feet high, encircles the base of the ESD.
- One (1) 537,400 gallon SST, with approximate dimensions of 108 feet in height and 30 feet in diameter.
- One (1) 10,000 cubic foot Biogas Holding Tank (gasholder tank), with approximate dimensions of 40 feet in height and 25 feet in diameter, and flare assembly. Digester gas is stored in the gasholder tank and utilized to fuel the pelletizing facility and the boiler assembly. Excess digester gas is flared. The gasholder tank and flare assembly will be relocated as part of this project to make room for the second ESD/SST vessels.
- Sludge drying and pelletizing facilities are housed in a separate building adjacent to the ESD/SST. The facility consists of two centrifuges for dewatering and a heat dryer for pelletizing.

The proposed Second ESD/SST will be of the same design as the existing ESD/SST. The new digester facilities will be constructed adjacent to the existing ESD/SST on the north side. Major components of the Second ESD/SST project include:

- One (1) 2,350,000 gallon ESD tank, with approximate dimensions of 108 feet in height and maximum diameter of 83.5 feet. A ring wall skirt, 72 feet in diameter, will encircle the base of the ESD. Mechanical equipment and controls dedicated to ESD mixing, foam suppression and heat exchange will be located in the space beneath the ESD, referred to as the Service Gallery.
- One (1) 537,400 gallon SST, with approximate dimensions of 108 feet in height and 30 feet in diameter.

- Access to the new SST and ESD will be accomplished through an interconnecting bridge between the existing SST and the new SST, and between the new SST and the new ESD vessel.
- The existing gasholder tank and flare assembly, and the existing gas scrubber structure will be relocated to accommodate the new SST and ESD vessel. A second gas flare will be installed with the relocated flare.
- Piping will be arranged to allow both ESD vessels to be able to discharge digested sludge and digester gas to either SST. This will allow the operations staff to isolate either ESD vessel or SST while maintaining operation of the system. Yard piping will be provided from the SST vessels to the gasholder tank and flare assembly, and to the gas scrubber system and pelletizer facility.
- The existing centrifuge and dryer have sufficient capacity to process treated sludge from the new ESD/SST and will not be modified.

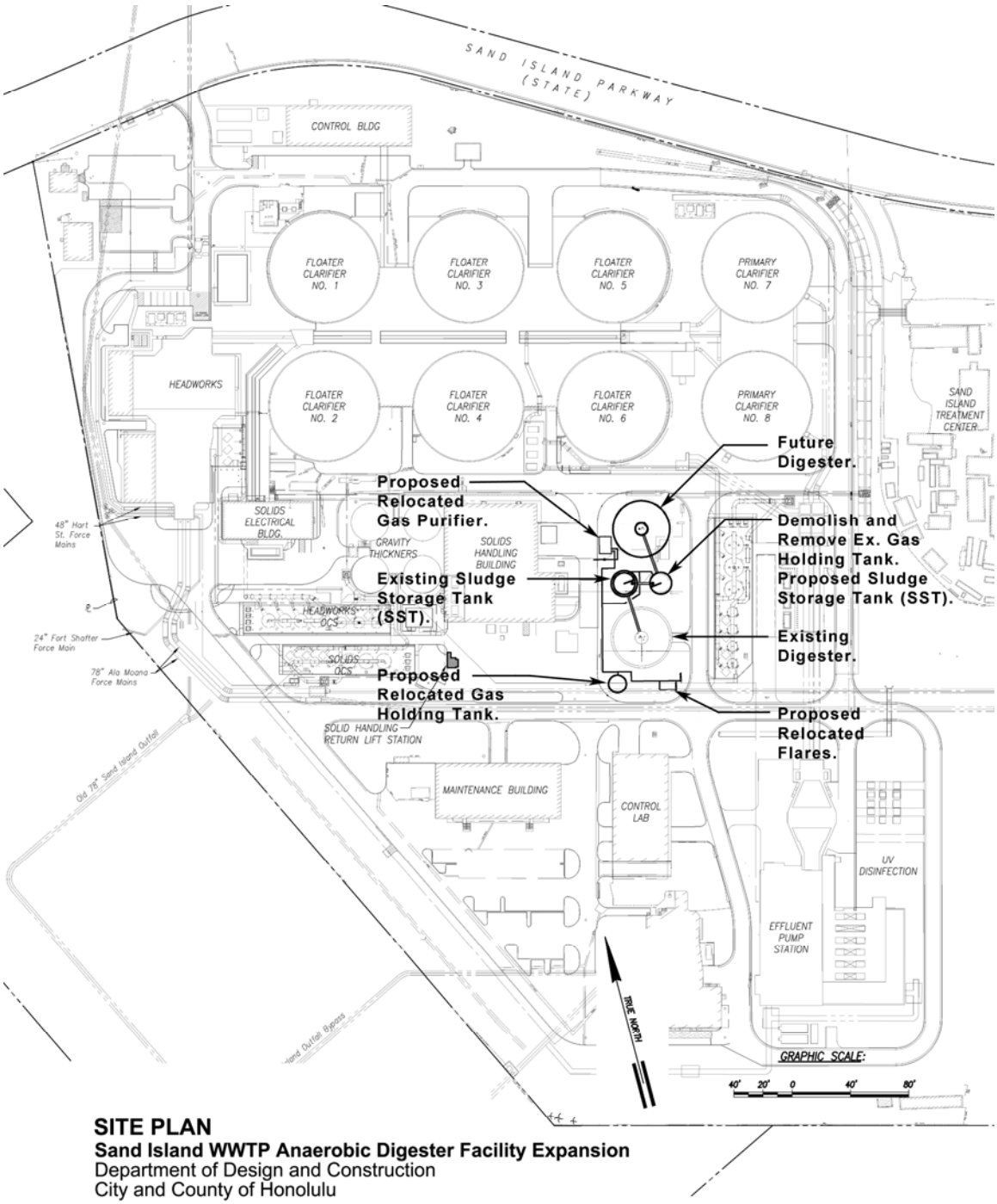
The following figures are provided for reference:

Figure 2-3, Sand Island WWTP ESD/SST Site Plan
Figure 2-4, Photo of Existing ESD/SST, Sand Island WWTP
Figure 2-5, Aerial View of Sand Island WWTP with Simulated Rendering of Proposed Second ESD/SST
Figure 2-6, Site Plan for Second ESD/SST
(labeled with section views A-A, B-B, and C-C)
Figure 2-7, Section A-A, View of Proposed Second ESD/SST.
Figure 2-8, Section B-B, View of Existing and Proposed Sludge Storage Tanks.
Figure 2-9, Section C-C, View of Existing ESD and Relocated Gasholder Tank.

The proposed ESD vessel will be constructed based on the same specifications as the existing ESD. The new ESD will be a steel fabricated structure with coal tar epoxy on interior surfaces exposed to biogas. Exterior surfaces are insulated with 2 inches of urethane foam. Surfaces above the ring wall will be finished with an elastomer and below with a fire protective coating.

Sludge will be introduced to the ESD through a continuous raw sludge feed system. The sludge is heated and mixed to ensure effective anaerobic digestion. The mixing system incorporates an external liquid recirculation system with dual internal draft tubes. The tubes act as internal pumps for maintaining a well-mixed digester. The operation of the dual tubes allows for complete mixing of the sludge into a nearly homogenous substrate within the vessel.

Like the existing ESD, the new ESD will also be equipped with an external recirculation system to provide scum and foam suppression. Foam and scum suppression is vital during conditions of high organic loading and start up times. Recirculated sludge is discharged at a high volume rate and velocity through spray nozzles located within the dome. The function of the high velocity stream is to break up emulsion and foam on the liquid surface. The result of this action is the release of gas, which is removed through a gas takeoff system and return liquid system.



SITE PLAN
Sand Island WWTP Anaerobic Digester Facility Expansion
Department of Design and Construction
City and County of Honolulu

Figure 2-3, Sand Island WWTP ESD/SST Site Plan

Figure 2-4, Photo of Existing ESD/SST and Gasholder Tank, Sand Island WWTP
(Source: CB&I)

The existing and proposed Second ESD/SST systems are each designed to function as constant liquid level primary digester vessels with a gas takeoff system in operation with the SST. This system design minimizes the potential of foam carryover from the ESD. The benefits of the SST are such that a totally enclosed gas tight system is achieved. This allows for the containment and non-release of emissions from the ESD or the SST.

After completion of the digestion process, the liquid digested biosolids are pumped from the anaerobic digestion system to the existing dewatering system. The biosolids are dewatered using high solid centrifuges located in the solids handling building. The existing centrifuges have sufficient capacity to handle increased solids from operations of the Second ESD/SST. The spent liquid (centrate) is returned to the start of the WWTP process along with any other liquids. The dewatered cake is conveyed, by means of closed screw conveyors to the drying system receiving bin. The dewatering equipment is ventilated and kept under negative pressure and exhaust is treated by a chemical scrubber system, prior to any release into the atmosphere.

The existing facility utilizes a direct heat drying and biosolids pelletization process with high rate exhaust gas recirculation. The process begins by combining heated air with the biosolids in a triple pass rotary drum dryer. The heated air comes into contact with the biosolids in the drum system where water is evaporated and a dry hard pellet is produced. The benefit of the air-drying system is high-rate exhaust gas recirculation that reduces the volume of air emissions and odors. The drying/pelletizing system has sufficient capacity to process sludge from the existing and proposed Second ESD/SST facilities. No modifications to the drying/pelletizing facility is required for this project.

Biogas, a product of anaerobic digestion, is used as a fuel resource for the dryer operation. The system utilizes the digester gas as a primary fuel, which reduces the energy cost required for the facility.

Figure 2-5, Aerial View of Sand Island WWTP with Simulated Rendering of Proposed Second ESD/SST.

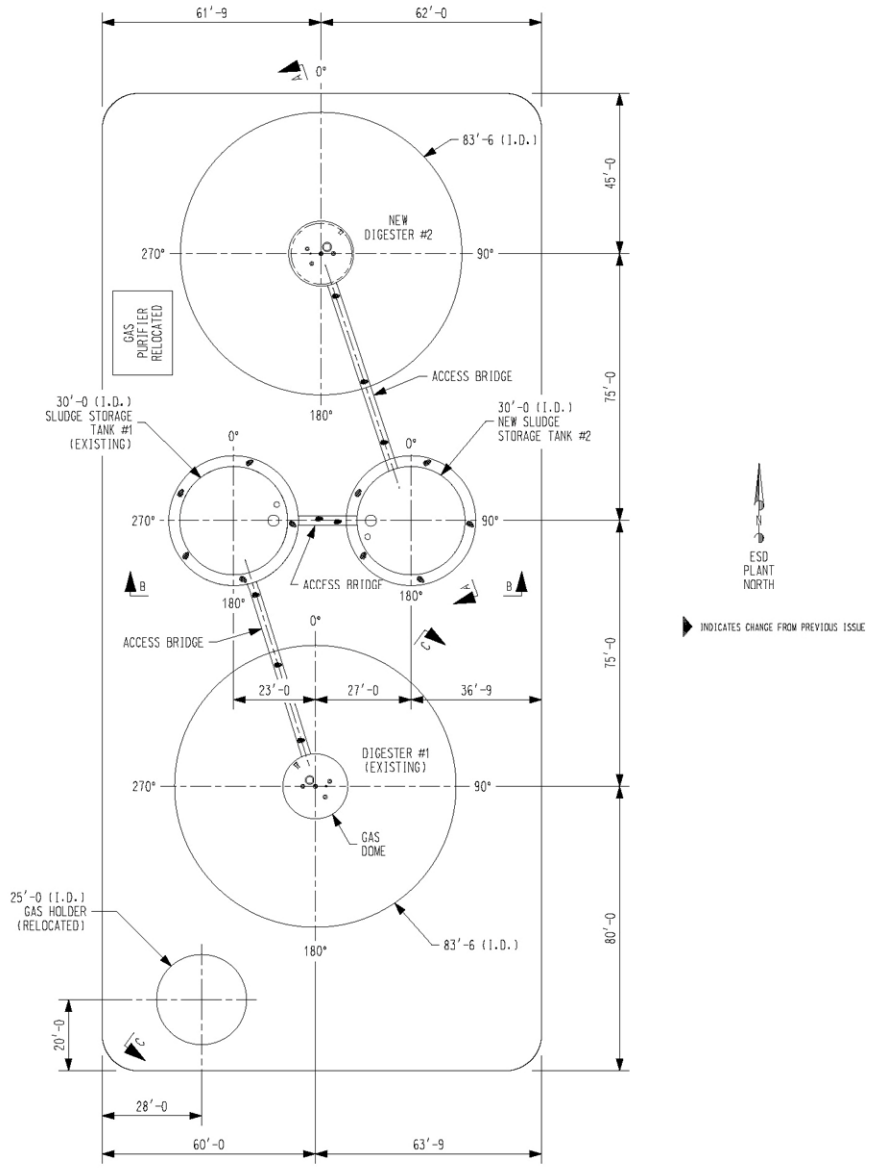


Figure 2-6, Site Plan for Second ESD/SST

Air emissions and odors are controlled by means of containment at the equipment and building level, recycling process air, and treatment of exhaust.

Liquid sludge is totally enclosed from the raw sludge pumping station, through the digesters and storage tanks, and to the dewatering centrifuges. Hence, odors cannot escape. Biogas is treated to remove H_2S in an adsorber located immediately downstream of the gas holding tank. This action ultimately reduces Sulfur Dioxide (SO_2) in the exhaust from the heat dryer process.

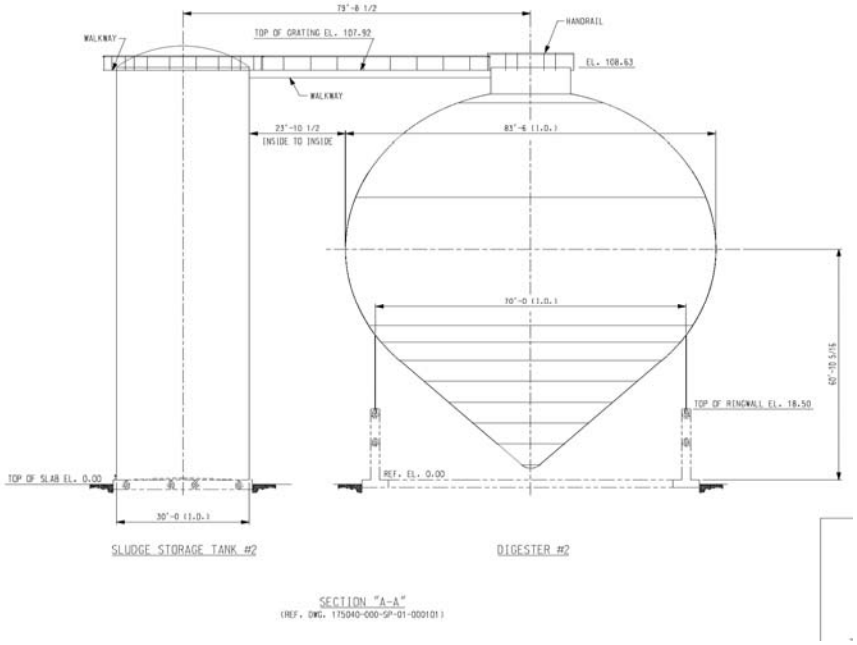


Figure 2-7, Section A-A, View of Proposed Second ESD/SST.

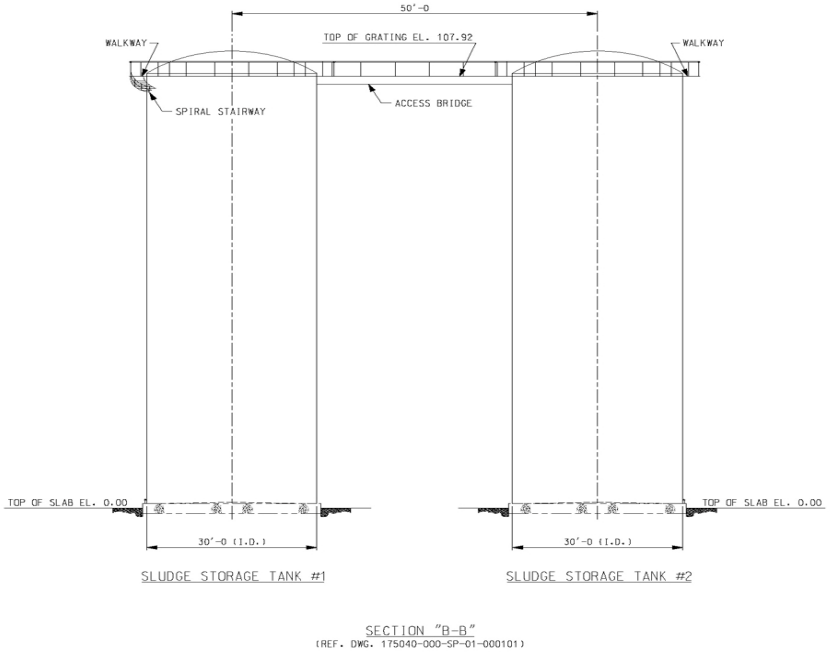


Figure 2-8, Section B-B, View of Existing and Proposed Sludge Storage Tanks.

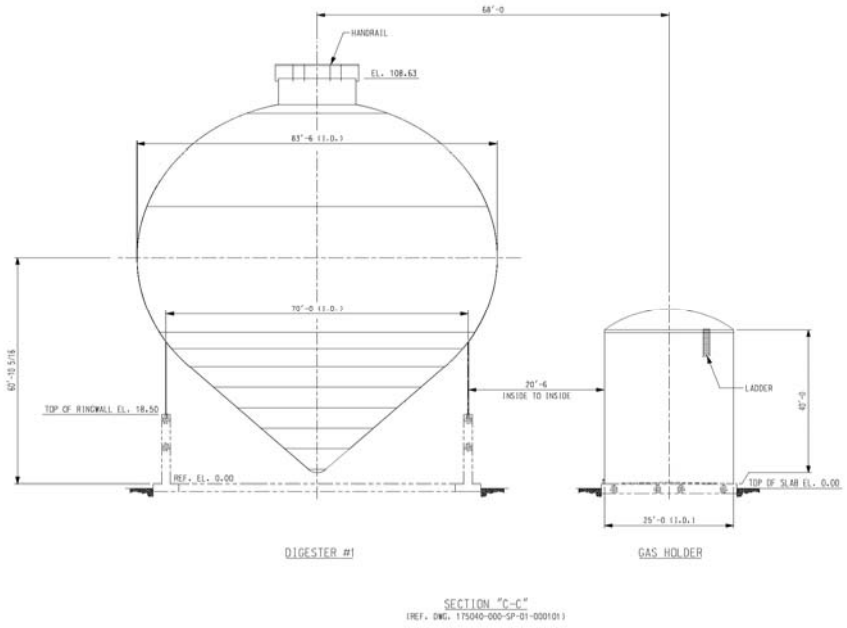


Figure 2-9, Section C-C, View of Existing ESD and Relocated Gasholder Tank.

The dewatering centrifuges, polymer preparation, centrate drain, and sludge cake conveyors are enclosed and kept under negative pressure. Air vented from this equipment is sent to a two stage chemical scrubber, which removes volatile organic compounds (VOC's), hydrogen sulfide, and ammonia before release. Two scrubbers are furnished, (one operational, one standby).

The heat drying process is operated under negative pressure. The combination of an air/solids separator and polycyclones to remove particulates followed by a sub-cooler-condenser to further remove particulates and condense water and VOCs enables eighty-five percent of the process air to be recycled. The remaining fifteen percent is further treated in a venturi scrubber to remove any remaining particulates and VOC's. Odors and VOC's are destroyed by thermal oxidation in a regenerative thermal oxidizer (RTO) before release to the atmosphere.

The enclosed dry material handling equipment is vented to a fabric filter to capture fugitive dust. The filter exhaust is sent to the RTO before release.

The dewatering and heat drying processes are contained within the Solids Handling Building, which is kept at negative pressure. The building exhaust is treated by the chemical scrubber before release.

The final pellets are stored in closed silos under a nitrogen blanket and coated with a vegetable oil before being loaded into a truck. All three actions prevent the release of odors and dust. As a final precaution, the silo, conveyor, and pellet oiler are vented to a fabric filter. This filter exhaust is treated by the chemical scrubber before release to the atmosphere.

2.3 PROJECT SCHEDULE AND COST

2.3.1 SCHEDULE

Completion of Permitting and Entitlements	April 2013
Award of Construction Contract	May 2013
Start of Construction	June 2013
Completion of Construction	June 2014

2.3.2 COST

The estimated construction cost for the Second ESD/SST is $24 million dollars.

2.4 ALTERNATIVES ANALYSIS

2.4.1 PREFERRED ALTERNATIVE

Existing ESD/SST Technology

The preferred alternative is to construct and operate a second ESD/SST which will be incorporated into the existing ESD/SST, sludge heat drying and pelletization infrastructure and biosolids handling operations. The existing ESD/SST system was constructed in 2005 and began operations in March 2006 to replace the previously existing low-pressure oxidation (LPO) sludge stabilization and landfilling process. The existing ESD/SST biosolids handling technology was selected following careful engineering analysis of various alternative technologies, a lengthy planning and public review process, and ultimately the ability of the technology to fulfill the CCH's operational criteria for Sand Island WWTP sludge treatment and disposal. (ENV, 2003).

The CCH determined that the ESD/SST, sludge heat drying and pelletization technology provided the most reliable and efficient process for eliminating sludge landfilling by producing a Class A biosolid product that can be beneficially re-used. "Class A" designates biosolids that are pathogen-free and can be distributed in the market place [Environmental Protection Agency (EPA) Part 503, Rule 109].

During the initial selection process for a biosolids treatment system to replace the previously existing LPO sludge stabilization process, the CCH assessed the following sludge treatment alternatives:

- Fluidized bed incineration – Fluidized bed incineration was considered and initial planning for a new sludge incinerator was included in the 2001 Environmental Assessment for the Sand Island WWTP expansion plan. However, sludge incineration would not help CCH meet the sludge reuse requirements of the 1995 consent decree.

Incineration also generates ash that would need to be landfilled. In addition, this alternative was determined to be an undesirable option because it requires high-energy consumption when incinerating primary sludge, and is difficult to permit because of public perception of health risks associated with air emissions. For these reasons, fluid incineration was eliminated from further consideration.

- Composting primary sludge – Composting was considered due to the potential for beneficial reuse of composted biosolids and resulting reduction in landfilling. However, it was determined that composting operations would require 5 to 10 acres of fenced land, with a minimum 3-mile buffer zone around the facility to minimize impacts from odors and vector attraction. The Sand Island WWTP lacks an adequate buffer zone needed to prevent nuisance odors from affecting commercial, recreational, and residential uses in the immediate area on Sand Island and the vicinity of downtown Honolulu and Kaka‘ako. For this reason, composting was eliminated from further consideration.
- Anaerobic digestion, sludge heat drying and pelletization – Biosolids stabilization, recycling, and beneficial reuse is a primary operational objective of the SIWWTP solids treatment process. When incineration (i.e. fluidized bed incineration), and composting are not considered viable alternatives, anaerobic digestion becomes a preferred choice for stabilization due to its low energy consumption, production of a renewable fuel, and the ability to support beneficial use technologies. Anaerobic digestion emerged as the preferred alternative for these reasons, as discussed further below.
- No action – No action would have resulted in continued reliance on landfilling of processed sewage sludge at the Waimānalo Gulch Landfill. Due to constant concern over the limited availability of landfill space, and the extreme difficulty and expense of siting new landfill space on O‘ahu, the CCH sought and selected a treatment system that reduces additional loading on the landfill by producing Class A biosolids for beneficial reuse as topsoil replacement, soil amendment and fertilizer applications.

The existing ESD/SST anaerobic digestion system that was selected to replace the original LPO system is a sludge stabilization process. Sludge stabilization processes are designed to achieve the following: (1) solids reduction; (2) production of a material that is easily dewatered; (3) reduction of concentration of pathogens; (4) production of a material with reduced vector attraction; (5) production of a beneficial use product; and, (6) control and elimination of potential odors with minimal environmental impact. (ENV, 2003).

Solids reduction reduces the quantity of material that must be dewatered and ultimately disposed of. Production of a material that can easily be dewatered to an acceptable solids concentration reduces processing efforts and the volume of material that requires disposal. Both of these characteristics have a significant influence in keeping treatment costs low. Furthermore, anaerobic digestion decomposes organic waste material and constituent pathogens into a variety of simpler end products that are safer to dispose of, including stabilized sludge, methane, carbon dioxide and water. Methane, or biogas, produced by digestion is captured and used as fuel source for the sludge drying system. The dried and pelletized sludge is an inert product that does not attract vermin when applied in the environment as a soil amendment or fertilizer. The anaerobic digestion

process occurs in a contained system that allows for control and treatment of malodorous compounds. (ENV, 2003).
In addition to these considerations, during the selection process to replace the original LPO sludge processing system at Sand Island WWTP, the anaerobic digestion, heat drying and pelletizing process based on an ESD/SST system was the only scenario which solicited a responsible bid resulting from the CCH request for bid process. (ENV, 2003).

Second ESD/SST
During the planning and design of the first ESD/SST, the proposed second ESD/SST was also programmed into the site and infrastructure plans at the Sand Island WWTP in anticipation of projected increases in treatment flows. The project site contains dedicated area for the second ESD/SST footprint. Sludge drying and pelletizing facilities, housed in a separate building adjacent to the existing ESD/SST, have sufficient capacity to process treated sludge from the new ESD/SST and do not require modification or expansion.

Currently, the existing Sand Island WWTP ESD/SST is operating above its design solid loading rate and above normally recommended loading rates based on industry standards. As a result, the digester is susceptible to overloading during peak flow conditions and cannot accommodate projected increased loading over the long-term. The current capacity constraints are due in part to anticipated increased loads resulting from population increases in the service area, and in part to increased capture of solids resulting from enhancements to the primary treatment system. In addition to ESD/SST capacity constraints, there is no facility redundancy to accommodate planned or emergency shut-down for maintenance or repair work: the existing ESD must operate continuously.

The purpose of the proposed Second ESD/SST is to provide additional process capacity needed for existing loads, and for projected design loads anticipated prior to the upgrade of the WWTP to secondary treatment. The secondary treatment upgrade is required by the 2010 Consent Decree to be completed by December 31, 2035, when design flows are projected to be approximately 85 mgd. The Second ESD/SST will also increase reliability by allowing temporary shutdown of one digester for routine maintenance or repair work, or in the event of an emergency.

Biosolids Processing System Retrofit Options
Several options to retrofit the existing Sand Island WWTP biosolids processing system were also evaluated to determine whether processes that incorporate incinerating residuals at H-Power offer a viable and cost effective alternative to construction of the second ESD/SST (AECOM, 2012). A secondary goal in evaluating the retrofit options is to eliminate landfilling of waste materials other than ash. The following alternatives were considered:

Baseline - Build a new, second ESD/SST and continue with existing sludge heat drying and pelletizing operations. In addition, an option that incorporates a combined heat and power (CHP) system to generate power from the excess gas not used in the sludge drying was also considered. This option has high reliability

and lower operational costs due to existing institutional familiarity with the equipment and processes, trained personnel, and established inventory of vendors for replacement parts. This option also provides required system redundancy for maintenance and safety in the event of equipment shut-down. The baseline option offers flexibility to produce various products with an array of applications, including Class A biosolids for land application, Class B biosolids for composting or landfill, and energy conversion (biogas or H-Power fuel).

Option 1 – Consists of operating the current digestion, drying and pelletization facility as currently loaded. Any excess residuals that cannot go through the digester would be chemically treated with Ferric Chloride, dewatered and hauled to H-Power for incineration. Digested dried pellets would either continue to be marketed by Synagro in accordance with the existing service agreement or could be sent to H-Power for incineration. This option has the lowest capital cost but highest annual operation cost. It would fail to provide necessary system redundancy, and would require landfill disposal if H-Power cannot process cake due to maintenance.

Option 2 – Consists of operating the current digestion facility as currently loaded but differs from Option 1 as the drying and pelletization facility is taken offline. Any excess residuals that cannot go through the digester would be dewatered and chemically treated. The digested and chemically treated sludge cake would be hauled to H-Power for incineration. A sub-option incorporating CHP was also considered. H-Power currently only accepts undigested sludge product on a short-term emergency basis, thus would need to modify the existing facility and permitting to handle the sludge. If H-Power cannot process undigested sludge, this option would require landfill disposal. In addition, this option does not provide redundancy in the digestion process.

Option 3 –Consists of taking the digester and drying / pelletization system offline. All undigested residuals would be chemically treated with Ferric Chloride, dewatered and transported to the H-Power incinerator. This option would include at least one redundant unit to accommodate equipment downtime and maintenance. This option would require alternate disposal, such as composting or landfill, if H-Power cannot process chemically treated sludge cake. This option also has the largest hauling volume requirement, and thus the highest cost, of all options considered.

Option 4 – Consists of operating the current digestion and drying / pelletization facility but differs from Option 1 as the undigested sludge cake will be blended with the digested sludge cake in the existing feed hopper and sent to the dryer. The dried pellets could continue to be marketed by Synagro in accordance with the existing service agreement or could be hauled to H-Power for incineration. This option would require chemical treatment facilities as back-up for processing raw cake if the dryer is down for maintenance or repairs. Under this option, future loads will exceed the capacity of the current dryer and will require expansion of the dryer facility in later years of the planning period. In addition, the current dryer supplier does not recommend sending undigested sludge to the existing dryer and may not warranty the dryer under this operation.

Option 5 –.Consists of operating the existing ESD, but replacing the dryer with one that is more suitable to process undigested sludge than the current dryer. In this option, undigested sludge that cannot be processed through the existing digester would be dewatered and the undigested sludge cake would be blended with the digested sludge cake in the cake hopper and sent to the new dryer. The replacement dryer would be a lower temperature dryer that may be more suitable to utilize waste heat from a CHP system if added in the future. The dried solids could continue to be marketed or hauled to H-Power for incineration. Lack of a second ESD under this option reduces the overall process reliability when compared to Baseline and would require disposal of large amounts of undigested cake when the existing ESD is down. In addition, there is limited vendor experience for the application of drying raw, undigested primary sludge. Additional operator training would also be required for the new equipment.

Option 6 – Consists of taking the existing ESD offline and replacing the dryer with one that is more suitable to process undigested sludge than the current dryer. In this option, undigested sludge is dewatered and the undigested sludge cake is sent to the dryer. The dried solids could continue to be marketed or hauled to H-Power for incineration. Similar to Option 5, there is limited vendor experience for the application of drying raw, undigested primary sludge. In addition, the dryers would require 100 percent thermal energy from fossil fuels, which greatly increases operational costs.

Option 7 – Expands on the current recommendation to build the second ESD/SST; however, the drying system would be replaced with one that is more suitable to utilize CHP waste heat. The intent of using waste heat from CHP is to improve the overall energy efficiency of the solids handling operations (both electrical and heat). The dried solids could continue to be marketed or hauled to H-Power for incineration. Option 7 also includes adding a CHP system to generate power from the digester gas while also producing waste heat that offsets the drying and ESD supplemental fuel requirements. This option has the highest capital cost but lowest annual operating cost. Overall process reliability is similar to the Baseline. The dry product will not have the same uniformity characteristics as the existing pellets and may reduce marketability as a fertilizer product. The dried solids from this process has a range of applications, including land application and energy recovery, when enhances overall system flexibility to respond to market fluctuations or energy capture equipment downtime.

The conclusion of the analysis was that the Baseline and Option 7 have the highest level of process reliability while meeting the requirements of the dryer manufacturer and the acceptability of the H-Power operator. A summary of the analysis is included in this document as **Appendix B**.

Construction and operation of the second ESD/SST is selected as the preferred alternative for the following reasons:

- The second ESD/SST will provide the necessary increased capacity and system redundancy for greater reliability of biosolids processing at Sand Island WWTP.

- The ESD/SST system is known and reliable technology. The CCH and the operator, Synagro, have strong institutional knowledge, trained personnel, and a broad network of supporting vendors to service the equipment and operations. Construction of a second ESD/SST therefore represents a much lower risk compared to alternative technologies.
- The Second ESD/SST can be seamlessly integrated with the existing solids handling infrastructure and operations to provide facility redundancy and process backup with reasonable capital expenditure and predictable life cycle operating costs.
- The existing ESD/SST system is 6 years into its useful expected life span of 30 years and represents a substantial capital investment to the CCH.
- Expansion of the ESD/SST system at Sand Island WWTP supports a strategy of waste minimization (reducing or eliminating landfilling of biosolids) and energy recovery (heat and power cogeneration and/or thermal processing for energy recovery), which is in alignment with CCH's goals for island-wide biosolids handing and strategies for municipal solid waste.
- The Second ESD/SST will function to maintain process reliability with a range of outlet opportunities, including land application of Class A biosolids, thermal processing for energy recovery (such as fuel for H-Power), energy co-generation (biogas and heat), composting of Class B biosolids, and landfill disposal, and thereby provide flexibility to deal with market fluctuations, equipment outages, other unforeseen disruptions.

2.4.2 NO ACTION

State legislation requires that a "no-action" alternative be considered to serve as a baseline against which potential actions can be measured. The no-action alternative would involve no effort to construct the Second ESD/SST or modify the existing ESD/SST system. Under this alternative, project costs and environmental impacts resulting from work activities would be avoided, but risks associated with system overloading and lack of redundancy would increase.

Under this alternative, the existing ESD/SST will continue to operate above its design loading rate and will remain susceptible to overloading during peak flow conditions. In addition, operations will continue to lack redundancy to accommodate planned or emergency shut-down for maintenance and repair work. In the event of system overload, the ENV and Synagro will be forced to rely on limited redundant capacity elsewhere in the Sand Island WWTP treatment system to temporarily stop and divert solid process flows from the existing ESD/SST.

Tanker trucking may be used to divert excess sewage sludge to the Honouliuli, Wai‘anae, or Kailua WWTPs for treatment to relieve the loading on the existing ESD/SST. Sewage sludge trucking operations would incur transport costs as well as additional operational costs at the receiving WWTPs. Potential adverse effects from increased trucking operations include traffic congestion, nuisance odors and visual impacts on transport routes, and increased risk of truck spills.

Taking no action would fail to address the project's purpose and need of providing sufficient solids treatment capacity at Sand Island WWTP to accommodate existing and projected design flows. Failure to expand solids treatment capacity in the near term increases the risk of overloading and related spills, and will require sustained trucking of sewage sludge to respond to peak loading conditions. Future population growth in the Sand Island sewer basin cannot be accommodated without an increased risk of failure of the existing ESD/SST. These conditions pose an unnecessary risk to public health and safety. For these reasons, the "No Action" alternative is eliminated from further consideration.

2.4.3 DELAYED ACTION

The delayed action alternative would postpone construction of the Second ESD/SST to an unspecified future date. Under this alternative, environmental impacts resulting from work activities would be delayed, but are anticipated to be generally the same as with the proposed project. It is also reasonable to expect that labor and material costs required for construction will increase over time, resulting in ultimately higher capital costs to build the project if the action is delayed. The delayed action alternative would further perpetuate risks to public health and safety from potential ESD/SST overloading and from increased reliance on sewage sludge trucking until such time as additional treatment capacity is developed. Delayed action will also increase annual operating costs for trucking waste not treated at the Sand island WWTP bioconversion facility to other facilities for treatment. For these reasons, the Delayed Action alternative is eliminated from further consideration.

SECTION 3
Description of Affected Environment

3.1 PHYSICAL ENVIRONMENT

3.1.1 CLIMATE

The project is located at Sand Island within an industrialized sector of urban Honolulu on the south shore of O‘ahu. Temperatures range from mid-70° F (degrees Fahrenheit) to the upper 80°s F with occasional reaches into the 90°+ F range (Atlas of Hawai‘i, 1998). The average annual temperature recorded at nearby Honolulu International Airport is 77.5° F.

Winds are primarily northeasterly tradewinds. Occasionally, during the winter months, storms are accompanied by winds from the south. Average wind speeds for Honolulu range from approximately 10 to 15 miles per hour with occasional gusts of 40+ miles per hour (Hawai‘i State Data Book, 2009).

Rainfall for the Honolulu area ranges from approximately 4 to 5 inches monthly from November through January, to less than 1 inch during the drier summer months. Annual rainfall averages approximately 15 to 20 inches throughout the remainder of the year. Average relative humidity in Honolulu has historically ranged from a high of 77.2% during January, to a low of 64.8% which is typically reached in June. The average annual humidity level is approximately 69 to 70% (Atlas of Hawai‘i, 1998).

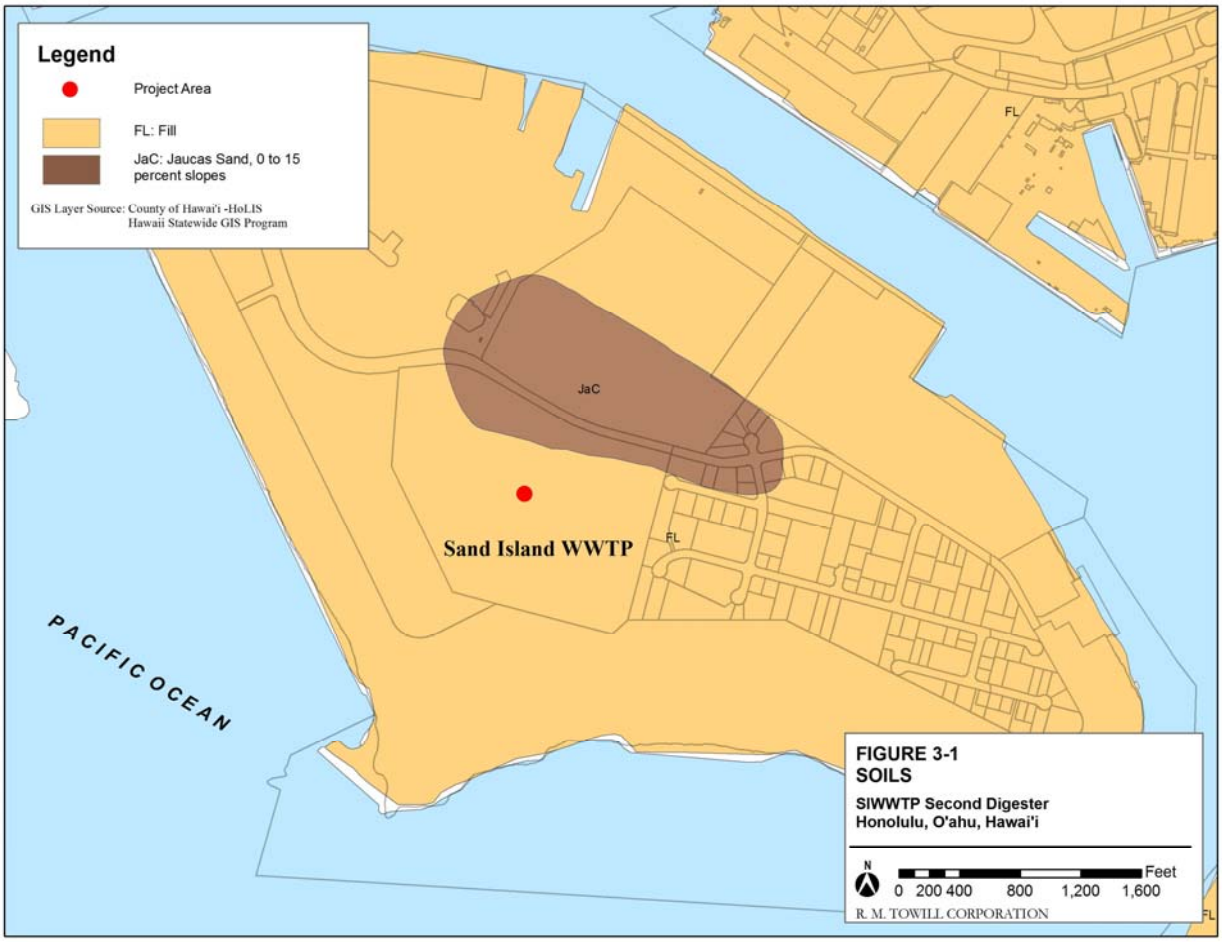
Impacts and Mitigation Measures

The proposed project will have no impacts on the existing climate of the region. The ESD/SST vessels will be designed to carry a minimum wind load of 105 mph in compliance with American Society of Civil Engineers (ASCE) and International Building Code (IBC) standards for wind exposure, and Revised Ordinances of Honolulu (ROH) Chapter 16. Additional mitigation measures will not be required.

3.1.2 TOPOGRAPHY, GEOLOGY, AND SOILS

The proposed project will be constructed within the existing Sand Island WWTP on man-made terrain comprised of dredged fill material. The project site is virtually flat with ground elevation of 8 feet above mean sea level (msl). The existing grades were established during the original construction of the Sand Island WWTP.

Soils underlying the project site are identified as Fill Land, mixed (FL). Fill land, mixed soils occur mostly near Pearl Harbor and in Honolulu, adjacent to the ocean. It consists of areas filled with material dredged from the ocean or hauled from nearby areas, garbage, and general material from other sources. This land type is used for urban development including airports, housing areas and industrial facilities (Soil Conservation Service, 1972). See **Figure 3-1, Soils**.



A 9-acre portion of the land on the east side of the Sand Island WWTP parcel is designated as a Soil Management Area. This area is a semi-permanent containment structure designed to facilitate on-site storage of soils impacted by low-level PCB (polychlorinated biphenyls) and other contaminants that have been excavated from other areas of the Sand Island WWTP. Ground excavations from various improvement projects which contain PCB concentrations less than 25 mg/Kg are stored in the Soil Management Area.

The Sand Island WWTP Soil Management Area is surrounded by a concrete reinforced geomembrane wall. It contains approximately 80,000 cubic yards of contaminated soils. Portions of the area have been capped with a asphalt or gravel cover and are 10 to 12 feet higher in elevation than the rest of the Sand Island WWTP. Other portions of the area are still open and exposed for acceptance of additional contaminated soil.

A 2009 study of soil issues at the Sand Island WWTP concluded that: 1) the source of PCBs could not be identified; and 2) in addition to PCBs, other contaminants exceeding regulatory thresholds include heavy metals, petroleum hydrocarbons (TPH-gas and TPH-diesel), xylenes and benzo(a)pyrene. Unlike PCBs, these contaminants have been identified only in localized areas and not at levels requiring remediation (KEI, 2009).

The study noted that human health risk assessments, incorporating data from all known site investigations, concluded that the risk to Sand Island WWTP operators from exposure to various contaminants is "acceptable" under current conditions. This conclusion was based on standards adopted by the EPA and State Department of Health (KEI, 2009).

Impacts and Mitigation Measures

The proposed project will not have a significant effect on the topography or soils of the area. The new ESD/SST will be similar in shape and size to the existing facilities. There will be supports for the digester. Since the Second ESD/SST will be 108 feet tall (above finish grade), a stable base of fill material will be required for utility lines, including gas lines to the relocated gas holder tank, sludge lines, and waterlines to service the new facilities. Excavation might also be required for construction of the second ESD and SST foundations. Excess soils will be tested, characterized and disposed of at the Sand Island WWTP Soil Management Area or at an offsite landfill in compliance with requirements of the State of Hawai'i, Department of Health. Soil placed within the Soil Management Area must be handled and secured in accordance with the facility's long term Maintenance and Monitoring Plan in order to prevent exposure of contaminated soils. No construction activities occur within the Soil Management Area. No other mitigation measures are required or recommended.

3.1.3 SURFACE WATERS AND HYDROLOGY

There are no standing water bodies, streams, or other surface water features in the immediate vicinity of the project site. Rainfall and stormwater runoff from the site is directed to the Sand Island WWTP's existing storm drain system consisting of catch basins and underground piping and discharges into a man-made drainage ditch located at the north side of the facility. The drainage ditch begins approximately 125 feet east the existing Flotation Clarifier Nos. 7 and 8 and extends eastward approximately 650 feet to the edge of the treatment plant property, then northward for approximately 120 feet to a 6-foot by 8-foot box culvert that passes under the Sand Island Parkway and nearby cargo container yard located north of the WWTP, and discharges to Honolulu Harbor.

Impacts and Mitigation Measures

The project is not expected to have adverse effects on surface waters or ground waters. Best Management Practices (BMPs) will be installed and maintained during all phases of construction activities to ensure that sediments and other contaminants are not discharged in runoff water from the site. Implementation of BMPs will serve to protect the wetland conditions in the ditch and the drainage system outfall waters of Honolulu Harbor.

3.1.4 AIR QUALITY

Hawai'i lies within the Northern Hemisphere Hadley Cell, which is responsible for persistent northeast trade winds. Consequently, air quality is relatively good with the exception of occasional Kona or leeward storms that produce a low pressure system that

brings southerly winds and precipitation. The Sand Island area is located within an industrial area that generally receives favorable trades.

The State Department of Health maintains an air quality monitoring station along Sand Island Access Road, near the entrance to the Sand Island State Recreation Area. The station monitors for ozone (O3), and PM2.5 (particulate matter 2.5 micron size or smaller), as well as wind speed and direction. Monitoring at this station consistently shows readings well in compliance with State and Federal air quality standards for the measured parameters. The most current published summary of State air quality data, which includes measurements from the years 2006 to 2008, records no instance where measured parameters at this station exceed air quality standards (DOH, 2008). The existing ESD/SST facility operates under Covered Source Permit No. 0216-06-C.

Impacts and Mitigation Measures

Dust and exhaust emissions will be generated from construction vehicles and equipment including backhoes, trucks, pile driving equipment, generators, fuel tanks, etc., during construction. Mitigation of fugitive dust generated during construction will be handled through the use of periodic site watering and applicable on-site BMPs. Additional measures as provided in Hawai‘i Administrative Rules (HAR) Chapter 11-60.1 - Air Pollution Control will also be followed and will include, but not be limited to, the following:

- The planning of project construction operations will focus on: minimizing the amount of dust-generating materials and activities; centralizing material transfer points and onsite vehicular traffic routes; and, locating potentially dusty equipment in areas of least impact;
- An adequate water source at the site will be provided prior to start-up of construction activities for dust control wet-down application;
- Disturbed soils will be stabilized as soon as possible by means of grassing, hydromulch, geo-fabric, or other methods of cover;
- Dust will be controlled by stabilizing ground conditions at project entrances to prevent dirt tracking onto adjacent access roads, and by covering or wetting down construction vehicles carrying dust-generating materials; and,
- Adequate dust control measures will be provided on weekends, after hours, and prior to daily start-up of construction activities.

Vehicle and construction equipment exhausts are a source of air pollution. Mitigation of potential adverse effects associated with use of construction equipment, fuel tanks, and vehicle exhausts will be handled through adherence to applicable Federal, State and County regulations. As required, all machinery and vehicles will be required to be in proper working order with appropriate use of mufflers.

Regarding odor issues, it is noted that the new facilities will be connected to the existing STI-administered odor control system on the WWTP site. The existing

system has sufficient capacity to accommodate the proposed improvements. There is an existing Covered Source Permit (Permit No. 0216-06-C). Minor modification to the permit may be needed to accommodate slight changes in volume and composition of odors.

The new facility will utilize an anaerobic digestion process which generates biogas. This is the same process utilized by the existing ESD and SST. The biogas production is a function of temperature, solids retention time and volatile solids loading. The two main constituents of digester gas are methane and carbon dioxide. Trace amounts of nitrogen, hydrogen, and hydrogen sulfide are also produced. Containment of biogas will assist in odor control. The biogas produced by the digester is prevented from escaping the system and entering the environment. The digester mechanical equipment, gas storage equipment and the associated piping are all gas tight to prevent the release of any emissions. The biogas generated during anaerobic digestion will be scrubbed to remove hydrogen sulfide. The process is safe and produces a non hazardous waste. This process also reduces the sulfur dioxide (SO_2) emissions, which are produced during combustion in the sludge heat drying process.

The sludge from the existing gravity thickeners will be stored in one of five Wet Sludge Storage Tanks (WSSTs) until processed in one of the two anaerobic digesters (ESDs) and stored in one of the digested sludge storage tanks (SSTs), prior to dewatering. The liquid biosolids handling system will be totally enclosed in gas-tight tanks which will prevent the escape of any emissions. An existing centrifuge system (one operational, one stand-by) will be used to dewater the biosolids. The centrifuge is enclosed, which will prevent the escape of any odors. All of the piping, conveyance and the associated equipment is totally enclosed and vented to the odor control system.

Air drawn from the dewatering operations will be treated in the existing two-stage scrubber system prior to release to the atmosphere. A redundant scrubber system will be provided to produce continuous treatment while routine maintenance is performed on the other.

The exhaust gas produced from the existing sludge heat drying process will pass through several stages of air emission and odor control treatment processes prior to release to the atmosphere. Up to eighty-five percent of the exhaust air is recycled in the drying process. An air/solid separator followed by polycyclones removes particulates, and further downstream a subcooler-condensor removes moisture, particulates and condensable odorous compounds. The remaining fifteen percent of the process air is treated in a Venturi scrubber to remove any remaining particulates and then in a Regenerative Thermal Oxidizer (RTO), where volatile organic compounds and odors are destroyed by thermal oxidation prior to release to the atmosphere.

Fugitive dust will be kept to a minimum by operating the sludge heat drying process equipment under negative pressure as well as installing a fabric filter at the process equipment vents. Exhaust air from the filter will also be treated in the RTO prior to release to the atmosphere.

The existing facility building containing both the dewatering and drying processes is also kept under negative pressure and vented to the two-stage chemical scrubber. The finished product (pellets) produced will be stored outside in silos under a nitrogen atmosphere and coated with a vegetable oil for dust control before being loaded into the trucks. Vents from the storage and coating equipment are attached to a fabric filter system to collect any fugitive dust. The filter exhaust is treated in the chemical scrubber prior to release to the atmosphere. Finished product will be transported off-site in covered vehicles to the end-use location.

The waste gas flare will be operated when digester gas is not utilized by the pelletizing facility or the boiler assembly. The proposed Second Egg-Shaped Digester will produce approximately 190,000 cubic feet (cf) of biogas per day in addition to the 513,000 cf produced by the existing facility. The biogas produced will be utilized for the operation of the dryer. During the period when the dryer is not in operation (two to three and a half days per week) the gas will be used by the boiler or flared. The flare will produce minimal $S0_2$ and nitrogen dioxide (NO_x) emissions. These emissions will be addressed in the amended air permit for the facility. The proposed odor and emission controls when implemented are expected to result in improved ambient air quality, which will produce positive long term impacts on air quality surrounding the treatment plant.

The ESD/SST facility currently operates under Covered Source Permit No. 0216-06-C issued by the Department of Health in compliance with HAR Chapter 11-60, Air Pollution Control. The existing air permit will be modified to account for changes to air quality resulting from the operation of the new ESD/SST include and accommodate the odor and emission control systems being proposed for the project.

3.1.5 NOISE

The project site is subject to noise generated from the existing Sand Island WWTP. Other existing sources of noise include overflights of aircraft within the 70 DNL (decibel noise level) noise contour of Honolulu International Airport; industrial activities from light industrial parcels located east of the site involving auto repair, metals recycling and recovery, and related activities; and traffic from the nearby Sand Island Parkway.

Impacts and Mitigation Measures

Construction activity will result in short-term noise impacts associated with the proposed project. Construction related noise will be generated by use of construction equipment and machinery such as bulldozers, backhoes, compressors, and pile driving equipment. Management of short term noise impacts will involve use of mufflers and related noise reduction technologies. As

required, construction equipment with mufflers in poor working condition shall be replaced or repaired. Noise generated by the construction activities will be similar in character and intensity as the existing noise conditions in the surrounding industrial areas and is not expected to have an adverse effect.
Once operational, the project facilities will have stationary noise sources similar to the existing noise generated from the WWTP. All noise generated will be required to be at the levels that are consistent with the existing standards and will be designed and operated in such a manner as to comply with the HAR Chapter 11-46, Community Noise Control. With the implementation of mitigative measures there are no anticipated adverse impacts associated with the generation of noise from stationary equipment.

Mitigative measures to address noise generated by the proposed project will include the enclosure of process equipment. The Second Egg-Shaped Digester's mechanical equipment, including the pumps, motorized valves and heat exchangers will be enclosed within the concrete ring wall (containment wall) supporting the digester. All of the existing process equipment involving the sludge drying and dewatering systems is contained within the solids handling building. By placing the process equipment indoors, noise transmission to the surrounding areas is mitigated.

3.1.6 NATURAL HAZARDS

Tsunami

A tsunami involves the generation of a series of destructive ocean waves that can affect all shorelines. These waves can occur at any time with limited or no warning. Persons in low lying shoreline or beach areas are advised to immediately go to higher ground.

On the Tsunami Evacuation Zone Map prepared by the Department of Emergency Management, the proposed project site is located outside of the evacuation boundary within an area considered to be safe from wave action and that would not likely be subject to inundation by a tsunami. See **Figure 3-2, Tsunami Evacuation Zone**.

Seismic Hazard

The Islands of Hawai‘i experience thousands of earthquakes each year but most are so small that they can only be detected by instruments. Some are strong enough to be felt and a few cause minor to moderate damage. Most of Hawai‘i's earthquakes are directly related to volcanic activity and are caused by magma moving beneath the earth's surface. The seismic design category as defined in the International Building Code 2003 (IBC) is a classification assigned to a structure based on its seismic use group and the severity of potential earthquake ground motion at the site. The seismic design category recognizes that building performance during a seismic event depends not only on the severity of sub-surface rock motion in a particular location, but also on the type of soil upon which a structure is founded. The seismic design category is thus a function of location (seismic zone), building occupancy (seismic use group), and soil type (site class). There are six seismic design categories: A, B, C, D, E, and F, with F having the highest seismic load

effect on a structure and A having the lowest seismic load effect. The Second ESD/SST facilities will have a seismic design category rating of D.

The seismic use group in the IBC corresponds to the occupancy importance factor in seismic design. For new Second ESD/SST structures, the seismic use group III should be considered (Chapter 16, Table 1604.5 ROH). Seismic use group III structures are those having essential facilities that are required for post-earthquake recovery and those containing substantial quantities of hazardous substances. The design of the proposed project will be in accordance with all applicable CCH standards.

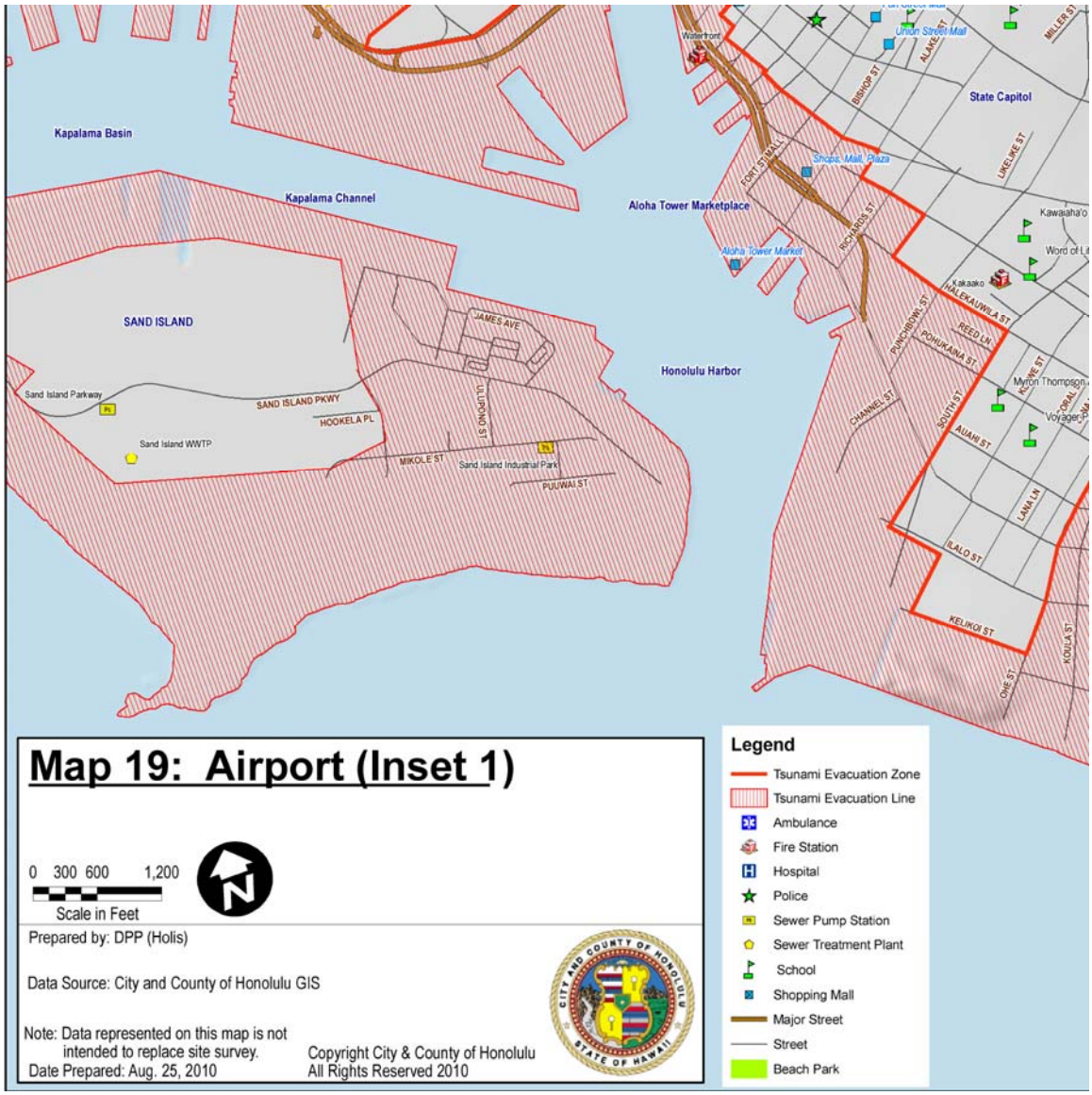


Figure 3-2, Tsunami Evacuation Zone

Flood

As shown on FIRM panel 15003C0361G, dated January 19, 2011, the project site is located within flood zone X, which designates areas outside of the 0.2 percent annual chance (500 year) floodplain. See **Figure 3-3, FEMA-FIRM Map.**

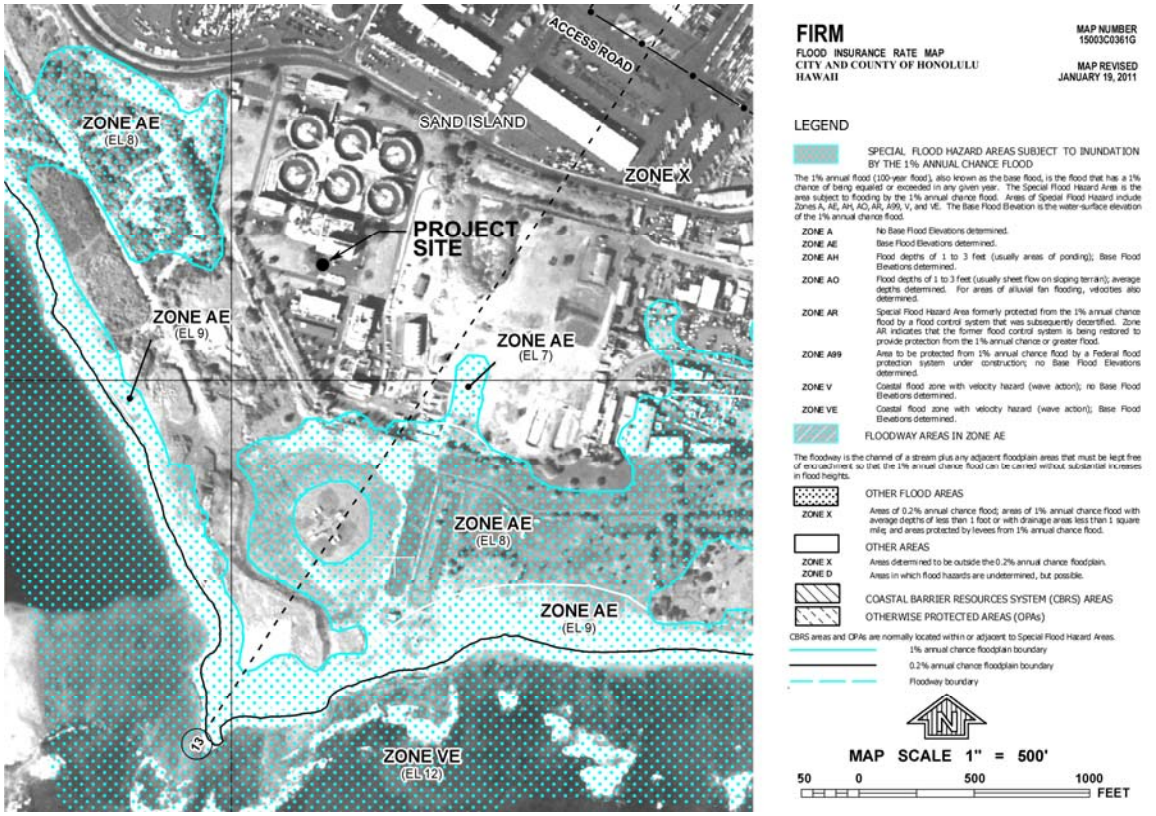


Figure 3-3, FEMA-FIRM Map Panel 15003C0361G (January 19, 2011).

Hurricane and Wind

The Hawaiian Islands are seasonally affected by Pacific hurricanes from the late summer to early winter months. The State has been affected twice since 1982 by significant hurricanes, ‘Iwa in 1982 and ‘Iniki in 1992. During hurricanes and storm conditions, high winds cause strong uplift forces on structures, particularly on roofs. Wind-driven materials and debris can attain high velocity and cause devastating property damage and harm to life and limb. It is difficult to predict these natural occurrences, but it is reasonable to assume that future events will occur. The project area is, however, no more or less vulnerable than the rest of the island to the destructive winds and torrential rains associated with hurricanes.

Impacts and Mitigation Measures

The project site is located outside of the Tsunami Evacuation Zone within an area considered to be relatively safe from tsunami inundation. Construction and operation of the Second ESD/SST is not anticipated to create conditions that could exacerbate the effects of a tsunami. In the event of a tsunami warning, the facility

will be secured and critical personnel will locate outside of the Tsunami Evacuation Zone until the tsunami warning is rescinded. No further mitigation measures related to the potential threat of a tsunami are proposed.

Earthquakes pose a threat throughout Hawai‘i, but disruptive seismic events are relatively uncommon in this region. Design and construction of the proposed Second ESD/SST will be in accordance IBC design category rating D and Seismic Use Group III, per CCH standards. No further mitigation measures related to seismic disturbance are proposed.

The site is located at elevation 8 feet above msl within FEMA flood zone X. No adverse effects to human health or safety associated with flooding are anticipated.

The potential for hurricanes, while relatively rare, is present. The site facilities are designed to withstand hurricane force winds. To safeguard against hurricane damage, the new ESD/SST vessels will be designed in compliance with ASCE and IBC standards for wind exposure, and will carry a design wind load of 105 mph (ROH Chapter 16).

3.1.7 FLORA AND FAUNA

The proposed project is located within an existing wastewater treatment facility in a highly altered environment. Consequently, no rare, threatened or endangered flora or fauna species have been observed to exist at the project site. Species most commonly frequented at the site are typical of urbanized areas and consist of common introduced flora and fauna. Several introduced fauna including the Common Indian Mynah (*Acridotheres tristis*), House Sparrow (*Passer domesticus*), Spotted or Lace-necked Dove (*Streptopelia chinensis*), Zebra Dove (*Geopelia striata*), and Cardinal (*Cardinalis cardinalis*) have been observed at the project location. Mammals such as stray cats, rats and mice have also been observed in the vicinity. Vegetation at the project site is limited to sparse, opportunistic growth of introduced weeds and grasses, including Centipede Grass (*Eremochloa ophiuroides*) and Bermuda Grass (*Cynodon dactylon*). No other landscape plantings or natural vegetation occurs in the project vicinity.

Some migratory seabirds and native waterfowl are known to visit areas within the wider coastal region. Endangered native species such as the Hawaiian hoary bat (*Lasiurus cinereus semotus*) and Short-eared owl or Pueo (*Asio flammeus sandwichensis*) do occur on rare occasions in the lowlands of O‘ahu, but due to the high level of development and human activity are highly unlikely to visit areas where project activities will occur.

Impacts and Mitigation Measures

Potential for adverse effects to flora and fauna is not anticipated. The project site is located within the Sand Island WWTP. No listed or protected plant species are known from the project area. Rare, threatened, or endangered fauna are not known to utilize the site for either habitat or foraging purposes. Construction activities may temporarily disrupt routine behavior of common faunal species in the immediate project area, but will not result in permanent displacement, or

adversely affect regional distribution of affected fauna. Once project activities are complete, faunal activity in the vicinity of the work site is expected to return to pre-existing conditions.

Although there is no evidence of migratory seabirds and native waterfowl species using the project site for breeding or habitation, some are known to visit areas within the wider project study area. No adverse impacts resulting from the project are anticipated. However, measures to prevent adverse effects to avifauna from night lighting will include the following:

- During construction activities, all nighttime lighting will be shielded and angled downward to reduce glare and disruption of bird flight.
- Following construction, permanent light sources will be shielded and angled downward to eliminate glare that could disturb or disorient animals.

No other mitigation measures are proposed.

3.2 SOCIO-ECONOMIC ENVIRONMENT

3.2.1 LAND USE

The project site occupies approximately 35,000 square feet near the center of the Sand Island WWTP. Surrounding WWTP facilities include the headworks, primary clarifiers, gravity thickeners, solids handling building, wet sludge storage tanks, and centrifuges. Uses on the surrounding properties include industrial harbor facilities to the north; the Sand Island Industrial Park to the east; the Sand Island State Recreation Area to the south-east and immediate south of the WWTP; and the State Department of Transportation, Harbors Division container yard to the west. The project site is located on land zoned I-3, (industrial waterfront) by the CCH. The existing Sand Island WWTP and proposed Second ESD/SST facilities are permitted "public uses" in the I-3 zoning district.

Impacts and Mitigation Measures

The proposed Second ESD/SST facilities comprise a needed addition to the existing Sand Island WWTP facilities. The existing digester has exceeded the design solids loading rate and is susceptible to overloading during peak flow conditions. The new digester provides needed flexibility and redundancy to the wastewater treatment process. It will not result in significant changes in land use at the WTTP and will not detract from or induce changes to the existing land uses on the surrounding properties. No mitigation measures are proposed.

3.2.2 HISTORIC AND ARCHAEOLOGICAL RESOURCES

The project site is situated within artificially created Fill Land, mixed (FL) which was entirely submerged by the ocean during pre- and post-contact periods. In addition, the project site was subject to extensive ground disturbance and modification during construction of the existing Sand Island WWTP. As a result, no archaeological sites are known or expected to be encountered at the project site.

Impacts and Mitigation Measures

The proposed project is not expected to result in potential for negative adverse effects on archaeological resources. This is due to the artificially created, mixed fill soils found at the project site. A review of records with the Department of Land and Natural Resources (DLNR), State Historic Preservation Division (SHPD), also indicates that there are no known historic sites at the project location (See **Appendix A: Letter from State Historic Preservation Division, March 5, 2001**). However, in the event of unexpected discovery of historic or archaeological resources, the SHPD will be immediately notified for appropriate response and action.

3.2.3 CULTURAL RESOURCES AND PRACTICES

The project site and surrounding Sand Island WWTP facility are not used for traditional, customary, or cultural practices. The project site is located on artificially created land comprised of mixed fill soils in an area that was submerged by the ocean until modern times. The site was heavily modified during construction of the Sand Island WWTP. Plants found at the site are introduced grass species not associated with cultural gathering or use activities. The artificial creation and developed condition of the site is not conducive to the presence of wahi pana (storied place) or other sites associated with cultural practices.

Impacts and Mitigation Measures

Based on the above, the potential for adverse effects on traditional and cultural practices is not anticipated. Construction of the Second ESD/SST will not disturb traditional sacred sites or traditional cultural objects; will not result in the degradation of resources used by native Hawaiians for subsistence or traditional cultural practices; will not obstruct landforms or wayfinding features; and will not result in loss of access to the shoreline or other areas customarily used by Hawaiians or others for resource gathering or traditional cultural practices. No mitigation measures are proposed.

3.2.4 SCENIC AND VISUAL RESOURCES

According to the City and County of Honolulu Primary Urban Center Development Plan, there are two recognized scenic vistas or view planes which are proximate to the Sand Island WWTP. See **Figure 3-4, Significant Panoramic Views**. The continuous views in which Sand Island is involved are designated as the view from Honolulu International Airport Runway, on Lagoon Drive, and from the west end of the Kakaako Waterfront recreational park. The distance from Lagoon Drive to the proposed project site is approximately two miles, and the distance from the recreational park to the proposed project is approximately one and a half miles.

The Sand Island WWTP is located in an industrial harbor area containing large commercial / industrial buildings, fuel tanks, and tall cranes used for container shipping operations. The WWTP facilities include several prominent structures, including clarifier tanks, gas tank (40 feet tall), incinerator building (80 feet tall), and the existing anaerobic digester tower (108 feet tall). These facilities are visible from the ocean, from Keʻehi

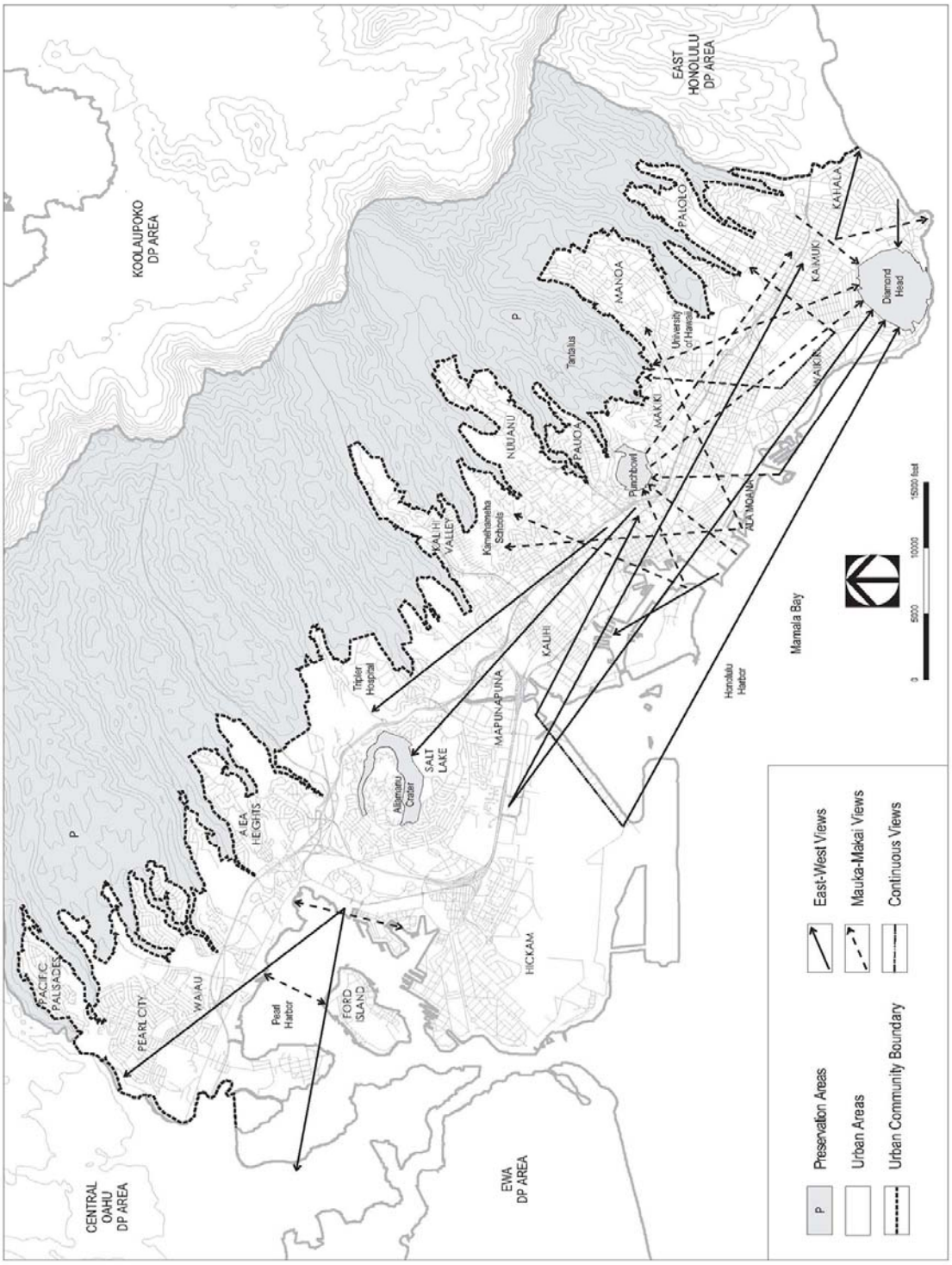


Figure 3-4, Significant Panoramic Views
Source: Department of Planning and Permitting, City and County of Honolulu, Primary Urban Center Development Plan

Lagoon, from various vantages within urban Honolulu and the immediate surrounding properties, and from areas with elevations exceeding 100 feet above sea level, including Punchbowl, Diamond Head, and high-rise buildings along Ala Moana Boulevard and Nimitz Highway. Within view planes from the urban coastal areas laterally down the shoreline or towards the sea, the Sand Island WWTP facilities are subordinate to the much taller cargo facility loading cranes (approximately 250 feet in height) and are consistent in appearance with other industrial facilities on Sand Island.

Impacts and Mitigation Measures

The Second ESD/SST would be approximately 108 feet in height with a major diameter of 84 feet. This exceeds the 60-foot height limit of the underlying County I-3 Waterfront Industrial zoning district. A Waiver Permit from the City Department of Planning and Permitting would be required. It is noted that the second digester is proposed to be the same height as the existing digester. In order to provide redundancy and consistency in the wastewater treatment process, the second digester should utilize the same process and equipment as the existing digester. If not, wastewater treatment may not necessarily meet applicable standards and may be compromised.

Moreover, the proposed Second ESD/SST facilities would be located near the center of the WWTP and will be consistent with the industrial character of the existing facilities. Many of the existing nearby industrial facilities share comparable height with some substantially taller structures and equipment. When viewed from nearby areas of urban Honolulu, the proposed new facilities will blend with other existing structures in the industrial area. The visual impact created by the Second ESD/SST is not anticipated to reduce or impede views from urban Honolulu to the WWTP and surrounding areas. The development of the project will be consistent with the zoning designation and any significant adverse visual impacts are not anticipated, due to the fact that other larger structures are present in this industrial setting.

3.2.5 AIR NAVIGATION

Notice to the Federal Aviation Administration (FAA) is required if construction or alteration is proposed at a greater height than an imaginary surface extending outward and upward at a slope of 100:1 for a horizontal surface of 20,000 feet from the nearest point of the nearest runway with at least one runway more than 3,200 feet in actual length, excluding heliports (Title 14 Part 77, 2010).

The proposed Second ESD/SST facilities are located approximately 9,250 feet from the edge of the Honolulu International Airport reef runway. Since the new anaerobic digester is proposed to be 108 feet in height, it exceeds the 100:1 slope and thus, notice to the FAA is required through the filing of FAA Form 7460-1.

An aeronautical study is then performed by the FAA to determine whether the aeronautical effects of the proposed action would constitute a hazard to air navigation. The FAA will issue *A Determination of Hazard to Air Navigation* when the aeronautical

study concludes that the proposed construction or alteration will exceed an obstruction standard and would have a substantial aeronautical impact. The FAA will issue *A Determination of No Hazard to Air Navigation* when the aeronautical study concludes that the proposed construction or alteration will exceed an obstruction standard but would not have a substantial impact to air navigation. *A Determination of No Hazard to Air Navigation* may include the following:

1) Conditional provisions of a determination;
2) Limitation necessary to minimize potential problems, such as the use of temporary construction equipment;
3) Supplemental notice requirements, when required;
4) Marking and lighting recommendations, as appropriate (Title 14, Part 77, 2010).

Impacts and Mitigation Measures

The proposed second anaerobic digester would be approximately 108 feet in height with a major diameter of 84 feet. Based on the FAA's 100:1 slope limitation and a distance of 9,250 feet from the Honolulu International Airport reef runway, notice to FAA is required for a structure which exceeds 92.5 feet.

It is noted that the existing digester is also 108 feet in height and slightly exceeds the 100:1 slope plane. The existing digester is located in close proximity, 50 feet to the south of the proposed site for the second digester. Moreover, there are existing cargo facility cranes (approximately 250 feet in height) utilized on Sand Island as part of harbor loading and unloading operations. Based on the fact that the proposed Second ESD/SST facilities involve a small intrusion above the 100:1 plane and that there are some existing industrial facilities which already protrude above the 100:1 plane, it is anticipated that the proposed project would pose no hazard to air navigation.

An FAA Form 7460-1 "Notice of Proposed Construction or Alternative", is being prepared and will be processed with the Federal Aviation Administration.

3.2.6 RECREATIONAL FACILITIES

Located on Sand Island at the entrance to Honolulu Harbor, the Sand Island State Recreation Area (SRA) is an approximately 141-acre coastal recreational area managed by the DLNR, Division of State Parks (DSP). Sand Island was extensively used by the military during WWII for coastal defense with bunkers and lookout towers still present throughout the SRA. Sand Island was known as Quarantine Island during the nineteenth century when it was used to quarantine ships believed to hold contagious diseases. During World War II, Sand Island was used to camp Japanese-American citizens and foreign nationals from Germany, Italy, and other countries as part of the wartime effort.

Approximately 97 acres of the SRA, at the east end of Sand Island adjacent to the Honolulu Harbor Channel, is existing developed park area. Facilities in this area include picnic tables, BBQs, campgrounds, open lawn passive recreation areas, baseball

diamonds, exercise and play apparatus, multi-use paths, covered pavilions, shade trees, and comfort stations. The park provides a wide sand beach that is over a half-mile long.

The remaining approximately 44 acres of the SRA extends along the south and southwest facing shores of Sand Island, and includes the lands makai of the Sand Island WWTP. The area is relatively undeveloped. Existing facilities include a marine education and training center, boat ramp, canoe pavilion, and parking at the mouth of the Kapalama Basin Kalihi Channel. The remaining area, comprising approximately 30 acres, is currently used as an off-highway vehicle (OHV) recreation area under a pilot project managed by the DLNR Na Ala Hele program.

There are no other recreational resources in the vicinity of the project site.

Impacts and Mitigation Measures

The proposed project will not have an adverse effect on recreational resources. The Second ESD/SST facilities will be located near the center of the Sand Island WWTP and blend with other existing industrial facilities in the area. Public access and use of the park and shoreline areas will remain unaffected by project activities. While the proposed project may be visible from the park, the potential for negative adverse scenic impacts are not expected. No mitigation measures are proposed or anticipated to be required.

3.2.7 FIRE, POLICE AND MEDICAL SERVICES

The nearest fire station is Kaka‘ako Fire Station located on Queen Street approximately 1 mile from the project site. The closest Police Station is on South Beretania Street, roughly 2 miles from the project site. And the closest hospital is The Queen’s Medical Center, approximately 1.5 miles from the project site.

Impacts and Mitigation Measures

The proposed project is not expected to have an adverse effect on or result in an increase in calls for fire, police or medical services. Planned improvements will not result in an increase in population. Emergency vehicle access will be maintained throughout the construction site for the duration of the project. Following construction, operation of the Second ESD/SST will not result in significant or noticeable change from existing operations at the WTTP facility. No mitigation measures are required or recommended.

3.2.8 SOCIO-ECONOMIC CONDITIONS

The service area for the existing Sand Island WWTP is metropolitan Honolulu from Moanalua-Aliamanu to Niu Valley-Paiko Peninsula and includes the U.S. Army facilities at Fort Shafter and Tripler Army Medical Center. The facility serves a combined urban resident and visitor population of approximately 403,000. From 2000 to 2008, the service area experienced only a 0.8 percent growth in population, the smallest growth among all counties in Hawai‘i. The rest of O‘ahu gained 5.1 percent in population during the same time period, and statewide population growth was 6.3 percent. The median age among

residents in the service area in 2010 is 43 years, three years older than the county-wide median age among residents.

Households in the Sand Island WWTP service area somewhat smaller than households islandwide (2.5 versus 2.9 persons per household, respectively). This finding is consistent with the older population, and therefore fewer children present in households. The number of housing units in the service area has remained fairly consistent over the past several years, increasing by less than one percent between 2005 and 2008. Countywide, the number of housing units has increased at double the rate during the same time period. A large proportion of the residents of the service area live in high-rise accommodations, with 44 percent of all the housing units in structures with 20 or more units. These units also tend to be older, with fully half of them constructed more than 30 years ago.

The Sand Island WWTP service area contains the central business district, Waikīkī and numerous other tourist attractions, industrial areas at Sand Island, Kakaʻako, and Mapunapuna, and is home to approximately three-quarters of jobs statewide. Waikīkī alone accounts for an estimated eight percent of Hawaiʻi's Gross State Product. This region also contains Honolulu Harbor and the Honolulu International Airport, which have relatively small work forces and total revenues, but together facilitate nearly all of the commercial activity in the State. While the number of jobs in the Honolulu area is expected to remain generally consistent for the foreseeable future, the composition of job types will likely change as more commercial and government growth occurs in west and central Oʻahu.

Impacts and Mitigation Measures

The project will not have an adverse effect on area demographics or economic conditions. The existing digester has exceeded the design solids loading rate and is susceptible to overloading during peak flow conditions. The Second ESD/SST will provide needed flexibility, reliability and redundancy to the wastewater treatment process. The urban Honolulu service area of the WWTP has grown relatively slowly compared to the remainder of Oʻahu and the State of Hawaiʻi as a whole.

While the proposed project enables the WWTP to process an incremental increase in flows, the proposed improvements will not accommodate or induce an increase or change in population.

Construction of the Second ESD/SST will result in temporary, positive economic activity in the form of construction jobs and material procurements. Construction effects will be temporary and will cease upon project completion. Facility operations following construction will remain generally unchanged from existing conditions. No mitigation measures are recommended or required.

3.3 INFRASTRUCTURE AND UTILITIES

3.3.1 TRAFFIC AND TRANSPORTATION SYSTEMS

Existing Traffic Conditions

Sand Island Parkway Road (State Highway 64) is the major thoroughfare serving Sand Island. It is the continuation of Sand Island Access Road, which extends from Nimitz Highway to and across Bascule Bridge, which crosses the Kalihi Channel between Sand Island and Kalihi Kai. The majority of the traffic near the project site is generated by surrounding activities, including the transportation of shipping containers from Honolulu Harbor to other locations; the U.S. Coast Guard Station Honolulu; the Sand Island State Recreation Area; and a number of small businesses and industries located in the area.

Impacts and Mitigation Measures

No significant increase in traffic associated with the proposed Second ESD/SST project is expected.

On a short-term basis, construction-related traffic may be temporarily noticeable on Sand Island Access Road. Construction-related traffic will not significantly alter the total volume of traffic on Sand Island Access Road. The contractor will be required to keep all construction vehicles in proper operating condition and ensure that material loads are properly secured to prevent dust, debris, leakage, or other adverse conditions from affecting public roadways. No other mitigation measures are required or recommended.

Should any proposed construction activities require the temporary closure of a traffic lane, parking, etc., on a local street, a street usage permit from the Department of Transportation Services will be obtained by the Department of Design and Construction.

3.3.2 DRAINAGE SYSTEM

Rainfall and stormwater runoff from the site are directed to the Sand Island WWTP's existing storm drain system consisting of catch basins and underground piping and discharges into a man-made drainage ditch located at the north side of the facility. The drainage ditch has a valve to isolate the drainage system. The drainage ditch begins near the existing Flotation Clarifier Nos. 7 and 8 and extends eastward approximately 700 feet to the edge of the treatment plant property, then northward for approximately 120 feet to a 6-foot by 8-foot box culvert. The box culvert passes under the Sand Island Parkway and nearby cargo container yard located north of the WWTP, and discharges to Honolulu Harbor.

Impacts and Mitigation Measures

No adverse effects to the drainage system or receiving waters are expected to result from the project. The project does not involve any modifications to the existing drainage system and will not result in an increase in impervious area. The

project contractor will employ construction stormwater BMPs to prevent sediment or other pollutants from discharging in stormwater runoff from the site.

A National Pollutant Discharge Elimination System (NPDES) Permit from the Department of Health, Clean Water Branch (DOH-CWB) for construction stormwater discharges is required when the project's area of ground disturbance, including on-site and off-site staging and stockpile areas, exceeds one acre. The planned construction site and staging area will be smaller than one acre therefore the project site alone does not trigger an NPDES permit. However, if excavated soils from the project are disposed at the Sand Island WWTP Soil Management Area, the total area of disturbance will exceed one acre and an NPDES permit will be obtained in compliance with DOH-CWB requirements. NPDES permit requirements include implementation of site-specific construction BMPs to prevent pollutant discharges in stormwater runoff.

The project will not require construction dewatering. Effluent from hydrotesting of new sludge lines and waterlines will be contained on site or in tanker trucks. Thus, NPDES Construction Dewatering and Hydrotesting permits are not anticipated to be required.

3.3.3 WATER SYSTEM

Water is provided to the Sand Island WWTP through an existing 12-inch water main which is connected to a Board of Water Supply (BWS) 16-inch water main located along Sand Island Parkway.

Impacts and Mitigation Measures

Construction and use of the proposed project will not disrupt or otherwise adversely affect the water system. Construction activities will require use of water for dust control, vehicle wash down, concrete mixing, general housekeeping activities, and for pipe pressure testing. These uses will be intermittent and of short duration and will cease upon project completion. Quantities of water required for these uses are relatively minor. The existing water system has sufficient capacity to accommodate the temporary demands from construction activities.

The existing water system is adequate to accommodate operations the Second ESD/SST. Following construction, operation of the Second ESD/SST will require water use for wash down as part of periodic maintenance and as seal water for the digested sludge pumps. The estimated daily volume of water required to maintain the seals is 132 gallons per day. No additional water use is required for routine operations of the new facilities. The Board of Water Supply will confirm the availability of water when the building permit application for the project is submitted for approval and will require Water System Facilities Charges for resource development, transmission and daily storage. No mitigation measures are required or recommended.

3.3.4 WASTEWATER SYSTEM

Wastewater generated by personnel and maintenance activities at the Sand Island WWTP is conveyed to the Makai Lift Station located within the Sand Island WWTP property. Influent is then pumped through an 8-inch force main directly to the Sand Island WWTP headworks. The facility provides primary wastewater treatment.

The treatment process is described in **Section 2.1.3**. Treated effluent is disposed through a deep ocean outfall. The solids handling building, located close to the project site, contains toilet and wash basin for use by facility personnel.

Impacts and Mitigation Measures

Construction and use of the Second ESD/SST will not disrupt or otherwise adversely affect wastewater systems. The new facilities will provide needed flexibility, reliability and redundancy to the wastewater treatment process.

Construction activities will not generate a significant quantity of wastewater. Construction personnel will have access to existing restroom facilities or be provided with Port-a-Johns. No other mitigation measures are recommended or required.

3.3.5 ELECTRICAL SYSTEMS

Electrical service for customers on Sand Island is provided by HECo. Sand Island is served by two HECo 46kV transmission lines, Iwilei 1 and 2. These two 46 kV circuits are run overhead through Kalihi Kai, cross Kalihi Channel as submarine cables, and continue underground to the HECo Sand Island Substation located near the east end of Bascule Bridge, adjacent to Kalihi Channel. The Sand Island Substation steps the 46 kV transmission voltage down to 11.5 kV for distribution on Sand Island. The 11.5 kV distribution feeders are designated Sand Island 1 and 2. The feeder lines are overhead lines supported on utility poles.

The two 46 kV lines extend from the HECo Sand Island Substation to the Mokuone Substation to support loads at the Sand Island WWTP. Mokuone Substation steps the 46 kV transmission voltage down to 11.5 kV for distribution on Sand Island. The two 11.5 kV distribution feeders from the Mokuone Substation are designated as Mokuone 1 and 2.

On-site electrical power distribution systems at the Sand Island WWTP consist of a combination of underground HECo-owned and City-owned 11.5 kV, 3-phase systems serviced by the Mokuone 1, and Sand Island 1 and 2 feeder lines. The system is serviced by the Sand Island 1 and 2 11.5 kV feeders which connect to primary switch gear located in the Primary Switching Station Building along Sand Island Parkway. The main switchgear then feeds City-owned and maintained 11.5 kV feeders, transformers, and primary distribution equipment within the Sand Island WWTP. A single HECo meter located within the primary switchgear is used to measure use.

In the event of a utility power outage, a system of backup generators located throughout the Sand Island WWTP automatically starts and provides power to the pumps and essential equipment.

Impacts and Mitigation Measures

Construction of the Second ESD/SST will not adversely affect the provision of electrical power at the facility. The existing HECo system has adequate capacity to meet the power requirements during construction activities. The existing ESD/SST uses approximately 12,600 kwh of power. Power is supplied from a dedicated electric meter located in the Solids Handling Building and operated by Synagro. The ESD/SST will increase power demand slightly in relation to increases in sludge volume. No mitigation measures are required or recommended.

3.3.6 SOLID WASTE DISPOSAL

Solid waste collection, transport and disposal operations are the responsibility of the CCH ENV Refuse Division. Solid waste is collected and disposed of at either the Waimānalo Gulch Landfill in the ʻEwa district, or the H-Power facility at Campbell Industrial Park. PVT Land Company operates a privately owned and operated, licensed solid waste facility for recovery of recyclable materials and disposal of construction and demolition materials. The PVT Landfill accepts waste on a pre-arranged basis from registered contractors. Waste loads are screened to remove recyclable materials and the remaining wastes are landfilled.

Impacts and Mitigation Measures

Construction activities will result in the generation of small amounts of construction and demolition debris. Construction and demolition debris will be disposed of at the PVT Landfill in accordance with CCH and State DOH regulations and provisions of the PVT facility license. Non-construction solid waste generated by project activities may be collected and disposed at the Waimānalo Gulch Landfill or H-Power. Project activities are not expected to generate significant excess excavated material. Excess soils resulting from excavation activities will be disposed by storage at the Sand Island WWTP Soil Management Area.

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SECTION 4
Relationship to Land Use Plans and Policies

4.1 THE HAWAI‘I STATE PLAN

The Hawai‘i State Plan, adopted in 1978, and promulgated in HRS, Chapter 226, consists of three major parts:

Part I, describes the overall theme including Hawai‘i’s desired future and quality of life as expressed in goals, objectives, and policies.
Part II, Planning Coordination and Implementation, describing a statewide planning system designed to coordinate and guide all major state and county activities and to implement the goals, objectives, policies, and priority guidelines of the Hawai‘i State Plan.
Part III, Priority Guidelines, which express the pursuit of desirable courses of action in major areas of statewide concern.

The proposed project is consistent with the objectives and policies of the Hawai‘i State Plan. Specifically, the proposed Second ESD/SST provides additional capacity to process solids providing needed flexibility, reliability and redundancy in the wastewater treatment process. Described below are sections of the Hawai‘i State Plan’s goals, objectives, and policies that are relevant to the proposed action.

> *§226-15 Objectives and policies for facility systems--solid and liquid wastes. (a) Planning for the State's facility systems with regard to solid and liquid wastes shall be directed towards the achievement of the following objectives:*
> *(1) Maintenance of basic public health and sanitation standards relating to treatment and disposal of solid and liquid wastes.*
> *(2) Provision of adequate sewerage facilities for physical and economic activities that alleviate problems in housing, employment, mobility, and other areas.*
> *(b) To achieve solid and liquid waste objectives, it shall be the policy of this State to:*
> *(1) Encourage the adequate development of sewerage facilities that complement planned growth.*
> *(2) Promote re-use and recycling to reduce solid and liquid wastes and employ a conservation ethic.*
> *(3) Promote research to develop more efficient and economical treatment and disposal of solid and liquid wastes. [L 1978, c 100, pt of §2; am L 1986, c 276, §14]*

The proposed project supports the State Plan objectives and policies related to the adequate development of sewerage facilities. The project will provide an additional capacity and redundancy in the wastewater process which aids in the proper treatment and disposal of liquid waste.

4.2 STATE LAND USE LAW

The State Land Use Commission classifies all lands in the State of Hawai‘i into one of four land use designations: Urban, Rural, Agricultural and Conservation. The project site is located in the State Land Use Urban District. Wastewater treatment facilities are an approved public use within this District. Land uses within the Urban District are regulated through the City and County of Honolulu (CCH) Land Use Ordinance, Chapter 21, Revised Ordinances of Honolulu (ROH). No action from the State Land Use Commission is required to implement the proposed project. See **Figure 4-1, State Land Use District**.

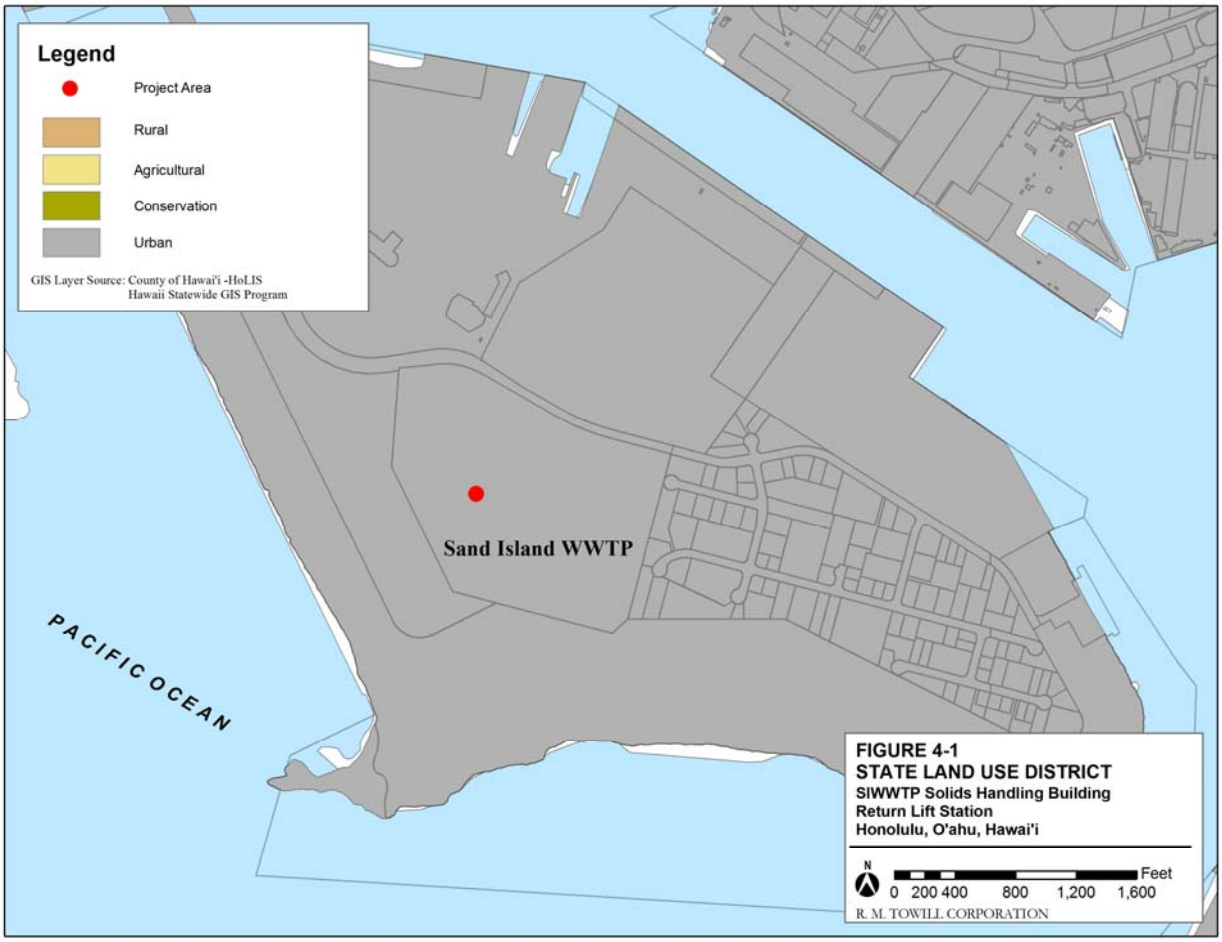

Figure 4-1 State Land Use District

4.3 CITY AND COUNTY OF HONOLULU (CCH) GENERAL PLAN

The General Plan, a requirement of the CCH Charter, is a written commitment by CCH to a future for the Island of O‘ahu. The current plan, approved in 2006, is a statement of the long-range social, economic, environmental, and design objectives and a statement of broad policies which facilitate the attainment of the objectives of the plan.

Wastewater facilities are considered utilities. Therefore, the most relevant section of the General Plan is Section V, entitled “Transportation and Utilities”.

Section V, Transportation and Utilities

Objective B: To meet the needs of the people of O‘ahu for an adequate supply of water and for environmentally sound systems of waste disposal.

Policy 3 - Encourage the development of new technology which will reduce the cost of providing water and the cost of waste disposal.

Policy 5 - Provide safe, efficient, and environmentally sensitive waste-collection and waste-disposal services.

Objective C: To maintain a high level of service for all utilities.

Policy 1 - Maintain existing utility systems in order to avoid major breakdowns.

Policy 2 - Provide improvements to utilities in existing neighborhoods to reduce substandard conditions.

Policy 3 - Plan for the timely and orderly expansion of utility systems.

Objective D: To maintain transportation and utility systems which will help O‘ahu continue to be a desirable place to live and visit.

Policy 1- Give primary emphasis in the capital-improvement program to the maintenance and improvement of existing roads and utilities.

Policy 2 - Use the transportation and utility systems as a means of guiding growth and the pattern of land use on O‘ahu.

Policy 4 - Evaluate the social, economic, and environmental impact of additions to the transportation and utility systems before they are constructed.

The proposed project is consistent with Section V, Objective B, concerning environmentally-sound utility systems. Implementation of the project will promote safe, efficient, and environmentally sensitive waste disposal. Objective C is aimed at maintaining a high level of service for all utilities under the jurisdiction of CCH, including wastewater collection and treatment. The Second ESD/SST will aid in providing the means to maintain a high level of infrastructure utility service. With regard to Objective D, maintaining utility systems, the planned improvements are intended not only to maintain, but to improve, wastewater treatment process.

4.4 CCH ZONING AND LAND USE ORDINANCE

The project site is located in the CCH I-3 (Waterfront Industrial) zoning district, as defined in Chapter 21, ROH, the "Land Use Ordinance" (LUO):

> *"Sec. 21-3.130 Industrial districts--Purpose and intent.*
> *(f) The intent of the I-3 waterfront industrial district is to set apart and protect areas considered vital to the performance of port functions and to their efficient operation. It is the intent to permit a full range of facilities necessary for successful and efficient performance of port functions. It is intended to exclude uses which are not only inappropriate but which could locate elsewhere. (Added by Ord. 99-12)"*

According to LUO Table 21-3, Master Use Table, the Sand Island WWTP facilities, including the proposed Second ESD/SST, are defined as "public uses and structures" and are permitted in the I-3 zoning district. The project is thus consistent with the purpose and uses of the land's associated zoning district classifications under the CCH LUO. See **Figure 4-2, Zoning**.

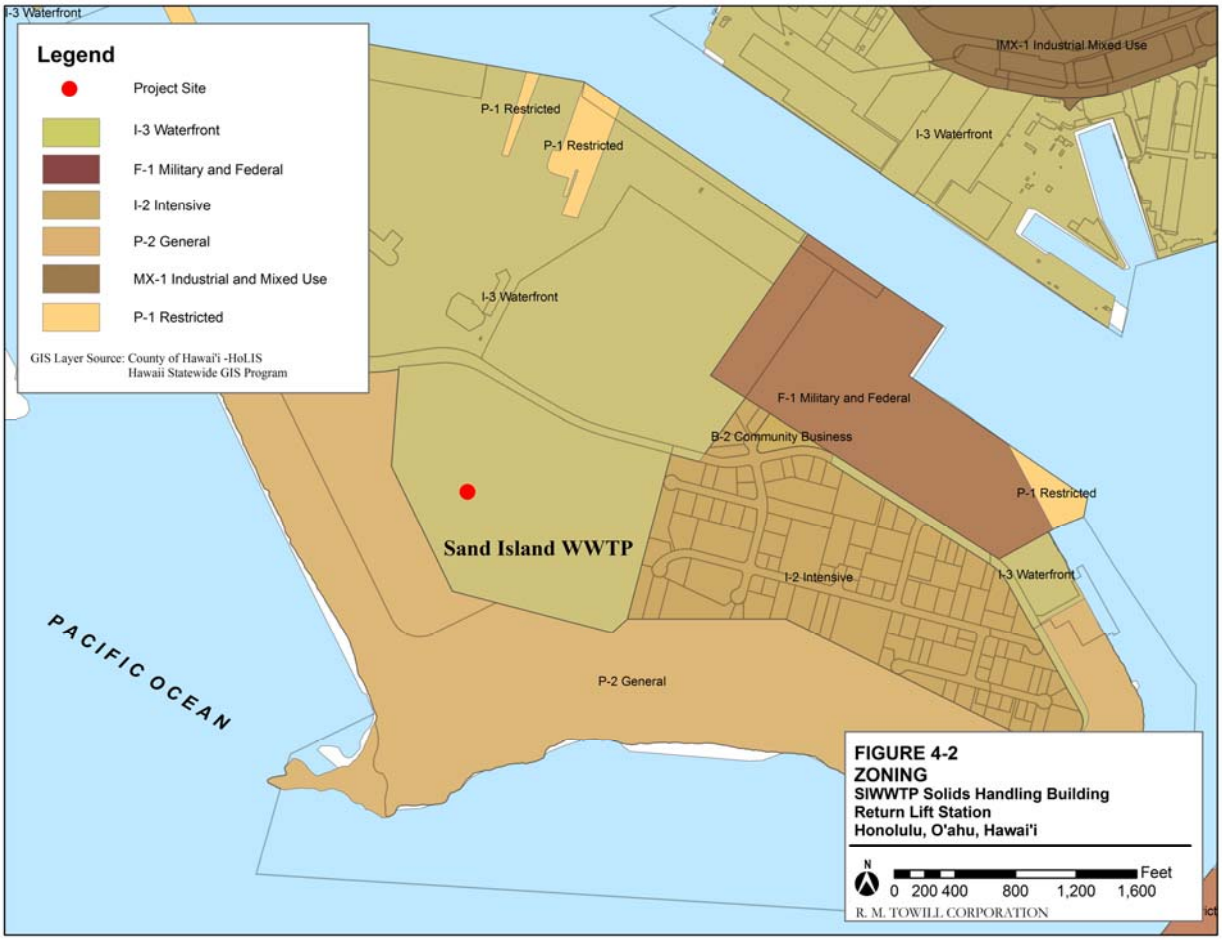

Figure 4-2 Zoning

4.5 PRIMARY URBAN CENTER (PUC) DEVELOPMENT PLAN

The PUC Development Plan, most recently updated in 2004, implements the objectives and policies of the General Plan for the PUC, which is described as the "cultural, governmental and economic center of both O'ahu and the State." The PUC Development Plan is incorporated into Ordinance 04-14 by reference. The proposed project is consistent with the policies described in the PUC Development Plan, Chapter 4.2, Wastewater:

Section 4.2.2 Policies

- *Implement adequate and timely upgrades/expansion of wastewater treatment facilities to meet the growth demands of the PUC.*

Although the proposed Second ESD/SST facility does provide additional capacity for solids processing, the proposed project is intended to ensure continued, reliable operations and maintenance of a satisfactory standard of treatment processes. The new facilities also will help to ensure that the Sand Island WWTP will be able to provide adequate wastewater treatment in response to planned growth. It is noted that the project will not spur additional growth within the urban Honolulu, but without the project, there are additional risks that wastewater treatment may not comply with all applicable regulations. The project site is located within land identified for "Industrial" use on the PUC DP Map A.5: Land Use Map PUC – Central. Wastewater treatment facilities are an approved use within this land use designation.

The project is consistent with the PUC Development Plan, Section 3.4.2.4, "Military, Airport, Harbor, and Industrial Areas Policy" which states: "Promote compatibility with the surrounding urban and natural environment. Where industrial areas are mixed with or adjacent to residential communities or natural areas, mitigate visual, noise, and other environmental impacts by adopting performance standards." The Second ESD/SST will blend with other existing industrial facilities in the area. Noise in the vicinity of the project site will be generated during construction by heavy equipment, internal combustion vehicles, and power tools used during construction. Due to the distance between the project site and the Sand Island State Recreation Area, and the intervening industrial structures, construction-generated noise is not expected to adversely affect public enjoyment of the recreation area. Construction noise will cease at project completion. Operation of the Second ESD/SST will not result in noticeable changes in sound levels compared to existing operations.

4.6 SPECIAL MANAGEMENT AREA (SMA) RULES AND REGULATIONS

The City and County of Honolulu has designated the shoreline and certain inland areas of O‘ahu as being within the Special Management Area (SMA). SMA areas are designated sensitive environments that should be protected in accordance with the State’s Coastal Zone Management policies, as set forth in Revised Ordinances of Honolulu (ROH), Section 25, Shoreline Management, and Hawai‘i Revised Statutes (HRS), Section 205A, Coastal Zone Management.

The Sand Island WWTP, including the proposed project site, is located within the SMA. See **Figure 4-3, Special Management Area**.

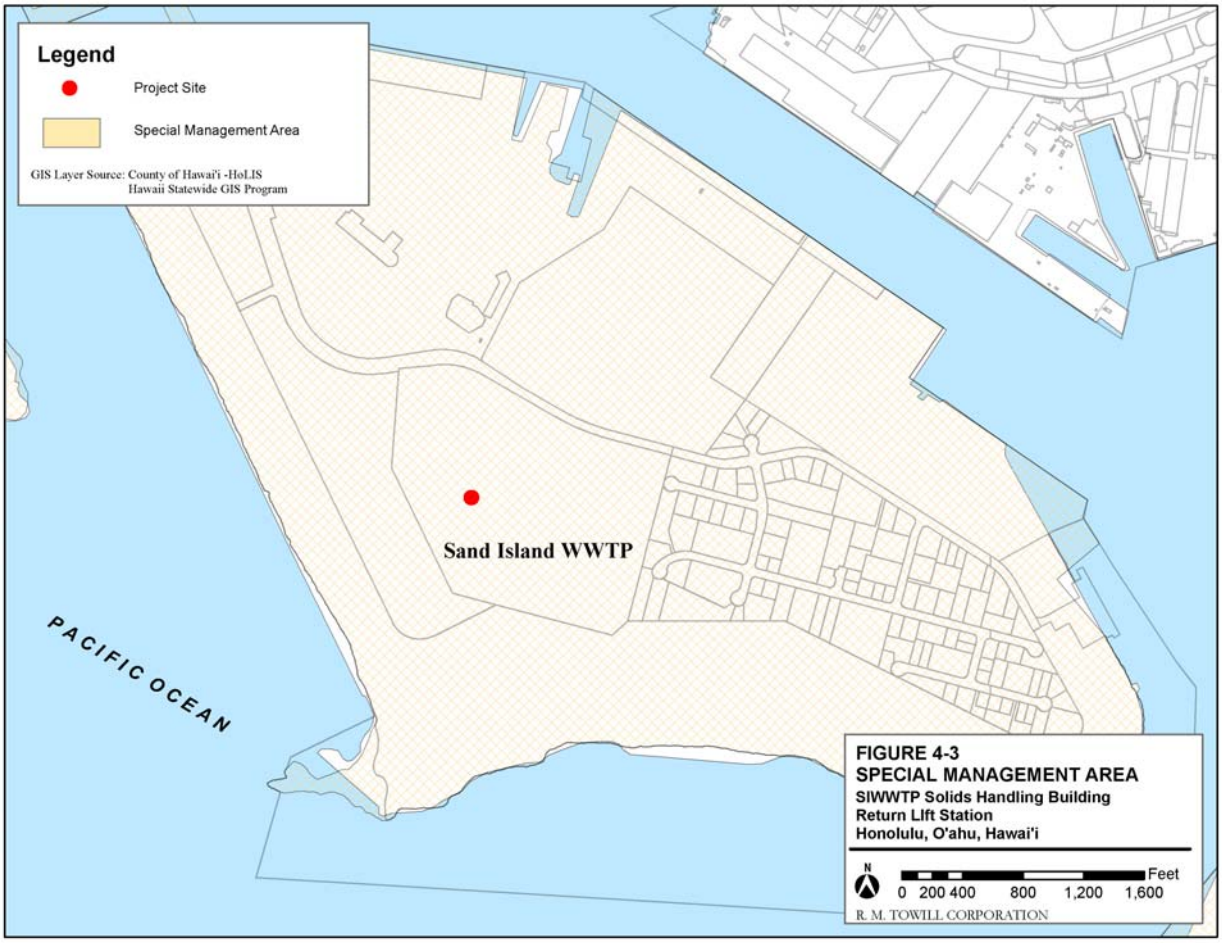

Figure 4-3 Special Management Area

4.6.1 SHORELINE MANAGEMENT, ROH SECTION 25

The potential effects of the proposed project are evaluated based on the review guidelines in the Revised Ordinances of Honolulu (ROH) Section 25-3.2. The following is a discussion of the applicability of the guidelines to the planned construction of the Second ESD/SST.

> *(a) All development in the special management area shall be subject to reasonable terms and conditions set by the council to ensure that:*
>
> *(1) Adequate access, by dedication or other means, to publicly owned or used beaches, recreation areas and natural reserves is provided to the extent consistent with sound conservation principles;*

The project site is located within the Sand Island WWTP facility. Access to beaches, recreation areas, and natural reserves will not be affected by project activities or operation of the Second ESD/SST following construction.

> *(2) Adequate and properly located public recreation areas and wildlife preserves are reserved*;

The project consists of improvements within an existing, established WWTP facility. Public recreation areas and wildlife preserves will not be affected by project activities or operation of the Second ESD/SST following construction.

> *(3) Provisions are made for solid and liquid waste treatment, disposition and management which will minimize adverse effects upon special management area resources; and,*

Construction activities will not generate a significant quantity of wastewater. Construction personnel will have access to existing restroom facilities at the solids handling building or be provided with Port-a-Johns. No other mitigation measures are recommended or required. Construction and use of the proposed project will not disrupt or otherwise adversely affect wastewater systems. The Second ESD/SST will benefit the Sand Island WWTP by aiding in the proper treatment and disposal of liquid waste.

Construction activities will result in the generation of small amounts of construction and demolition debris. Construction and demolition debris will be disposed of at the PVT Landfill in accordance with CCH and State DOH regulations and provisions of the PVT facility license. Non-construction solid waste generated by project activities may be collected and disposed at the Waimānalo Gulch Landfill or H-Power. Excess soils resulting from excavation activities would be disposed by storage at the Sand Island WWTP Soil Management Area.

> *(4) Alterations to existing land forms and vegetation; except crops, and construction of structures shall cause minimum adverse effect to water resources and scenic and recreational amenities and minimum danger of floods, landslides, erosion, siltation or failure in the event of earthquake.*

The Second ESD/SST facilities are being constructed in a vacant area adjacent to the existing digester near the center of the Sand Island WWTP. The project site is flat with an

existing elevation of approximately 8 feet above mean sea level (msl), and is not susceptible to landslides or erosion. There are no surface waters in the immediate vicinity. Best management practices will be undertaken during construction activities to ensure that silt and dust will not escape the project site during ground disturbing activities. The site is located in FEMA Flood Zone X, which designates areas with 0.2 percent annual chance of flooding, thus is exposed to minimal risk from flooding. The site is located outside of the tsunami evacuation zone. All structures will be constructed to meet International Building Code 2003 standards for seismic design category rating 'D', which designates the highest load effect on a structure; and seismic use group III (Chapter 16, Table 1604.5 ROH), which designates essential facilities that are required for post earthquake recovery and those containing substantial quantities of hazardous substances.

The Second ESD/SST would be approximately 113 feet in height with a major diameter of 84 feet. This exceeds the 60-foot height limit of the underlying County I-3 Waterfront Industrial zoning district. A height variance from the City Department of Planning and Permitting would be required. It is noted that the Second ESD is proposed to be the same height as the existing digester. The second digester should be the same as the existing digester to meet applicable standards and provide redundancy and consistency in the wastewater treatment process.

The proposed Second ESD/SST would be located near the center of the WWTP and will be consistent with the industrial character of the existing facilities. Many of the existing nearby industrial facilities are of similar height, including the 80-foot tall Sand Island WWTP clarified tanks, and the existing ESD/SST. Also in the vicinity are substantially taller industrial structures and equipment, including the 250-foot tall cargo cranes operated at the Matson Container Yard. When viewed from nearby areas of urban Honolulu, the proposed new facilities will blend with other existing structures in the industrial area. The visual impact created by the new facilities is not anticipated to reduce or impede views from urban Honolulu to the WWTP and surrounding areas. The development of the project will be consistent with the zoning designation and any significant adverse visual impacts are not anticipated, due to the fact that other larger structures are present in this industrial setting.

> *(b) No development shall be approved unless the council has first found that:*
>
> *(1) The development will not have any substantial, adverse environmental or ecological effect except as such adverse effect is minimized to the extent practicable and clearly outweighed by public health and safety, or compelling public interest. Such adverse effect shall include, but not be limited to, the potential cumulative impact of individual developments, each one of which taken in itself might not have a substantial adverse effect and the elimination of planning options;*

The proposed project is not anticipated to involve a substantial degradation of environmental quality. The site has long been developed and in use as Honolulu's primary wastewater treatment facility. The planned construction and operation of the Second ESD/SST will not substantially alter environmental conditions at the project site.

Planning and design for the project includes mitigation measures to prevent or minimize potential adverse environmental effects. The project will not result in cumulative impacts, will not involve a commitment to larger actions, and will not result in the elimination of planning options.

The minor environmental effects from construction activities should be considered in light of the project's benefit to wastewater treatment operations which will aid in the proper treatment and disposal of liquid waste.

> *(2) The development is consistent with the objectives and policies set forth in Section 25-3.1 and area guidelines contained in HRS Section 205A-26;*

The project is in compliance with the objectives and policies set forth in HRS 205A-2, and SMA guidelines contained in HRS 205-A26. This document is prepared to summarize the project effects in relation to the SMA guidelines in HRS Section 205A-26 and ROH Section 25. See Section 4.6.2 for discussion of the project's compliance with the State's objectives and policies for the Coastal Zone.

> *(3) The development is consistent with the county general plan, development plans and zoning. Such a finding of consistency does not preclude concurrent processing where a development plan amendment or zone change may also be required.*

The project is in conformance with the General Plan objectives for Transportation and Utilities, as described in **Section 4.3**. The County zoning designation for the project site is I-3, Waterfront Industrial. According to Table 21-3, Master Use Table, of the LUO, the planned Second ESD/SST facilities are each considered a "public use and structure" and is a permitted use in the I-3 zoning district, as described in **Section 4.4**. The project site is designated as "Industrial" in the Development Plan for the Primary Urban Center. The Second ESD/SST facilities are in compliance with this designation, as described in **Section 4.5**.

> *(c) The council shall seek to minimize, where reasonable:*
>
> > *(1) Dredging, filling or otherwise altering any bay, estuary, salt marsh, river mouth, slough or lagoon;*

The project does not involve filling or otherwise altering any water body.

> > *(2) Any development which would reduce the size of any beach or other area usable for public recreation;*

The project site is located within the existing Sand Island WWTP and does not affect any beach or other area usable for public recreation.

> > *(3) Any development which would reduce or impose restrictions upon public access to tidal and submerged lands, beaches, portions of rivers and streams within the special management area and the mean high tide line where there is no beach;*

The project is not located where it would reduce or impose restrictions upon public access to any shoreline areas or surface waters.

(4) Any development which would substantially interfere with or detract from the line of sight toward the sea from the state highway nearest the coast; and

The Second ESD/SST would not substantially interfere with or detract from the line of sight from Sand Island Parkway. Waterfront industrial structures in the area, including facilities at Sand Island WWTP, are visible from the ocean, from Keʻehi Lagoon, from various vantages within urban Honolulu and the immediate surrounding properties, and from areas with elevations exceeding 100 feet above sea level, including Punchbowl, Pacific Heights, Diamond Head, and high-rise buildings along Ala Moana Boulevard and Nimitz Highway. Within view planes from the urban coastline towards the sea, the Sand Island WWTP facilities are subordinate to the much taller cargo facility loading cranes and are consistent in appearance with other industrial facilities on Sand Island.

(5) Any development which would adversely affect water quality, existing areas of open water free of visible structures, existing and potential fisheries and fishing grounds, wildlife habitats, or potential or existing agricultural uses of land.

The project site is located within an existing, developed industrial facility at the Sand Island WWTP. The Second ESD/SST facilities represent a closed system which represents one stage of processing within the Sand Island WWTP. The project will not adversely affect water quality, existing areas of open water free of visible structures, existing and potential fisheries and fishing grounds, wildlife habitats, or potential or existing agricultural uses of land.

4.6.2 COASTAL ZONE MANAGEMENT, HRS 205(A)

The State of Hawaiʻi designates the Coastal Zone Management Program (CZMP) to manage the intent, purpose and provisions of Chapter 205(A)-2 of the Hawaiʻi Revised Statutes (HRS), as amended, for the areas from the shoreline to the seaward limit of the State's jurisdiction, and any other area which a lead agency may designate for the purpose of administering the Coastal Zone Management program. The following is an assessment of the project with respect to the CZMP objectives and policies set forth in Section 205(A)-2.

1. Recreational resources

Objective: *Provide coastal recreational opportunities accessible to the public*.

Policies:

A) Improve coordination and funding of coastal recreational planning and management; and

B) Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by:

(i) Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas;

(ii) Requiring replacement of coastal resources having significant recreational value including, but not limited to, surfing sites, fishponds, and sand beaches, when such resources will be unavoidably damaged by development; or requiring

reasonable monetary compensation to the State for recreation when replacement is not feasible or desirable;
(iii) Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value;
(iv) Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation;
(v) Ensuring public recreational uses of county, state, and federally owned or controlled shoreline lands and waters having recreational value consistent with public safety standards and conservation of natural resources;
(vi) Adopting water quality standards and regulating point and nonpoint sources of pollution to protect, and where feasible, restore the recreational value of coastal waters;
(vii) Developing new shoreline recreational opportunities, where appropriate, such as artificial lagoons, artificial beaches, and artificial reefs for surfing and fishing; and
(viii) Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the land use commission, board of land and natural resources, and county authorities; and crediting such dedication against the requirements of section 46-6.

Discussion:
The proposed project will not have an adverse effect on the adjacent Sand Island State Recreation Area or other recreational resources. The project site near the center of the Sand Island WWTP may be visible from limited areas of the park, however due to distance and the general industrial nature of the area, construction activities will not be generally noticeable nor have an adverse effect on recreational activities at the park. Operation of the Second ESD/SST following construction will not result in noticeable change from existing operations at the WWTP facility. Public access and use of the park and shoreline areas will remain unaffected by project activities.

Water quality will be protected during construction through the application of construction stormwater BMPs to prevent sediment or other pollutants from discharging in runoff from the site.

A National Pollutant Discharge Elimination System (NPDES) Permit from the Department of Health, Clean Water Branch (DOH-CWB) for construction stormwater discharges is required when the project's area of ground disturbance, including on-site and off-site staging and stockpile areas, exceeds one acre. The planned construction site and staging area will be smaller than one acre therefore the project site alone does not trigger an NPDES permit. However, if excavated soils from the project are disposed at the Sand Island WWTP Soil Management Area, the total area of disturbance will exceed one acre and an NPDES permit will be obtained in compliance with DOH-CWB requirements. NPDES permit requirements include implementation of site-specific construction BMPs to prevent pollutant discharges in stormwater runoff.

The project will not involve construction dewatering. Construction of the Second ESD/SST and new connecting lines will require hydrotesting. However, any water from hydrotesting procedures will be processed through the WWTP. Thus, NPDES Construction Dewatering and Hydrotesting permits are not anticipated to be required as well.

Planned improvements will not alter existing drainage patterns. Operation of the new Second ESD/SST following construction will result in a continued satisfactory and reliable standard of wastewater treatment.

2. Historic resources

Objective: *Protect, preserve, and, where desirable, restore those natural and manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.*

Policies:
(A) Identify and analyze significant archaeological resources;
(B) Maximize information retention through preservation of remains and artifacts or salvage operations; and
(C) Support state goals for protection, restoration, interpretation, and display of historic resources.

Discussion:
The project site is situated within artificially created Fill Land, mixed (FL) which was entirely submerged by the ocean during pre- and post-contact periods. In addition, the project site was subject to extensive ground disturbance and modification during construction of the existing Sand Island WWTP. As a result, no archaeological sites are known or expected to be encountered at the project site.

The proposed project is not expected to result in potential for negative adverse effects to archaeological resources. This is due to the artificially created, mixed fill soils found at the project site. A review of records with the Department of Land and Natural Resources (DLNR), State Historic Preservation Division (SHPD), also indicates that there are no known historic sites at the project location. See **Appendix A, Letter from State Historic Preservation Division, March 5, 2001**. However, in the event of unexpected discovery of historic or archaeological resources, the SHPD will be immediately notified for appropriate response and action.

The project site and surrounding Sand Island WWTP facility is not used for traditional, customary, or cultural practices. The project site is located on artificially created land comprised of mixed fill soils in an area that was submerged by the ocean until modern times. The site was heavily modified during construction of the Sand Island WWTP. Plants found at the site are introduced grass species not associated with cultural gathering or use activities. The artificial creation and developed condition of the site is not conducive to the presence of wahi pana (storied place) or other sites associated with cultural practices.

Based on the above, the potential for adverse effects to traditional and cultural practices is not anticipated. Construction of the Second ESD/SST will not disturb traditional sacred sites or traditional cultural objects; will not result in the degradation of resources used by native Hawaiians for subsistence or traditional cultural practices; will not obstruct landforms or wayfinding features; and will not result in loss of access to the shoreline or other areas customarily used by Hawaiians or others for resource gathering or traditional cultural practices. No mitigation measures are proposed.

3. Scenic and open space resources

Objective: *Protect, preserve, and, where desirable, restore or improve the quality of coastal scenic and open space resources*.

Policies:

(A) Identify valued scenic resources in the coastal zone management area;
(B) Ensure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms and existing public views to and along the shoreline;
(C) Preserve, maintain, and, where desirable, improve and restore shoreline open space and scenic resources; and
(D) Encourage those developments that are not coastal dependent to locate in inland areas.

Discussion:

The Sand Island WWTP is located in an industrial harbor area containing large commercial / industrial buildings, fuel tanks, and tall cranes used for container shipping operations. The existing WWTP facilities include several prominent structures, including clarifier tanks, gas tank (40 feet tall), incinerator building (80 feet tall) and existing anaerobic digester tower (113 feet tall). These facilities are visible from the ocean, from Keʻehi Lagoon, from various vantages within urban Honolulu and the immediate surrounding properties, and from areas with elevations exceeding 100 feet above sea level, including Punchbowl, Diamond Head, and high-rise buildings along Ala Moana Boulevard and Nimitz Highway. Within view planes from the urban coastal areas laterally down the shoreline or towards the sea, the Sand Island WWTP facilities are subordinate to the much taller cargo facility loading cranes (approximately 250 feet in height) and are consistent in appearance with other industrial facilities on Sand Island.

The proposed site for the Second ESD/SST is located near the center of the Sand Island WWTP adjacent to the existing digester. It is intended to be the same height (113 feet tall) as the existing digester. The scale and massing of the Second ESD/SST will be similar to the surrounding WWTP facilities and will be consistent in appearance with the industrial character of the existing facilities. The height of the new facilities exceeds the maximum building height of 60 feet for the underlying zoning district. Thus, a waiver permit from the Department of Planning and Permitting will be required.

Due to the location near the center of the existing Sand Island WWTP, and industrial context of the surrounding area, the project is not expected to adversely affect scenic and visual resources in the shoreline area. The Second ESD/SST will not obstruct or degrade

lateral coastal views or mauka-makai views from the shoreline, Sand Island Parkway, or the Sand Island State Recreation Area.

4. Coastal ecosystems

Objective: *Protect valuable coastal ecosystems, including reefs, from disruption and minimize adverse impacts on all coastal ecosystems.*

Policies:

(A) Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;
(B) Improve the technical basis for natural resource management;
(C) Preserve valuable coastal ecosystems, including reefs, of significant biological or economic importance;
(D) Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land and water uses, recognizing competing water needs; and
(E) Promote water quantity and quality planning and management practices that reflect the tolerance of fresh water and marine ecosystems and maintain and enhance water quality through the development and implementation of point and nonpoint source water pollution control measures.

Discussion:

The proposed project is not expected have any adverse affects on marine resources. Project activities do not involve work in the coastal waters or alterations to stream channels or other water bodies or water sources. Following project completion, there will be no noticeable change in wastewater treatment operations, or in discharge effluent quantity or quality over existing conditions.

During construction, construction stormwater BMPs will be employed to prevent pollutant discharge in storm water runoff. Discharge pollution prevention measures will be installed for each project action as required by project activities. Measures to prevent sediment discharge in storm water runoff during construction will be in place and functional before project activities begin and will be maintained throughout the construction period. Planned improvements will not alter existing drainage patterns or involve modifications to existing drainage systems.

5. Economic uses

Objective: *Provide public or private facilities and improvements important to the State's economy in suitable locations.*

Policies:

(A) Concentrate coastal dependent development in appropriate areas;
(B) Ensure that coastal dependent development such as harbors and ports, and coastal related development such as visitor industry facilities and energy generating facilities, are located, designed, and constructed to minimize adverse social, visual, and environmental impacts in the coastal zone management area; and

(C) Direct the location and expansion of coastal dependent developments to areas presently designated and used for such developments and permit reasonable long-term growth at such areas, and permit coastal dependent development outside of presently designated areas when:

(i) Use of presently designated locations is not feasible;
(ii) Adverse environmental effects are minimized; and
(iii) The development is important to the State's economy.

Discussion:
The proposed project is located near the center of the existing Sand Island WWTP and involves a needed upgrade to increase reliability and redundancy of wastewater treatment.

The project has been assessed for social, visual, and environmental impacts in accordance with Chapter 343, HRS. With the implementation of mitigation measures outlined in this document, no adverse impacts are expected to result from this project.

6. Coastal hazards

Objective: *Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, subsidence, and pollution*.

Policies:
(A) Develop and communicate adequate information about storm wave, tsunami, flood, erosion, subsidence, and point and nonpoint source pollution hazards;
(B) Control development in areas subject to storm wave, tsunami, flood, erosion, hurricane, wind, subsidence, and point and nonpoint source pollution hazards;
(C) Ensure that developments comply with requirements of the Federal Flood Insurance Program; and
(D) Prevent coastal flooding from inland projects.

Discussion:
The project will be undertaken in a manner that will reduce potential harm to life and property from coastal hazards.

- The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) panel 15003C0361G, dated July 22, 2009, identifies the project site within flood zone X, which designates areas outside of the 0.2 percent annual chance (500 year) floodplain. The project will not exacerbate conditions that would contribute to coastal flooding. No special provisions for flood risk mitigation are recommended.
- The project will not result in changes to existing drainage patterns. Rainfall and stormwater runoff from the site is directed to the Sand Island WWTP's existing storm drain system consisting of catch basins and underground piping, and discharges into a man-made drainage ditch located at the north side of the facility. The drainage ditch connects to a 6-foot by 8-foot box culvert that passes under the Sand Island Parkway and

nearby cargo container yard located north of the WWTP, and discharges to Honolulu Harbor. No modifications to the drainage system are proposed.

- On the Tsunami Evacuation Zone Map prepared by the Department of Emergency Management, the proposed project site is located outside of the evacuation boundary within an area considered to be safe from wave action and that would not likely be subject to inundation by a tsunami.
- The potential for hurricanes, while relatively rare, is present. To safeguard against hurricane damage, the new facility will be designed in compliance with 2003 IBC standards for wind exposure rating C, and will carry a design wind load of 105 mph (ROH Chapter 16).
- Earthquakes pose a threat throughout Hawai‘i, but disruptive seismic events are relatively uncommon in this region. Design and construction of the proposed facility will be in accordance IBC design category rating D and Seismic Use Group III, per CCH standards.

7. Managing development

Objective: *Improve the development review process, communication, and public participation in the management of coastal resources and hazards.*

Policies:

(A) Use, implement, and enforce existing law effectively to the maximum extent possible in managing present and future coastal zone development;
(B) Facilitate timely processing of applications for development permits and resolve overlapping or conflicting permit requirements; and
(C) Communicate the potential short and long-term impacts of proposed significant coastal developments early in their life cycle and in terms understandable to the public to facilitate public participation in the planning and review process.

Discussion:

All work activities will be conducted in compliance with federal, state, and county environmental rules and regulations. This environmental assessment document is prepared to identify and, where necessary, propose mitigation measures to address impacts anticipated from the construction and operation of proposed improvements.

8. Public participation

Objective: *Stimulate public awareness, education, and participation in coastal management.*

Policies:

(A) Promote public involvement in coastal zone management processes;
(B) Disseminate information on coastal management issues by means of educational materials, published reports, staff contact, and public workshops for persons and organizations concerned with coastal issues, developments, and government activities; and
(C) Organize workshops, policy dialogues, and site-specific mediations to respond to coastal issues and conflicts.

Discussion:
Public participation in the project is being accommodated during the Draft Environmental Assessment (EA) publication period, and during public hearings to be conducted as part of the SMA permit application process. Public notice of the proposed action is provided through publication of the EA and SMA permit application in the OEQC Bulletin.

9. Beach protection

Objective: *Protect beaches for public use and recreation.*

Policies:
(A) Locate new structures inland from the shoreline setback to conserve open space, minimize interference with natural shoreline processes, and minimize loss of improvements due to erosion;
(B) Prohibit construction of private erosion-protection structures seaward of the shoreline, except when they result in improved aesthetic and engineering solutions to erosion at the sites and do not interfere with existing recreational and waterline activities;
and
(C) Minimize the construction of public erosion-protection structures seaward of the shoreline.

Discussion:
The project site is located approximately ¼ mile inland from the shoreline and will not interfere with coastal open space or natural shoreline processes. The project site is situated on flat topography within a developed, industrial wastewater treatment facility. The site is not susceptible to erosion.

10. Marine resources

Objective: *Promote the protection, use, and development of marine and coastal resources to assure their sustainability.*

Policies:
(A) Ensure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;
(B) Coordinate the management of marine and coastal resources and activities to improve effectiveness and efficiency;
(C) Assert and articulate the interests of the State as a partner with federal agencies in the sound management of ocean resources within the United States exclusive economic zone;
(D) Promote research, study, and understanding of ocean processes, marine life, and other ocean resources in order to acquire and
inventory information necessary to understand how ocean development activities relate to and impact upon ocean and coastal resources; and
(E) Encourage research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources.

Discussion:
The proposed project does not involve construction activities within a sensitive marine environment. The project site is located approximately ¼ mile from the shoreline within the Sand Island WWTP. The **Second ESD/SST** are required to ensure the continued reliable operation of wastewater treatment processes at the facility for the protection of public health and safety and for the protection of the natural environment and water resources.

No listed or protected plant species are known from the area surrounding the project site. Rare, threatened, or endangered fauna are not known to utilize the site for either habitat or for foraging purposes. Although there is no evidence of migratory seabirds and native waterfowl species using the project site for breeding or habitation, some are known to visit areas within the wider project study area. Mitigation measures to prevent adverse effects to avifauna from night lighting will include the following:

- During construction activities, all nighttime lighting will be shielded and angled downward to reduce glare and disruption of bird flight.
- Following construction, permanent light sources will be shielded and angled downward to eliminate glare that could disturb or disorient animals.

No other mitigation measures are proposed.

SECTION 5
Necessary Permits and Approvals

5.1 CITY AND COUNTY OF HONOLULU

Department of Design and Construction

- Finding of No Significant Impact

Department of Planning and Permitting

- Special Management Area Use Permit
- Waiver Permit (for building height)
- Construction Plan Review and Approval (including Grading and Erosion Control Plan Review as appropriate with concurrent review by Department of Design and Construction)
- Building Permit
- Grading and Stockpiling Permits

5.2 STATE OF HAWAI‘I

Department of Health

- Construction Plan Review and Approval, by Wastewater Branch
- Modification to Covered Source Permit No. 0216-06-C, by Clean Air Branch
- National Pollutant Discharge Elimination System (NPDES) Permit for Construction Stormwater

5.3 FEDERAL

Federal Aviation Administration

- FAA Form 7460-1 Review

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SECTION 6
Organizations and Agencies Consulted during the Preparation of the DEA

6.1 City and County of Honolulu

- Department Environmental Services
- Department of Planning and Permitting
- Department of Design and Construction
- Department of Transportation Services

6.2 State of Hawai‘i

- DLNR, Land Division
- Department of Health, Clean Water Branch
- Office of Environmental Quality Control

6.3 Federal Agencies

- Federal Aviation Administration

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SECTION 7
Organizations and Agencies Consulted during the 30-Day DEA Review Period

7.1 City and County of Honolulu

Department of Design and Construction
Department of Facilities Maintenance
Department of Parks and Recreation
Department of Planning and Permitting
Department of Transportation Services
Honolulu Board of Water Supply
Honolulu Fire Department
Honolulu Police Department

7.2 State of Hawai‘i

Department of Accounting and General Services
Department of Business, Economic Development and Tourism
Department of Health
Department of Land and Natural Resources
Department of Transportation
Disability and Communication Access Board
Office of Environmental Quality Control
Office of Hawaiian Affairs
State Historic Preservation Division, DLNR
University of Hawai‘i Environmental Center

7.3 Federal Agencies

U. S. Army Corps of Engineers
U. S. Environmental Protection Agency – Pacific Islands Office
Federal Aviation Administration
U. S. Fish & Wildlife Service
National Marine Fisheries Service

7.4 Elected Officials and Boards

City and County of Honolulu
Mayor Peter Carlisle
Councilmember Tom Berg, District 1
Councilmember Ernest Martin, District 2
Councilmember Ikaika Anderson, District 3
Councilmember Stanley Chang, District 4
Councilmember Ann Kobayashi, District 5

Councilmember Tulsi Gabbard, District 6
Councilmember Romy Cachola, District 7
Councilmember Breene Harimoto, District 8
Councilmember Nestor Garcia, District 9

Neighborhood Boards
Downtown Neighborhood Board No. 13
Kalihi Palama Neighborhood Board No. 15
Kalihi Valley Neighborhood Board No. 16
Salt Lake-Aliamanu Neighborhood Board No. 18

State of Hawai‘i
Senator Suzanne Chun Oakland, Senate District 13
Representative Joey Manahan, House District 29

7.5 Utility Companies

Hawaiian Electric Company, Inc.
Hawaiian Telcom

7.6 Community Organizations

Kalihi Business Association
Sand Island Business Association
Chinese Merchants Association

SECTION 8
Determination

In accordance with the content requirements of Chapter 343, Hawai‘i Revised Statutes, and the significance criteria in Section 11-200-12 of Title 11, Chapter 200, it is anticipated that this project will have no significant adverse impact to water quality, air quality, existing utilities, noise, archaeological sites, or wildlife habitat. All anticipated impacts will be temporary and will not adversely impact the environmental quality of the area.
According to the significance criteria:

1. Irrevocable commitment to loss or destruction of natural or cultural resources.

The proposed project is not expected to adversely impact any natural or cultural resources. The proposed activity will involve use of fill land on Sand Island. This area contains the existing wastewater treatment plant which has already been subject to extensive grading and land disturbance.

2. Curtailment of the range of beneficial uses of the environment.

The proposed project will involve use of disturbed areas of land within the existing Sand Island WWTP site. No curtailment of the range of beneficial uses that may be exercised at the site are therefore expected. With or without the project, the Sand Island WWTP will continue to handle a major part of the wastewater processing needs of the City and County of Honolulu.

3. Conflicts with the State's long·term environmental policies or goals and guidelines as expressed in Chapter 344, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders.

The proposed project is consistent with the environmental policies, goals and guidelines expressed in Chapter 343, HRS. Potential sources of adverse impacts have been identified and appropriate measures have been developed to either mitigate or minimize potential impacts to negligible levels.

4. Substantially affects the economic or social welfare of the community or state.

The proposed project is expected to enhance the future long term stability of the City and State through the provision of basic public works infrastructure necessary to the health and welfare, of the community and region.

5. Substantially affects public health.

The proposed project will be constructed in accordance with Federal, State, and City and County of Honolulu, rules and regulations governing public safety and health. Concerns involving air, water, noise, and waste impacts have been addressed in this EA document by use of appropriate mitigation measures as described. Upon completion, the proposed modifications will benefit public health by improving the reliability of wastewater treatment processes at the Sand Island WWTP.

6. Involves substantial secondary impacts, such as population changes or effects on public facilities.

The proposed project will involve the construction of modifications necessary for improved operations of a wastewater treatment facility which is consistent with the General Plan, Population, Objectives and Policies. The proposed project will create short-term employment opportunities, but will not be an inducement to changes in population size or distribution. Public infrastructure requirements, including power and water services, which will be utilized by the project have been evaluated and no negative adverse effects to the public utilities are anticipated. The project will not influence use by the public of the Sand Island State Recreation Area and related shoreline areas. Following project completion there will be no noticeable change in wastewater treatment operations, or in discharge effluent quantity or quality over existing conditions.

7. Involves substantial degradation of environmental quality.

The proposed project will be developed in accordance with the environmental polices of Chapter 343, HRS, and the National Environmental Policy Act. The project will help to ensure the continued reliable operation of wastewater treatment processes. No degradation of environmental quality is, therefore, anticipated or expected.

8. Is individually limited but cumulatively has considerable effects on the environment, or involves a commitment for larger actions.

Based on the description of the proposed action and mitigation measures identified in this document, potential for considerable adverse environmental effects and a commitment for larger actions, are neither anticipated nor expected.

9. Substantially affects a rare, threatened or endangered species or its habitat.

There are no endangered flora or fauna species within the project site.

10. Detrimentally affects air or water quality or ambient noise levels.

As required, any potential impacts to air, water quality, or noise levels will be addressed through the implementation of appropriate mitigation measures described in this document.

11. Affects or is likely to stiffer damage by being located in an environmentally sensitive area, such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, freshwater, or coastal waters.

The proposed activity will be undertaken within an existing industrial area which is home to Sand Island WWTP. The site contains no especially sensitive environmental characteristics which would detract from continued use for this activity.

12. Substantially affects scenic vistas and view planes identified in county or state plans or studies.

The proposed project is not expected to adversely affect the public's enjoyment of scenic vistas or mauka-makai and lateral shoreline view planes from urban Honolulu, Sand Island Parkway, the Sand Island State Recreation Area, or other areas in the vicinity of the Sand Island WWTP. The project site at the center of the Sand Island WWTP may be visible from limited areas of the State Recreation Area, however due to distance and the general industrial nature of the area, construction activities will not be generally noticeable or have an adverse effect on recreational activities at the park.

The second anaerobic digester is proposed to be the same height (108 feet tall) as the existing digester. The scale and massing of the new digester will be similar to the surrounding WWTP facilities and will be consistent in appearance with the industrial character of the existing facilities. The height of the new digester exceeds the maximum building height of 60 feet for the underlying zoning district. Thus, a variance from the Department of Planning and Permitting will be required.

13. Requires substantial energy consumption.

The facilities identified in this project will not consume a substantial amount of energy. Construction activities will result in a short-term increase in power demand, but the increase will be of short duration and will cease upon project completion.

Based on the above evaluation and the information contained in this Environmental Assessment, it is anticipated that an Environmental Impact Statement (EIS) will not be required and that a recommended Finding of No Significant Impact (FONSI) will be published for this project.

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SECTION 9
References

(AECOM, 2011) Alternative Technologies for the Beneficial Reuse of Sewage Sludge, Response to Resolution 11-182, O‘ahu, Hawai‘i. AECOM, prepared for the City and County of Honolulu, Department of Environmental Services. Honolulu, HI. October 2011.

(AECOM, 2012) Technical Memorandum, Sand Island WWTP Evaluation of Sludge Processing Alternatives, O‘ahu, Hawai‘i. AECOM. Prepared for the City and County of Honolulu, Department of Environmental Services. Honolulu, HI. March 2012.

(DDC, 2001) Sand Island Wastewater Treatment Plant Modifications and Expansion, Honolulu, O‘ahu, Hawai‘i. R. M. Towill Corporation, prepared for the City and County of Honolulu, Department of Design and Construction. Honolulu, HI. April, 2001.

(DDC, 2011) Final Environmental Assessment Wet Sludge Storage Tank Addition Sand Island Wastewater Treatment Plant Modifications and Expansion. R. M. Towill Corporation, prepared for the City and County of Honolulu Department of Design and Construction, May 2011.

(DOH, 1988) Water Quality Standards Map of the Island of O‘ahu, to be used in Conjunction with Hawai‘I Department of Health, Chapter 54, Water Quality Standards. State of Hawai‘i, Department of Health. 1988.

(DOH, 2011) Island of O‘ahu, Daily Air Quality Data. State of Hawai‘i, Department of Health. November 16, 2011. http://www.state.hi.us/doh/air-quality/main.html

(DPP, 2004) Primary Urban Center Development Plan (ROH, Ch. 24, Article 2). Department of Planning and Permitting, City and County of Honolulu. Honolulu, HI. June 2004.

(ENV, 2003) Sand Island Wastewater Treatment Plant New In-Vessel Bioconversion Facility, Honolulu, O‘ahu, Hawai‘i, Analytical Planning Consultants, prepared for the City and County of Honolulu, Department of Environmental Services, April 2003.

(FEMA, 2009) Federal Insurance Rate Map (FIRM), City and County of Honolulu. Map No. 15003C0361G, dated July 22, 2009. Federal Emergency Management Agency.

(HoLIS, 2009) Honolulu Land Information System, Geographic Information System. City and County of Honolulu, Department of Planning and Permitting. 2009.

(UH, 1998) University of Hawai‘i, Department of Geography, Atlas of Hawai‘i, University of Hawai‘i Press, Honolulu, HI.

(Stearns and Vaksviks, 1935) Geology and Groundwater Resources of the Island of O‘ahu, Hawai‘i. Division of Hydrography, Volume 1. H. T. Stearns and K. N. Vaksviks. Honolulu, HI. 1935.

(USDA, 1972) Soil Survey of Islands of Kaua‘i, O‘ahu, Maui, Moloka‘i and Lāna‘i, State of Hawai‘i. Published by the United States Department of Agriculture (USDA), Soil Conservation Service, in Cooperation with The University of Hawai‘i Agricultural Experiment Station. Honolulu, HI. August 1972.

(USGS, 2000) Ground Water in Hawai‘i. U. S. Geological Survey. Honolulu, HI. 2000

Appendix A

Letter from State Historic Preservation Division, March 5, 2001

Appendix B

Executive Summary, Technical Memorandum, Sand Island WWTP Evaluation of Sludge Processing Alternatives (AECOM, 2012)

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Appendix A

Letter from State Historic Preservation Division, March 5, 2001
Chapter 6E Historic Preservation Review
Sand Island Wastewater Treatment Plant

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STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION
Kakuhihewa Building, Room 555
601 Kamokila Boulevard
Kapolei, Hawaii 96707

GILBERT S. COLOMA-AGARAN, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTIES
JANET E. KAWELO
UNNEL NISHIOKA

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND
STATE PARKS

March 5, 2001

Rae M. Loui, Acting Director
Department of Design and Construction
City & County of Honolulu
650 South King Street, 11th floor
Honolulu, Hawaii 96813

LOG NO: 27043
DOC NO: 0102EL15

RECEIVED
01 MAR 15 2 37 PM '01
DIV. OF LAND SURVEY AND ACQUISITION

Dear Ms Loui:

SUBJECT: Chapter 6E-8 Historic Preservation Review – Draft Environmental Assessment for the Sand Island Wastewater Treatment Plant, Modifications and Expansion
Honolulu, Kona, O'ahu
TMK:1-5-041:005

Thank you for the opportunity to comment on the DEA for the Sand Island Wastewater Treatment Plant Modifications and Expansion. Our review is based on historic reports, maps, and aerial photographs maintained at the State Historic Preservation Division; no field inspection was made of the project areas.

The DEA is correct in stating that the project site is comprised of fill lands and mixed fill lands. A review of our records shows that there are no known historic sites at the project location. This area of Sand Island has been in-filled to enlarge the shoreline. Since modifications are proposed for the existing Sand Island WWTP, and the plant is built upon fill soils, we believe that this project will have "no effect" on historic sites.

If you have any questions please call Elaine Jourdane at 692-8027.

Aloha,

Don Hibbard, Administrator
State Historic Preservation Division

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Appendix B

Executive Summary
Technical Memorandum, Sand Island WWTP
Evaluation of Sludge Processing Alternatives
AECOM, March 2012

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EXECUTIVE SUMMARY

The City and County of Honolulu (CCH) Department of Environmental Services (ENV) is in the process of developing the Sand Island Wastewater Facilities Plan (Sand Island Fac Plan) which covers the Sand Island sewer basin. The study area for the Sand Island Fac Plan consists of the Sand Island Wastewater Treatment Plant (SIWWTP) and its wastewater service area serving the eastern half of Oahu. The SIWWTP sewer basin serves a population of over 700,000 and provides preliminary and primary treatment to all flows at present. Currently, SIWWTP treats approximately 60 million gallons per day (mgd) of wastewater from the sewer basin.

AECOM has prepared this preliminary engineering study report for various alternatives to retrofit the existing Sand Island Biosolids Processing System (operated by Synagro). CCH requested a review to evaluate whether alternative options that incorporate incinerating residuals at H-Power are viable and cost effective compared to the construction of a second digester in accordance with the provisions of the existing Synagro contract. An additional driver and goal for CCH is to eliminate landfilling waste materials other than ash in the near future.

EVALUATED OPTIONS

A summary of the options evaluated in this report along with capital and 20 year present worth life cycle Costs (LCC) cost are listed in **Table ES-1** and defined as follows:

- Baseline - Build new digester and continue to operate existing dryer. A sub option incorporating combined heat and power (CHP) was also evaluated.
- Option 1 - Dewater the excess raw undigested primary sludge and transfer the cake material to H-Power for incineration.
- Option 2 - Dewater blended digested and undigested primary sludge and transfer the cake material to H-Power for incineration. A sub option incorporating CHP was also evaluated.
- Option 3 - Dewater and chemically treat undigested sludge and transfer cake to H-Power for incineration
- Option 4 - Dry blended digested and undigested primary sludge using the existing dryer and transfer the dry material to H-Power for incineration.
- Option 5 - Dry blended digested and undigested primary sludge replacing the existing dryer and transfer the dry material to H-Power for incineration. A sub option incorporating CHP was also evaluated.
- Option 6 - Dry undigested sludge using a new dryer and transport the dry material to H-Power for incineration.
- Option 7 - Build a second digester and replace existing dryer with one that operates utilizing waste heat from cogeneration

The above options consider inclusion of CHP where appropriate. CHP is currently intended for future implementation at WWTPs as part of island-wide planning.

A summary and comparison of some of the non-economic factors for each Option is shown in **Table ES-2**. There are non-quantifiable aspects that need to be considered in the decision but

since they are policy-related, CCH should carefully consider the attached table in order to incorporate aspects such as reliability and risk in addition to cost and timing in its decision-making process.

It should be noted that Options evaluated and life cycle costs presented in this report do not account for:

- Increase in solids production due to planned secondary treatment beyond 2035
- Potential revenue from H-Power from energy produced by the sludge used as fuel, as the specific details of this are to be determined based on agreement with the H-Power operator.
- Options for incineration at SIWWTP

Preliminary implementation milestones for the Baseline following a notice to proceed (NTP) are:

- Complete Design: 6 Months from NTP
- Obtain EA/SMA/Permits: 8 Months from NTP
- Procurement and Award: 4 Months from Permit Approval
- Construction Complete: 30 Months from Award
- Total Estimated Duration: 42 Months (3.5 Years)

The engineering, permitting, procurement and equipment supply for all Options would have a similar duration to the Baseline. The construction of the digester is somewhat of a specialty and may take slightly longer than installation of equipment such as an alternate dryer or centrifuge. However, the above timeline should be used for planning purposes regarding any of the evaluated options.

It should be noted that the time needed for the front end of the procurement process, prior to the NTP, may vary considerably depending on whether an existing contract is amended or a new procurement process is started. The difference in the two processes varies but can potentially be significant, perhaps up to a full year difference in the time required.

CONCLUSION

The 20 year life cycle cost estimates for the Baseline Options and Options 1, 2b, 4, 5, 5b and 7 are all within approximately 10% of one another. With the accuracy of cost estimation available for this level of planning purposes it is possible that the actual ranking may vary with detailed planning, design, construction and implementation. There are specific limitations that were identified for some of these options:

- Options 2b - The H-Power operator has indicated to CCH that undigested sludge product (Options 2b) would not be an acceptable product other than on a short term emergency basis.
- Option 4 – The existing dryer manufacturer highly discourages the drying of blended sludge (Option 4) and may not warranty operation of their equipment in such a manner.
- Option 5 – The 20 year life cycle cost is similar to that for implementing the Baseline Option with CHP. However, the lack of a second digester reduces the overall process reliability when compared to the Baseline Options and would require disposal of large amounts of undigested cake during maintenance or repair of the existing digester.

Additionally, the lower quality blend of digested and undigested sludge may limit marketability as a fertilizer product.

- Option 7 – The overall cost and process reliability is similar to that of the Baseline Option. However, the dry product will not have the same uniformity characteristics as the existing pellets and may reduce marketability as a fertilizer product.

Based on the above, the Baseline Option and Option 7 have the highest level of process reliability, while meeting the requirements of the dryer manufacturer (Andritz) and acceptability by the H-Power operator (Covanta). Options 1 or 2 may be accepted by H-Power on emergency or short term interim basis dependent on quality and quantity of material.

Table ES-1: Options Summary

Option	Digestion	Dewatering	Chemical Treatment	Drying	Biogas Use	Offsite Incineration	Fertilizer Product	Capital Costs[1]	20 Year LCC[2]
Baseline	Additional digester	All as digested	None	Existing direct dryer for all (digested)	Digester heating and drying, excess flared	None	Continue existing pellets w/ digested	$25.7 MM	$94.1 MM
Baseline (With CHP)[3]	Additional digester	All as digested	None	Existing direct dryer for all (digested)	Digester heating and drying, excess to CHP cogen	None	Continue existing pellets w/ digested	$34.2 MM	$93.8 MM
Option 1	Existing digester only	Digested and undigested separately	Undigested cake portion	Existing direct dryer for only digested portion	Digester heating and drying, excess flared	Dewatered cake undigested	Continue existing pellets w/ digested	$8.7 MM	$99.6 MM
Option 2	Existing digester only	Digested and undigested separately	Undigested cake portion	None	Digester heating, excess flared	Dewatered cake blended	None	$8.7 MM	$111.9 MM
Option 2 b (With CHP)	Existing digester only	Digested and undigested separately	Undigested cake portion	None	Digester heating and CHP cogen	Dewatered cake blended	None	$22.1 MM	$99.0 MM
Option 3	No digestion	All as undigested	All as undigested cake	None	None	Dewatered cake undigested	None	$11.2 MM	$184.7 MM
Option 4	Existing digester only	Digested and undigested separately	Potential backup	Existing direct dryer for all (blended)	Digester heating and drying, excess flared	Dried pellets blended	Lower quality pellets w/ blended	$9.0 MM	$95.4 MM
Option 5	Existing digester only	Digested and undigested separately	Potential backup	New indirect dryer for all (blended)	Digester heating and drying, excess flared	Dried granular blended	Lower quality granular solids w/ blended sludge	$17.0 MM	$85.7 MM
Option 5b (With CHP)	Existing digester only	Digested and undigested separately	Potential backup	New indirect dryer for all (blended)	CHP cogen w/ waste heat for digester heating and drying	Dried granular blended	Lower quality granular solids w/ blended sludge	$30.4 MM	$102.2 MM
Option 6	No digestion	All as undigested	Potential backup	New indirect dryer for all (undigested)	None	Dried granular undigested	Lower quality granular solids w/ undigested primary sludge	$22.4 MM	$144.7 MM
Option 7 (Incl. CHP)	Additional digester	All as digested	None	New indirect dryer for all (digested)	CHP cogen w/ waste heat for digester heating and drying	None	Less uniform product than direct dryer w/ digested	$53.0 MM	$97.3 MM

1. The carrying costs associated with construction of the original digester and bioconversion facility are not included as part of the Capital Costs or LCC. Issues such as remaining bond repayment and remaining contractual arrangements are not included or accounted for as part of these costs and may alter final rankings if and when considered. Capital costs are based on February, 2011 costs $ENR_{20\ Cities}$ Index = 9,000.
2. Operating costs of the solids processing facilities are based on existing operations as well as typical operating costs associated with the representative processing technologies and may vary based on contractual conditions with third party operators. Section 5.1 provides additional information regarding third party operating costs.
3. CHP: Combined Heat and Power cogeneration using digester biogas

Table ES-2: Non-Economic Factors

Option	Process Risk	Back-up Processes	Operational Complexity	Comparison to Typical Industry Practice	Dryer Manufacturer Acceptability	H-Power [1] Acceptability
Baseline	Low - well proven	Second Digester and Chemical Treatment	Medium	Commonly used	Accepted by existing dryer manufacturer	Acceptable as dry pellets or digested cake
Baseline (with CHP)	Low - well proven	Second Digester and Chemical Treatment	Medium	Commonly used	Accepted by existing dryer manufacturer	Acceptable as dry pellets or digested cake
Option 1	Low - well proven	Chemical Treatment	Medium to High	Both processes commonly used	Accepted by existing dryer manufacturer	Not acceptable as undigested cake
Option 2	Low - well proven	Chemical Treatment	Low to Medium	Both processes commonly used	No Drying	Not acceptable as undigested cake
Option 2b (with CHP)	Low - well proven	Chemical Treatment	Medium	Both processes commonly used	No Drying	Not acceptable as undigested cake
Option 3	Low - well proven	Chemical Treatment	Low	Commonly used	No Drying	Not acceptable as undigested cake
Option 4	High - against vendor recommendation	Chemical Treatment	Medium	Uncommon	Discouraged by existing dryer manufacturer	Acceptable as dry pellets or digested cake
Option 5	Medium - limited successful applications	Chemical Treatment	Medium	Uncommon	Accepted by multiple manufacturers	Acceptable as dry pellets or digested cake
Option 5b (with CHP)	Medium - limited successful applications	Chemical Treatment	Medium	Uncommon	Accepted by multiple manufacturers	Acceptable as dry pellets or digested cake
Option 6	High - No reference sites	Chemical Treatment and Dryer	Medium	Uncommon	Discouraged by several manufacturers	Acceptable as dry pellets or digested cake
Option 7 (with CHP)	Low - well proven	Second Digester and Chemical Treatment	Medium	Commonly used	Accepted by multiple manufacturers	Acceptable as dry pellets or digested cake

[1] H-Power would consider the acceptance of undigested cake on an emergency short term basis only.

RECOMMENDATION

There are several key issues that are driving the future for sludge processing and disposal locally:

- The changing demographics of the island land use away from agricultural activities toward residential and tourism could eventually limit the future market of land application for soil amendment and fertilizer purposes. The currently available and planned facilities that CCH intends to use for creation of fertilizer and compost product should be adequate to meet future market demands. The current pelletized fertilizer product produced by Synagro is currently supplied to users at no charge and the market demand for such product does not appear to have a strong future growth opportunity. The demographic of residential and tourism typically prefer other soil amendment products that do not use wastewater biosolids and often require significant engagement to prove that it has equivalent aspects to other market products.
- There is a relatively high cost of both fossil fuels and electrical power locally and a national trend for energy costs to continue to grow at a greater pace than inflation. Due to the rising cost of power and recent technology developments, the implementation of waste to energy and energy reduction improvements at wastewater and solids handling facilities is growing rapidly. These technologies typically consist of combined heat and power cogeneration using combustible biogas gas from anaerobic digesters as well as thermal oxidation of solids, which also greatly reduces the amount of waste material for disposal.
- Due to the limitation of available land there is a strong desire locally to limit or eliminate the amount of material that is required for disposal at a landfill. A goal for CCH is the elimination of landfilling of materials other than ash in the near future. The ongoing operation and expansion of the H-Power waste to energy facility plays a key role in this by greatly reducing the amount of material that is land filled while generating electricity from the municipal solid waste it receives.
- There are existing and established sludge processing assets in place at the three largest WWTPs. Many of these assets are relatively new and provide a consistent and reliable treatment process. Consideration of the potential operational benefits and capital investment already in place will be part of any future planning considerations.

Based on these key issues and available opportunity it is recommended that CCH pursue a long term strategy for the processing and disposal of sludge that focuses on cost effective recovery of energy and minimization of sludge solids through generation of an ash product by thermal oxidation. Additionally, CCH should retain the ability to have multiple processing and outlet sources available in the future to ensure continued and reliable service in the event of the unforeseen. Any changes to in plant processing or end use/disposal should be focused on establishing an overall level of risk and reliability that is equal to or better than current operations.

Available industry established technologies and strategies that either recover energy and/or reduce waste include:

- Anaerobic digestion reduces the volatile solids portion of sludge and creates a combustible biogas. The biogas can be used to generate both heat energy for use in treatment processes and electrical energy that can be using in the plant or returned to

the power grid. The digested end product is reduced in mass but would require subsequent thermal oxidation to convert to an ash product.

- Digested, undigested or blended sludge can be dewatered to create a cake product with approximately +/-30 percent solids concentration and thermally oxidized either onsite or off site. This material would burn autogenously (energy to remove water equals energy recovery from solids) generating no additional energy other than what is required to reduce the material to ash. It should be noted that digestion reduces the thermal energy available and would require a dryer cake product to burn autogenously, however, it reduces the incinerator mass throughput so the equipment sizing can be reduced.
- Digested, undigested or blended sludge can be dewatered and then dried to create a solid product with approximately +90 percent solids concentration and thermally oxidized either onsite or off site. This incinerated material has a high thermal value and may be capable of generating both heat and electrical energy while reducing the material to ash. As with incineration of cake material, digestion reduces the thermal energy available. Additionally there is heat energy required for drying of the material from the +/-30 percent solids to the +90 percent solids that would need to be taken into consideration of net energy benefit.

This strategy of waste minimization and energy recovery is aligned with that for municipal solids waste and there may be opportunities for pursuit of solutions that are mutually beneficial to both. The H-power facility is one potential outlet opportunity and should be fully pursued and developed along with other available outlets. H-Power is an operating and permitted facility that is currently planned to have the capability to receive 90 tons per day of +/-30 percent solids sludge cake material. It is unknown if or how much +90 percent dry sludge material H-Power could receive but this would represent a significant opportunity for energy recovery and waste reduction. It is recommended that is issue be fully investigated prior to making any long term decisions regarding sludge handling operations at any of the WWTPs.

CCH is currently engaged in an Island-wide Biosolids Master Plan, which will outline future needs and solutions for all nine CCH WWTPs in an integrated manner. Maintaining a diverse sludge management portfolio that allows for multiple disposal options such as land application, thermal processing (such as H-Power), or landfill disposition will provide the greatest flexibility to deal with market fluctuations and equipment outages.

With regards the current sludge processing facilities at SIWWTP the determination of modifications to the existing operation should be based on the final determination of the type and amount of material that can be received at H-Power. Additional considerations include the determination of cost effectiveness related to digestion and beneficial use of biogas to either generate electricity and/or provide thermal energy for drying and process operations. When comparing capital costs, consideration should be given to providing adequate redundant process equipment and/or back-up processes. If a second digester is not installed then a sufficient number of centrifuges and chemical treatment system should be installed sufficient to dewater and handle the undigested sludge flow. Additionally it should be ensured that a disposal outlet is capable of receiving undigested, chemically treated sludge in the quantity anticipated if the existing digester is out of service.

Based on the key aspects discussed, the life cycle cost comparison and keeping potential risk at or below current conditions it is recommended that a second digester be pursued that can maintain process reliability with a range of outlet opportunities. Furthermore the options available for incineration of cake and/or dried sludge at H-Power should be further evaluated and developed to provide opportunities for SIWWTP as well as the other eight CCH WWTPs.

Final determination of a long term outlet for the digested sludge from SIWWTP should be part of the Island-wide Biosolids Master Plan, which will consider the opportunities as H-Power and other potential outlets.